

ECONOMICS

N. GREGORY MANKIW
AND MARK P. TAYLOR

25

OPEN-ECONOMY MACROECONOMICS:

I. The International Flows of Goods and Capital

Introduction

Open and Closed Economies

- A *closed economy* is one that does not interact with other economies in the world.
 - There are no exports, no imports, and no capital flows.
- An *open economy* is one that interacts freely with other economies around the world.
- An Open Economy interacts with other countries in two ways.
 - It buys and sells goods and services in world product markets.
 - It buys and sells capital assets in world financial markets.

The Flow of Goods: Exports, Imports, Net Exports

Exports are goods and services that are produced domestically and sold abroad.

Imports are goods and services that are produced abroad and sold domestically.

Net exports (NX) are the value of a nation's exports minus the value of its imports.

Net exports are also called the *trade balance*.

The Flow of Goods: Exports, Imports, Net Exports

A *trade deficit* is a situation in which net exports (NX) are negative.

- Imports > Exports

A *trade surplus* is a situation in which net exports (NX) are positive.

- Exports > Imports

Balanced trade refers to when net exports are zero—exports and imports are exactly equal.

The Flow of Goods: Exports, Imports, Net Exports

Factors That Affect Net Exports:

- Consumer tastes for domestic and foreign goods.
- The prices of goods at home and abroad.
- The exchange rates at which people can use domestic currency to buy foreign currencies.
- The incomes of consumers at home and abroad.
- The costs of transporting goods from country to country.
- The policies of the government toward international trade.

The Flow of Financial Resources: Net Capital Outflow

Net capital outflow refers to the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners.

- A UK resident buys shares in the BMW and a Japanese resident buys a bond issued by the UK government.
- When a UK resident buys shares in BMW, the German car company, the purchase *raises* UK net capital outflow.
- When a Japanese resident buys a bond issued by the UK government, the purchase *reduces* the UK net capital outflow.

The Flow of Financial Resources: Net Capital Outflow

Variables that Influence *Net Capital Outflow*

- The real interest rates being paid on foreign assets.
- The real interest rates being paid on domestic assets.
- The perceived economic and political risks of holding assets abroad.
- The government policies that affect foreign ownership of domestic assets.

The Equality of Net Exports and Net Capital Outflow

Net exports (NX) and net capital outflow (NCO) are closely linked.

For an economy as a whole, NX and NCO must balance each other so that:

$$NCO = NX$$

- This holds true because every transaction that affects one side must also affect the other side by the same amount.

Saving, Investment, and their Relationship to the International Flows

Net exports is a component of GDP:

$$Y = C + I + G + NX$$

National saving is the income of the nation that is left after paying for current consumption and government purchases:

$$Y - C - G = I + NX$$

Saving, Investment, and their Relationship to the International Flows

National saving (S) equals $Y - C - G$ so:

$$S = I + NX$$

or, because $NX = NCO$

$$S = I + NCO$$

Savings = Domestic Investment + Net Capital Outflow

Three possible outcomes

Table 1. International Flows of Goods and Capital:

Trade deficit	Balanced trade	Trade surplus
Exports < Imports	Exports = Imports	Exports > Imports
Net exports < 0	Net exports = 0	Net exports > 0
$Y < C + I + G$	$Y = C + I + G$	$Y > C + I + G$
Saving < Investment	Saving = Investment	Saving > Investment
Net capital outflow < 0	Net capital outflow = 0	Net capital outflow > 0

A *trade deficit* means that the value of exports is less than the value of imports.

A *trade surplus* means that the value of exports exceeds the value of imports.

A *trade balance* means exports equal imports, so net exports are zero.

Balance of Payments

- Definition of *balance of payments*: the official account of international payments for the import and export of goods, services and capital.
- The *current account* of the balance of payments records the flows of money which represent payments for goods and services transacted between the domestic economy and foreign economies.
- The *financial account* records the flows of funds between the domestic economy and foreigners for investment.
- The *capital account* records the transfer of funds for the purchase and sale of non-financial assets such as land, the movement of funds for aid for capital works.

Balance of Payments

The trade between countries can be affected by a range of factors.

- Key among these are:
 - interest rates,
 - exchange rates,
 - government policies,
 - productivity levels in different countries,
 - the difference in inflation rates,
 - levels of consumer spending in different countries on imports and exports.

II. The Prices For International Transactions: Real And Nominal Exchange Rates

Introduction

International transactions are influenced by international prices.

The two most important international prices are the *nominal exchange rate* and the *real exchange rate*.

Nominal Exchange Rates

The *nominal exchange rate* is the rate at which a person can trade the currency of one country for the currency of another.

- The nominal exchange rate is expressed in two ways:
 - In units of foreign currency per euro.
 - In euros per unit of the foreign currency.
- Assume the exchange rate between the Japanese yen and the euro is 80 yen to one euro.
 - One euro trades for 80 yen.
 - One yen trades for $1/80$ ($= 0.0125$) of a euro.

Nominal Exchange Rates

Appreciation refers to an increase in the value of a currency as measured by the amount of foreign currency it can buy.

Depreciation refers to a decrease in the value of a currency as measured by the amount of foreign currency it can buy.

If a euro buys:

- More foreign currency, there is an appreciation of the euro.
- Less foreign currency, there is a depreciation of the euro.

Real Exchange Rates

The *real exchange rate* is the rate at which a person can trade the goods and services of one country for the goods and services of another.

The real exchange rate compares the prices of domestic goods and foreign goods in the domestic economy.

- If a kilo of British wheat sells for £1 and a kilo of European wheat sells for €3.
- If the nominal exchange rate is 2 euros per £, then....
- The price of British wheat in euros is €2.
- So the real exchange rate is $\frac{2}{3}$ kilo of European wheat per kilo of British wheat.

Real Exchange Rates

The real exchange rate depends on the nominal exchange rate and the prices of goods in the two countries measured in local currencies.

The real exchange rate is a key determinant of how much a country exports and imports.

$$\text{Real exchange rate} = \frac{\text{Nominal exchange rate} \times \text{Domestic price}}{\text{Foreign price}}$$

Real Exchange Rates

A **depreciation** (fall) in the UK real exchange rate:

- Means that UK goods have become cheaper relative to foreign goods.
- This encourages consumers both at home and abroad to buy more UK goods and fewer goods from other countries.
- As a result, UK exports rise, and UK imports fall, and both of these changes raise UK net exports.

An **appreciation** in the UK real exchange rate:

- Means that UK goods have become more expensive compared to foreign goods.
- UK net exports fall.

III. A First Theory Of Exchange Rate Determination: Purchasing Power Parity

Introduction

The *purchasing power parity theory* is the simplest and most widely accepted theory explaining the variation of currency exchange rates.

The Basic Logic of Purchasing Power Parity

Purchasing power parity is a theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries.

- It is based on a principle called *the law of one price*.
 - A good must sell for the same price in all locations.
- If the law of one price were not true, unexploited profit opportunities would exist.
 - The process of taking advantage of differences in prices in different markets is called *arbitrage*.
- Exchange rates move to ensure ppp.

$$1/p = e/P^*$$

$$e = p^*/p$$

Implications of Purchasing Power Parity

The *nominal exchange rate* between the currencies of two countries must reflect the different price levels in those countries.

Because the nominal exchange rate depends on the price levels, it must also depend on the money supply and money demand in each country.

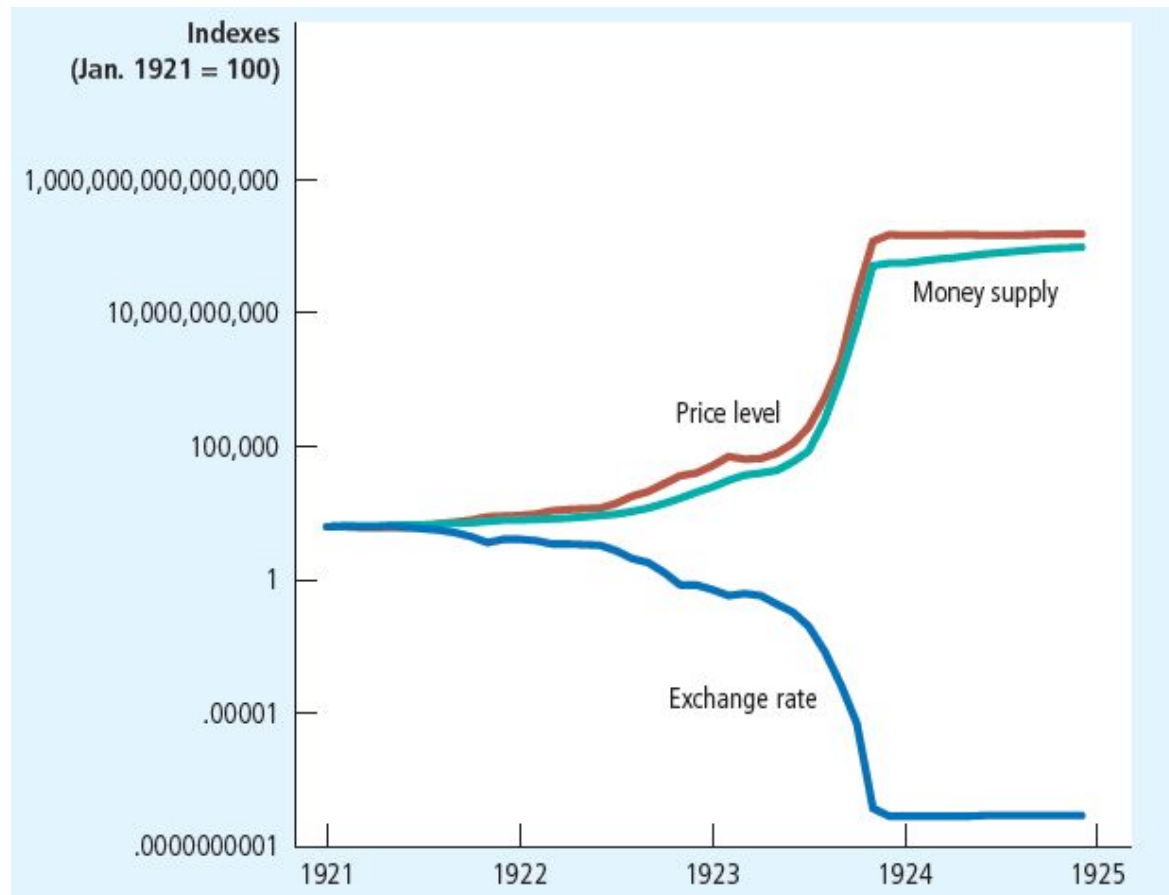
- If a central bank prints large quantities of money, then money loses value both in terms of the goods and services it can buy and in terms of the amount of other currencies it can buy.

Limitations of Purchasing Power Parity

Many goods are not easily traded or shipped from one country to another.

Tradable goods are not always perfect substitutes when they are produced in different countries.

Figure 3 Money, Prices, and the Nominal Exchange Rate during the German Hyperinflation



This figure shows the money supply, the price level, and the nominal exchange rate (measured as U.S. cents per mark) for the German hyperinflation from January 1921 to December 1924. Notice how similarly these three variables move. When the quantity of money started growing quickly, the price level followed and the mark depreciated relative to the dollar. When the German central bank stabilized the money supply, the price level and exchange rate stabilized as well.

IV. A Macroeconomic Theory of the Open Economy

Introduction: Open Economies

An *open economy* is one that interacts freely with other economies around the world.

- The important macroeconomic variables of an open economy include:
 - net exports
 - net foreign investment
 - nominal exchange rates
 - real exchange rates
- The model takes the economy's
 - GDP as given.
 - price level as given.

V. Supply and Demand for Loanable Funds and for Foreign Currency Exchange

Introduction

To understand forces at work in an open economy we must consider two markets.

1. The market for loanable funds....
 - Co-ordinates savings, investment and net capital outflow.
2. The market for foreign currency....
 - Co-ordinates people who wish to exchange domestic to foreign currency.

1. The Market for Loanable Funds

The supply of loanable funds comes from national saving (S).

The demand for loanable funds comes from domestic investment (I) and net capital outflows (NCO).

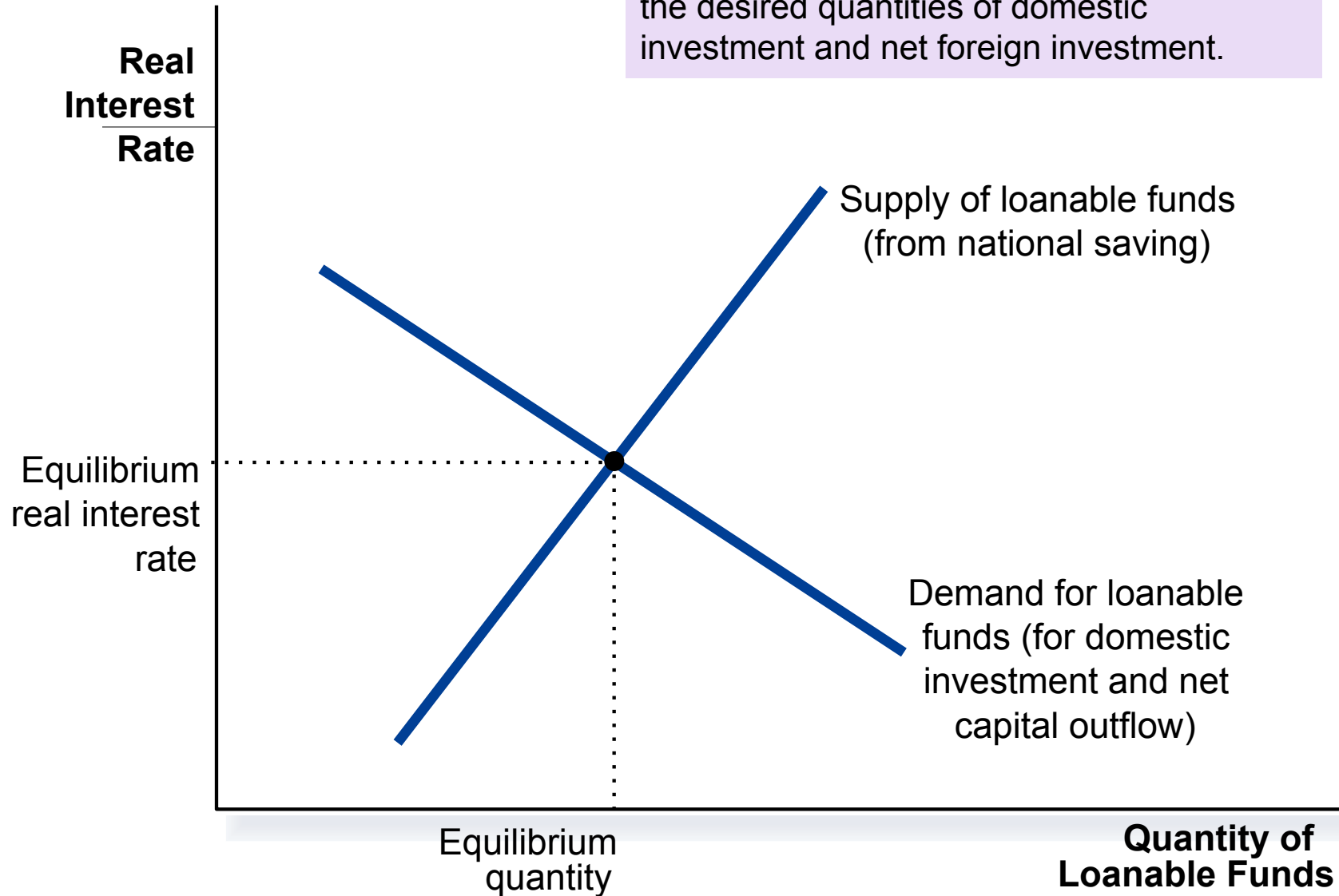
$$S = I + NCO$$

The Market for Loanable Funds

The supply and demand for loanable funds depend on the *real interest rate*.

- A higher real interest rate encourages people to save and raises the quantity of loanable funds supplied.
- The interest rate adjusts to bring the supply and demand for loanable funds into balance.

Figure 1. The Market for Loanable Funds



2. The Market for Foreign Currency Exchange

The two sides of the foreign currency exchange market are represented by *NCO* and *NX*.

- *NCO (net capital outflow)* represents the imbalance between the purchases and sales of capital assets.
- *NX (net exports)* represents the imbalance between exports and imports of goods and services.

The Market for Foreign Currency Exchange

In the market for UK foreign currency exchange, pounds are traded for foreign currencies.

- For an economy as a whole, NCO and NX must balance each other out, or:

$$NCO = NX$$

- The price that balances the supply and demand for foreign currency is the *real exchange rate*.

The Market for Foreign Currency Exchange

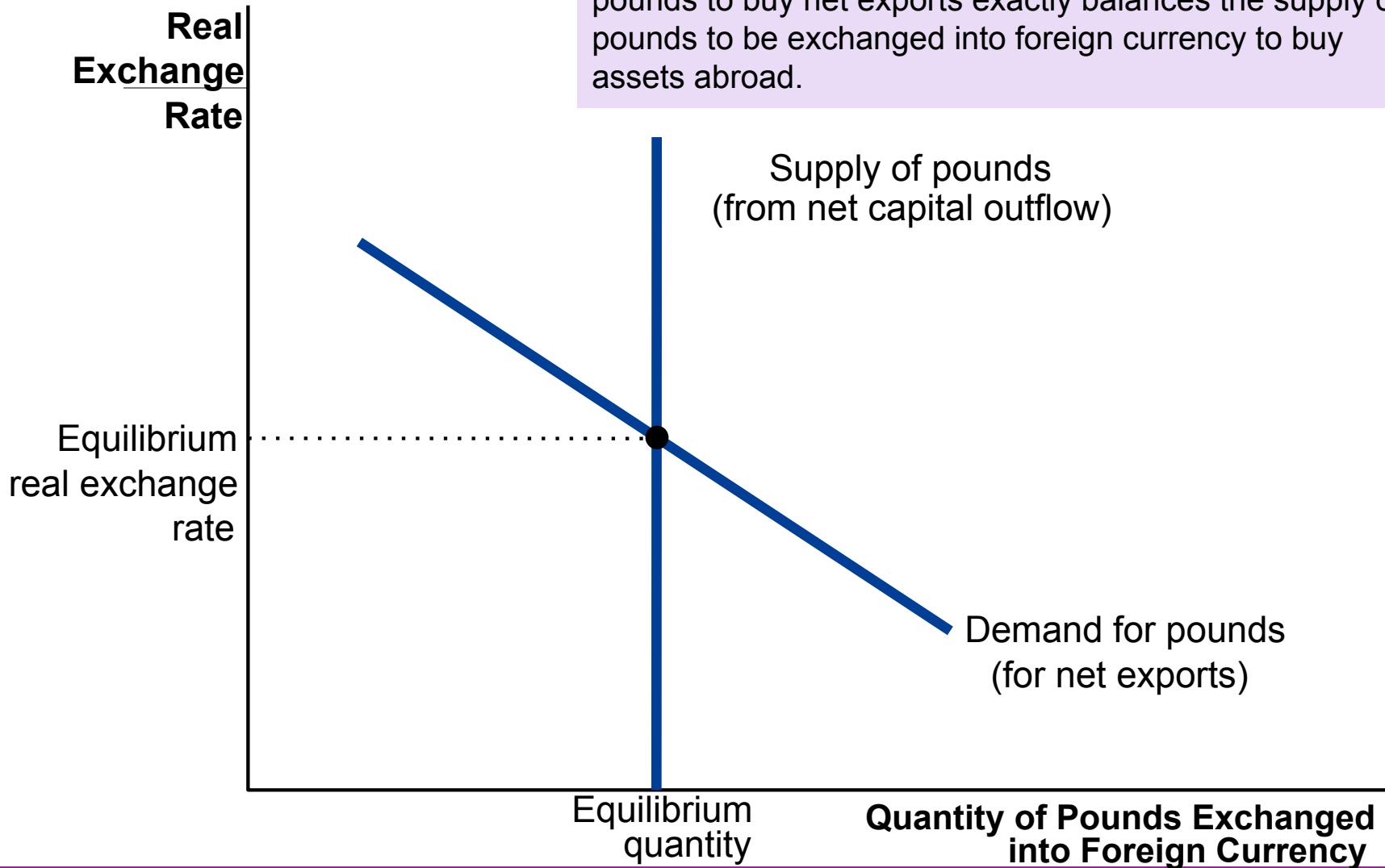
The demand curve for foreign currency is downward sloping because a higher exchange rate makes domestic goods more expensive.

The supply curve is vertical because the quantity of pounds supplied for net capital outflow is unrelated to the real exchange rate.

Figure 2. The Market for Foreign Currency Exchange

The real exchange rate adjusts to balance the supply and demand for pounds.

At the equilibrium real exchange rate, the demand for pounds to buy net exports exactly balances the supply of pounds to be exchanged into foreign currency to buy assets abroad.



VI. Equilibrium In The Open Economy

The market for loanable funds and the market for foreign exchange are related to each other.

Net Capital Outflow: The Link Between the Two Markets

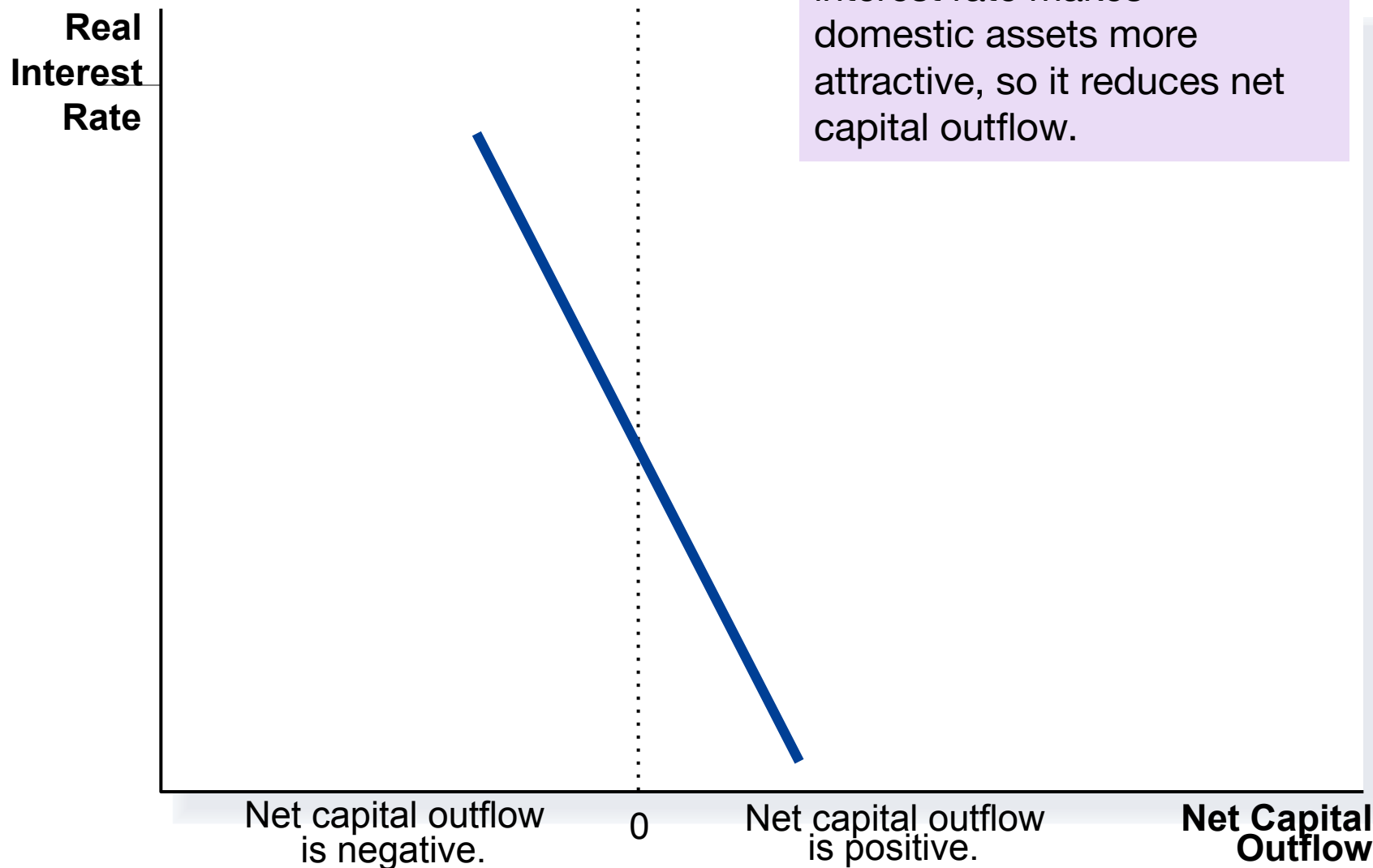
In the market for **loanable funds**, supply comes from national saving and demand comes from domestic investment and net capital outflow.

In the market for **foreign currency exchange**, supply comes from net capital outflow and demand comes from net exports.

Net capital outflow links the loanable funds market and the foreign currency exchange market.

- The key determinant of net capital outflow is the real interest rate.

Figure 3. How Net Capital Outflow Depends on the Interest Rate



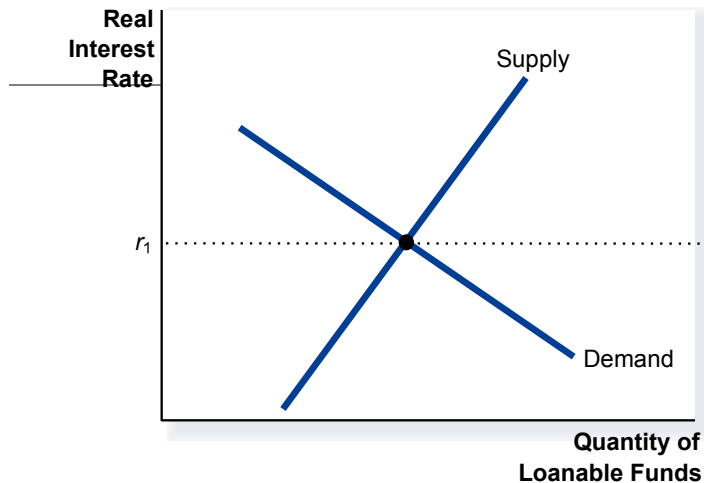
Simultaneous Equilibrium in Two Markets

Prices in the loanable funds market and the foreign currency exchange market adjust simultaneously to balance supply and demand in these two markets.

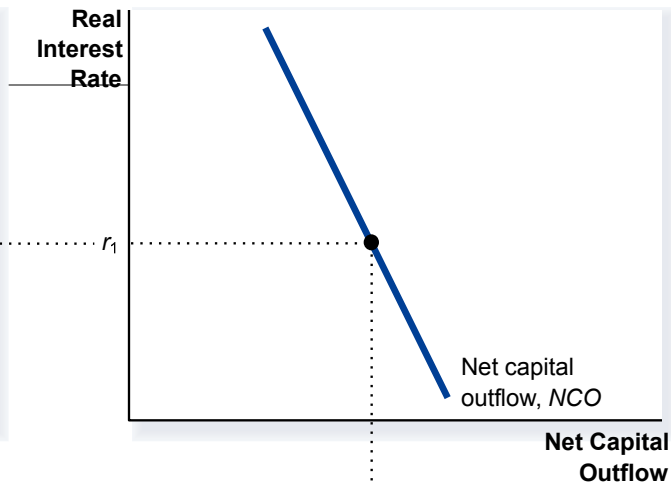
As they do, they determine the macroeconomic variables of national saving, domestic investment, net foreign investment, and net exports.

Figure 4. The Real Equilibrium in an Open Economy

(a) The Market for Loanable Funds



(b) Net Capital Outflow

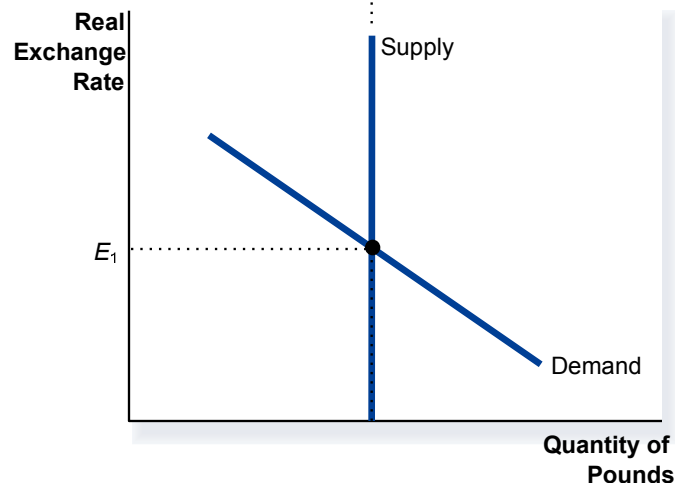


In panel (a), the supply and demand for loanable funds determine the real interest rate.

In panel (b), the interest rate determines net capital outflow, which provides the supply of pounds in the market for foreign currency exchange.

In panel (c), the supply and demand for pounds in the market for foreign currency exchange determine the real exchange rate.

(c) The Market for Foreign Currency Exchange



VI. How Policies And Events Affect An Open Economy

Introduction

Changes in policy and other events alter the economy's equilibrium. These arise from:

1. Government budget deficits.
2. Trade policies.
3. Political and economic stability.

1. Government Budget Deficits

Effect of Budget Deficits on the Loanable Funds Market

- A government budget deficit reduces national saving, which:
 - Shifts the supply curve for loanable funds to the left, which in turn:
 - Raises interest rates.

Government Budget Deficits

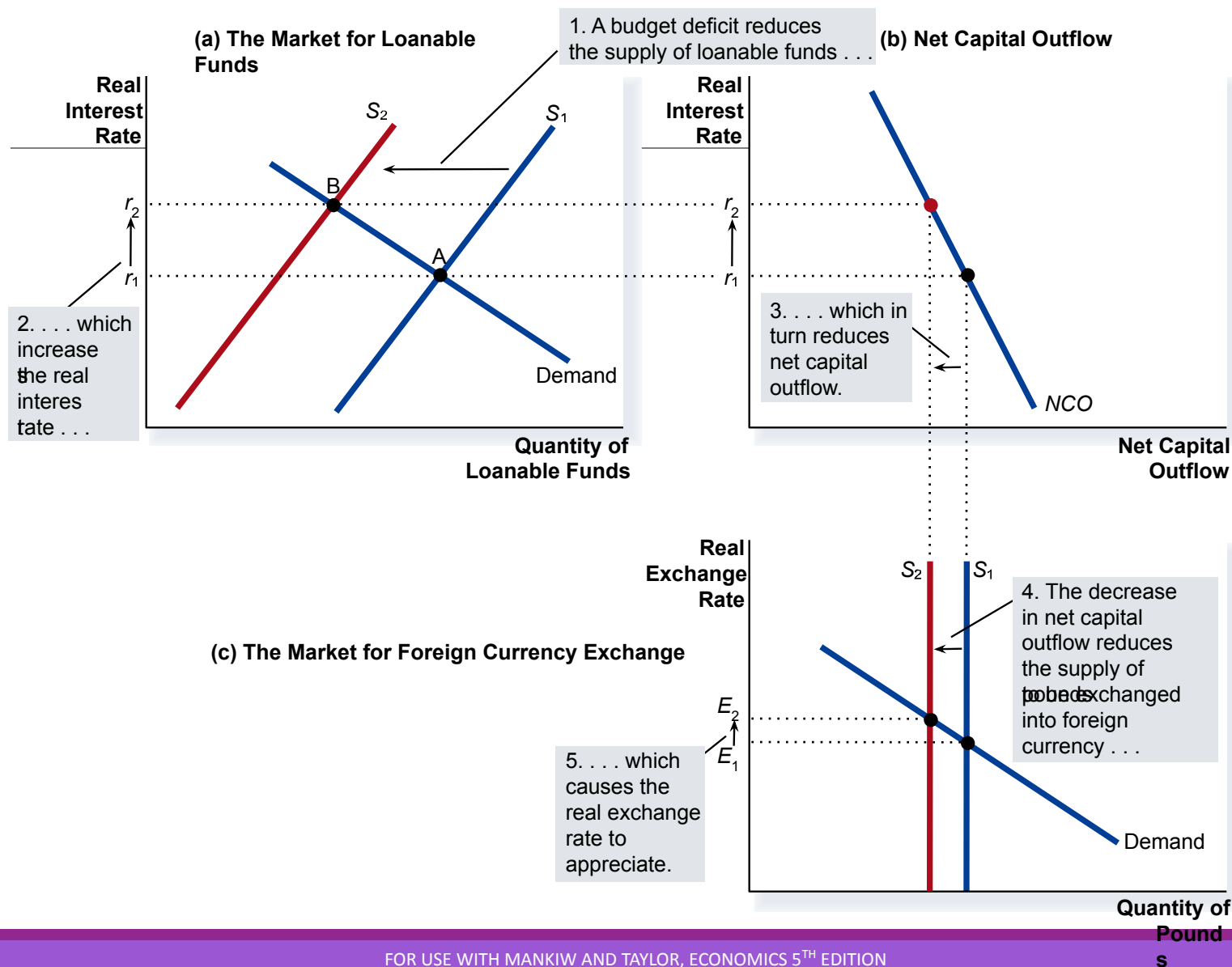
Effect of Budget Deficits on Net Foreign Investment.

- Higher interest rates reduce net foreign investment.

Effect on the Foreign Currency Exchange Market.

- A decrease in net foreign investment reduces the supply of pounds to be exchanged into foreign currency.
- This causes the real exchange rate to *appreciate*.

Figure 5. The Effects of Government Budget Deficit



Government Budget Deficits

In an open economy, government budget deficits:

- Reduce the supply of loanable funds.
- Drive up the interest rate.
- Crowd out domestic investment.
- Cause net foreign investment to fall.

Because they are so closely related, the budget deficit and the trade deficit are often called the *twin deficits*.

2. Trade Policy

A *trade policy* is a government policy that directly influences the quantity of goods and services that a country imports or exports.

- *Tariff*: A tax on an imported good.
- *Import quota*: A limit on the quantity of a good produced abroad and sold domestically.

Trade Policy

Because they do not change national saving or domestic investment, trade policies do not affect the trade balance.

- For a given level of national saving and domestic investment, the real exchange rate adjusts to keep the trade balance the same.

Trade policies have a greater effect on microeconomic than on macroeconomic markets.

Trade Policy:

Effect of an Import Quota

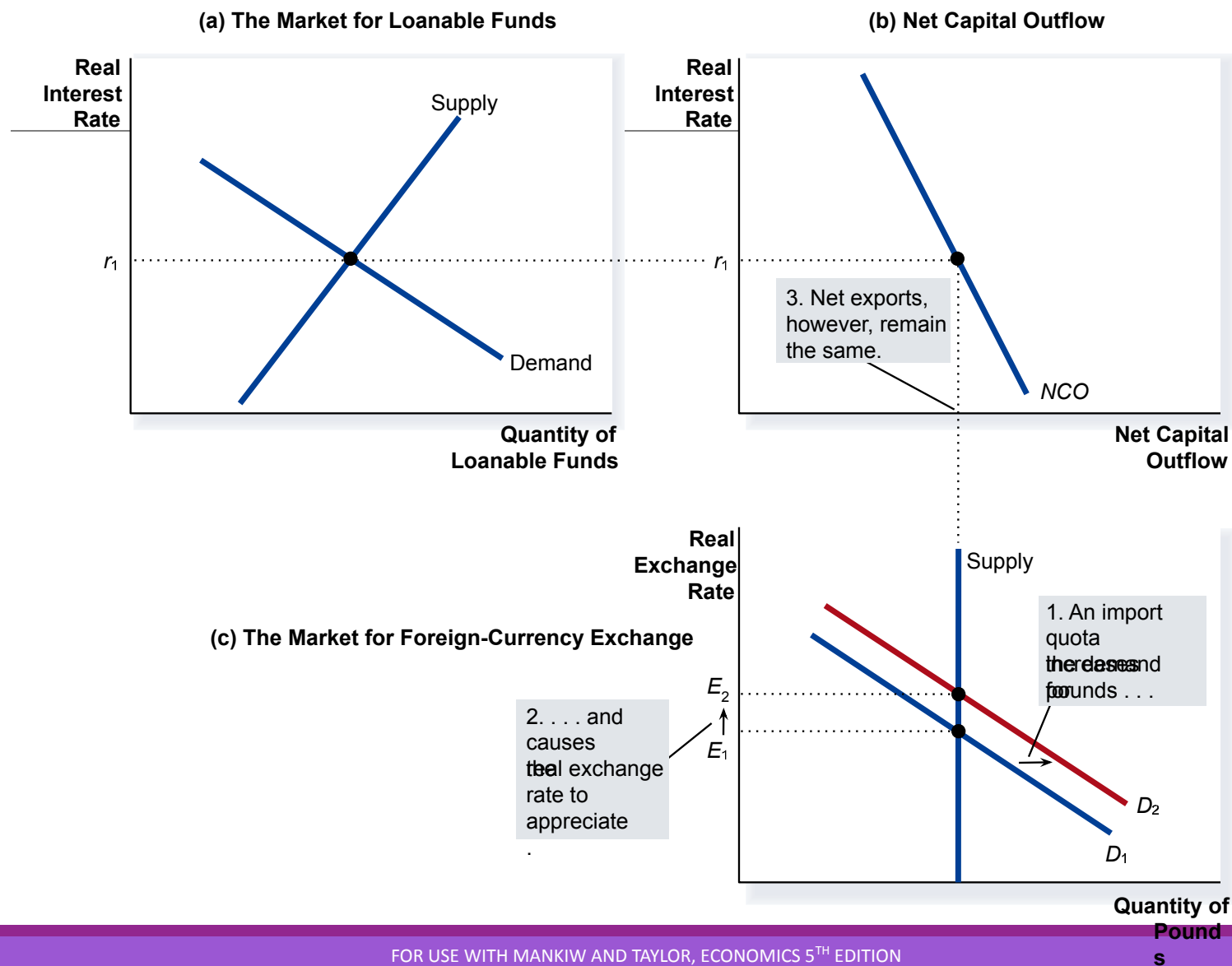
- Because net exports equal exports minus imports, an import restriction policy also affects net exports.
- *The quota* reduces imports at any given real exchange rate.
- Net exports, which equal exports minus imports, will therefore *rise* for any given real exchange rate.
- Because non-Europeans need euros to buy EU net exports, there is an increased demand for euros in the market for foreign currency exchange.
- There is no change in the interest rate because nothing happens in the loanable funds market.
- There will be no change in net capital outflow and therefore no change in net exports.

Trade Policy

Effect of an *Import Quota* continued.

- An appreciation of the pound in the foreign exchange market encourages imports and discourages exports.
- This offsets the initial increase in net exports due to import quota.
- Trade policies do not affect the trade balance.

Figure 6. The Effects of an Import Quota



3. Political Instability and Capital Flight

Capital flight is a large and sudden reduction in the demand for assets located in a country.

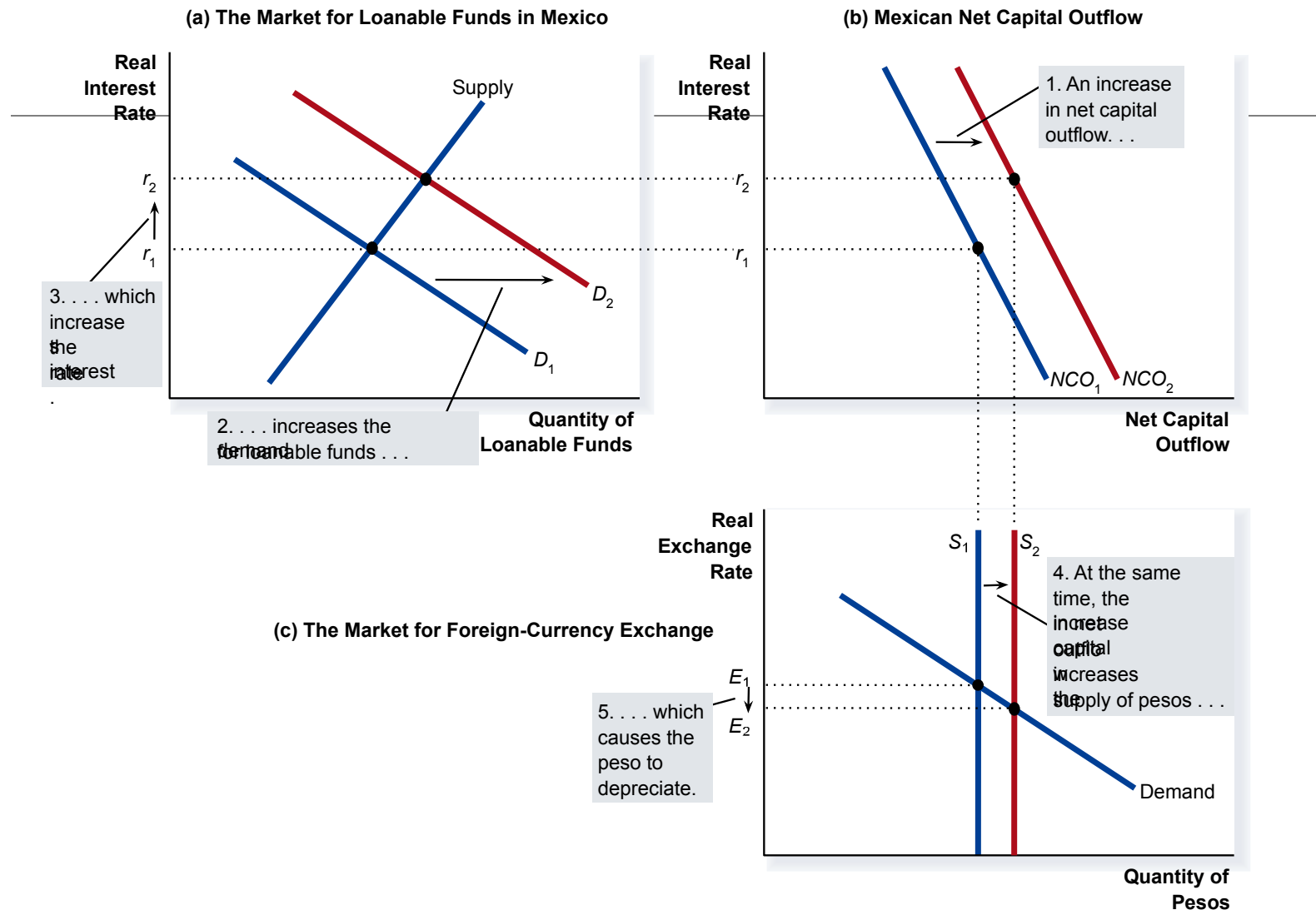
- Capital flight has its largest impact on the country from which the capital is fleeing, but it also affects other countries.
- If investors become concerned about the safety of their investments, capital can quickly leave an economy.
- Interest rates increase and the domestic currency depreciates.

Political Instability and Capital Flight

Investors around the world observed political problems in Nigeria, they sold some of their Nigerian assets and used the proceeds to buy assets of other countries.

- There was a capital outflow.
- The demand for loanable funds in the loanable funds market increased, which increased the interest rate.
- This increased the supply of nias in the foreign currency exchange market causing a depreciation.

Figure 7. The Effects of Capital Flight



Summary

1. Net exports are the value of domestic goods and services sold abroad minus the value of foreign goods and services sold domestically.
2. Net capital outflow is the acquisition of foreign assets by domestic residents minus the acquisition of domestic assets by foreigners.
3. An economy's net capital outflow always equals its net exports.
4. An economy's saving can be used to either finance investment at home or to buy assets abroad.

Summary

- 5. The nominal exchange rate is the relative price of the currency of two countries.
- 6. The real exchange rate is the relative price of the goods and services of two countries.
- 7. When the nominal exchange rate changes so that each euro buys more foreign currency, the euro is said to appreciate or strengthen.
- 8. When the nominal exchange rate changes so that each euro buys less foreign currency, the euro is said to depreciate or weaken.

Summary

- 9. According to the theory of purchasing power parity, a unit of currency should buy the same quantity of goods in all countries.
- 10. The nominal exchange rate between the currencies of two countries should reflect the countries' price levels in those countries.
- 11. To analyze the macroeconomics of open economies, two markets are central — the market for loanable funds and the market for foreign currency exchange.
- 12. In the market for loanable funds, the interest rate adjusts to balance supply for loanable funds and demand for loanable funds.

Summary

- 13. In the market for foreign currency exchange, the real exchange rate adjusts to balance the supply of pounds (for net capital outflow) and the demand for pounds (for net exports).
- 14. Net capital outflow is the variable that connects the two markets.
- 15. A policy that reduces national saving, such as a government budget deficit, reduces the supply of loanable funds and drives up the interest rate.
- 16. The higher interest rate reduces net capital outflow, reducing the supply of pounds.
 - The pound appreciates, and net exports fall.

Summary

17. A trade restriction increases net exports and increases the demand for pounds in the market for foreign currency exchange.
- As a result, the pound appreciates in value, making domestic goods more expensive relative to foreign goods.