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# International Economics

## XII. The Open Economy

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## XII. The Open Economy

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1. How Does the Open Macroeconomy Work?
2. Internal and External Balance under a Fixed Exchange Rate
3. Internal Balance under a Floating Exchange Rate
4. Conclusion

Pugel, *International Economics*, pp.-540-628



# 1. How Does the Open Macroeconomy Work?

## Internal and External Balance

- Internal balance means actual production close to potential, low unemployment, and price stability
- External balance: the balance of payments with the rest of the world is sustainable
  - Official settlements balance is close to zero
  - The country is neither acquiring or losing reserves
- The goal is to achieve internal and external balance at the same time



## A Keynesian Model

- Pugel presents a Keynesian model applied to international sphere
  - Prices are sticky in the short run
  - IS-LM-FE model
  - There are critiques of such macroeconomic models, but they are usual in international economics

## Beyond the Short Run

- The price level responds to demand and supply shocks
- Long run inflation depends on growth of the money supply
- The economy tends toward full employment in the long run



## General Equilibrium

- When domestic production ( $Y$ ) equals desired aggregate demand ( $AD$ ) for domestically produced goods and services:

$$Y = AD = C + I_d + G + (X - M)$$

## International Aspects

- The volume of imports depends positively on the country's real production and income:  $M = M(Y)$
- The *marginal propensity to import* measures the dependency
- The volume of exports depends on the real production and income of foreigners
- Recall also the relationship between savings and trade

$$S = Y - C - G$$

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$$\text{So therefore: } S = I_d + X - M \text{ or } S - I_d = X - M$$

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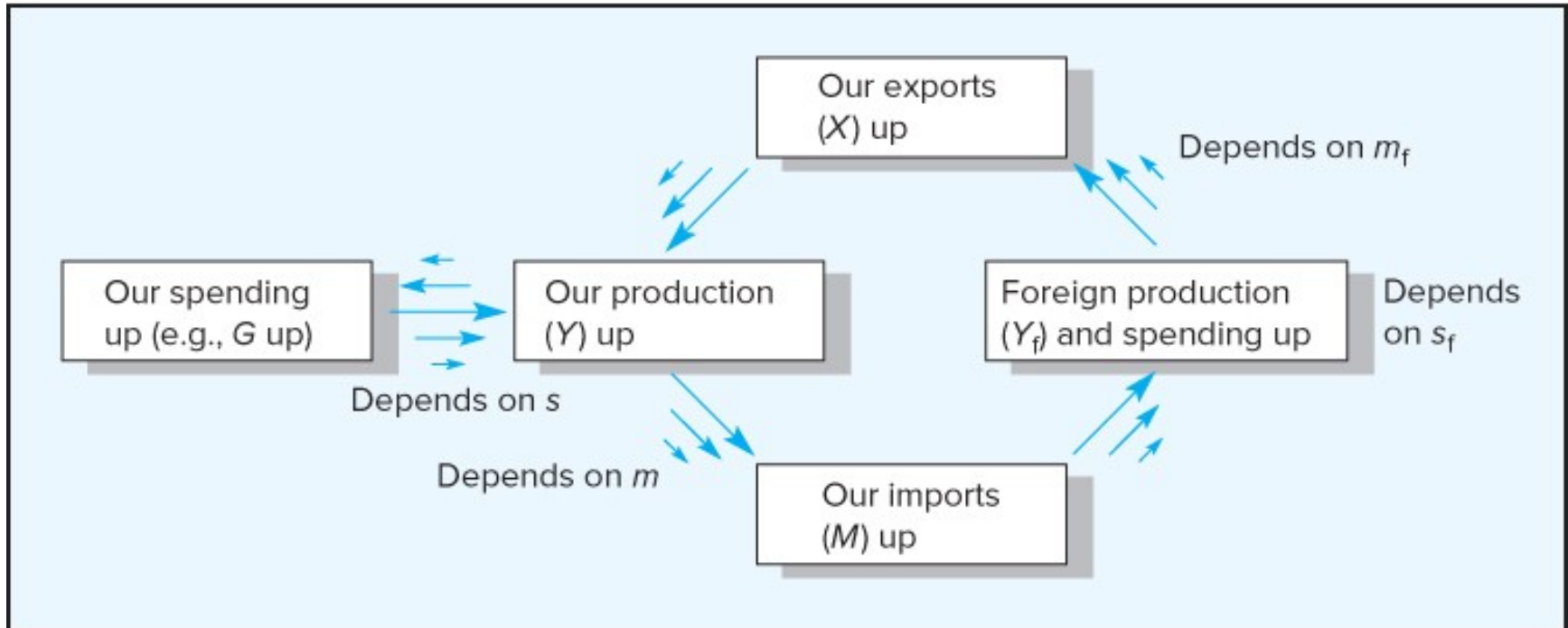


- If a country is small, changes in its imports will not have any measurable impact on world trade
- If instead a country is large, spillover effects can be important in two ways
  - Changes in production and income of a large country have spillover effects on production and income in other countries
  - The changes in foreign incomes alter foreign purchases of the first country's exports
- The existence of foreign spillovers and foreign-income repercussions explains cross-country correlation of national business cycles



# Foreign Spillovers and Income Repercussions

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## Macroeconomic Model

- Domestic product market
- Money market
- Foreign exchange market

## Endogenous Variables

- The domestic product  $Y$
- The rate of interest  $i$

## Exogenous Forces

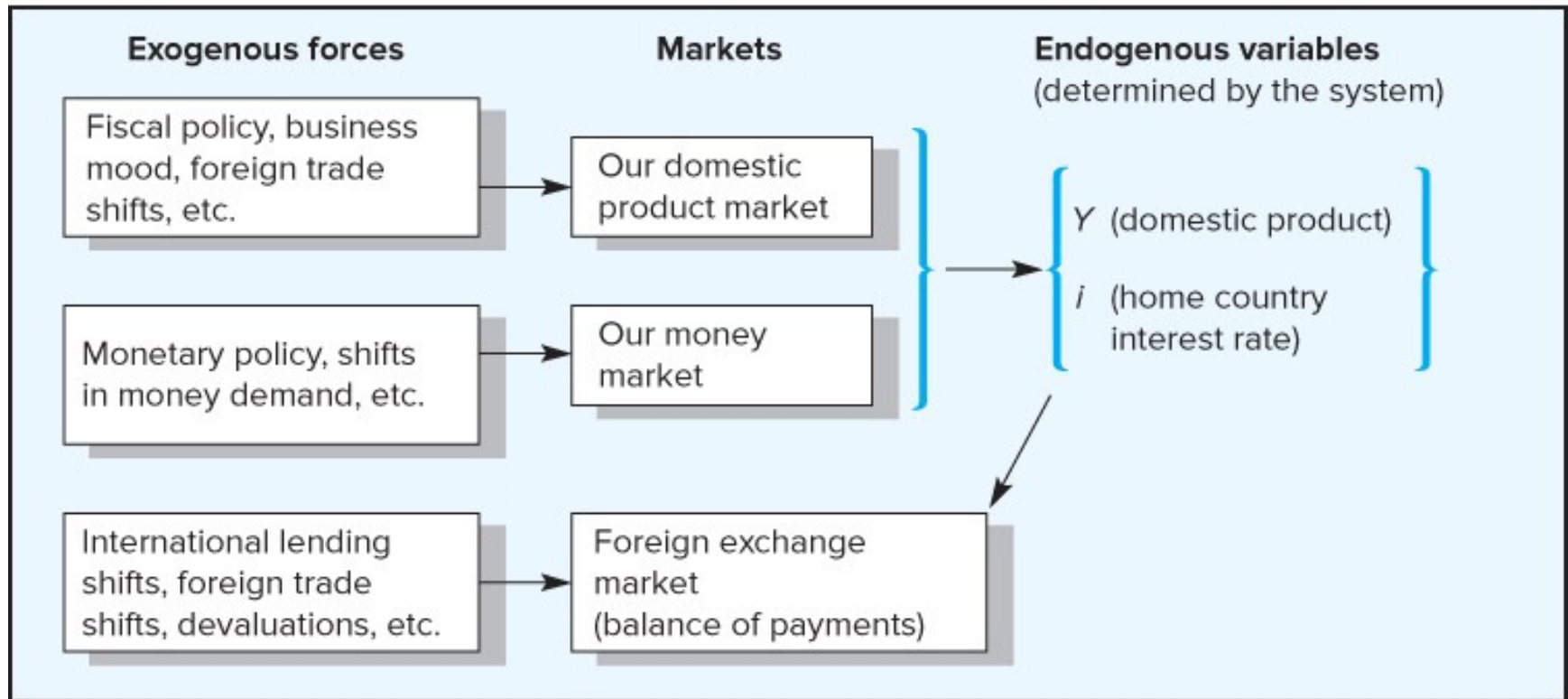
- Fiscal policy
- Monetary policy
- International lending





# Three Markets

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## Domestic Product and Money Markets

- Determine real domestic product and interest rates
- Domestic interest rates impact the market for foreign exchange

## Outside Forces

- Fiscal policy, business mood, foreign trade, impact the domestic product market
- Monetary policy and changes in money demand affect the domestic money market
- International lending shifts, foreign trade shifts, and currency devaluations impact the foreign exchange market.



## The IS Curve (investment-savings)

- Shows all combinations of domestic product levels and interest rates for which the domestic product market is in equilibrium
- It slopes downward to the right
- Recall that national saving equals domestic investment and net exports. It follows that there is equilibrium when:

$$S(Y) = I_d(i) + X - M(Y)$$

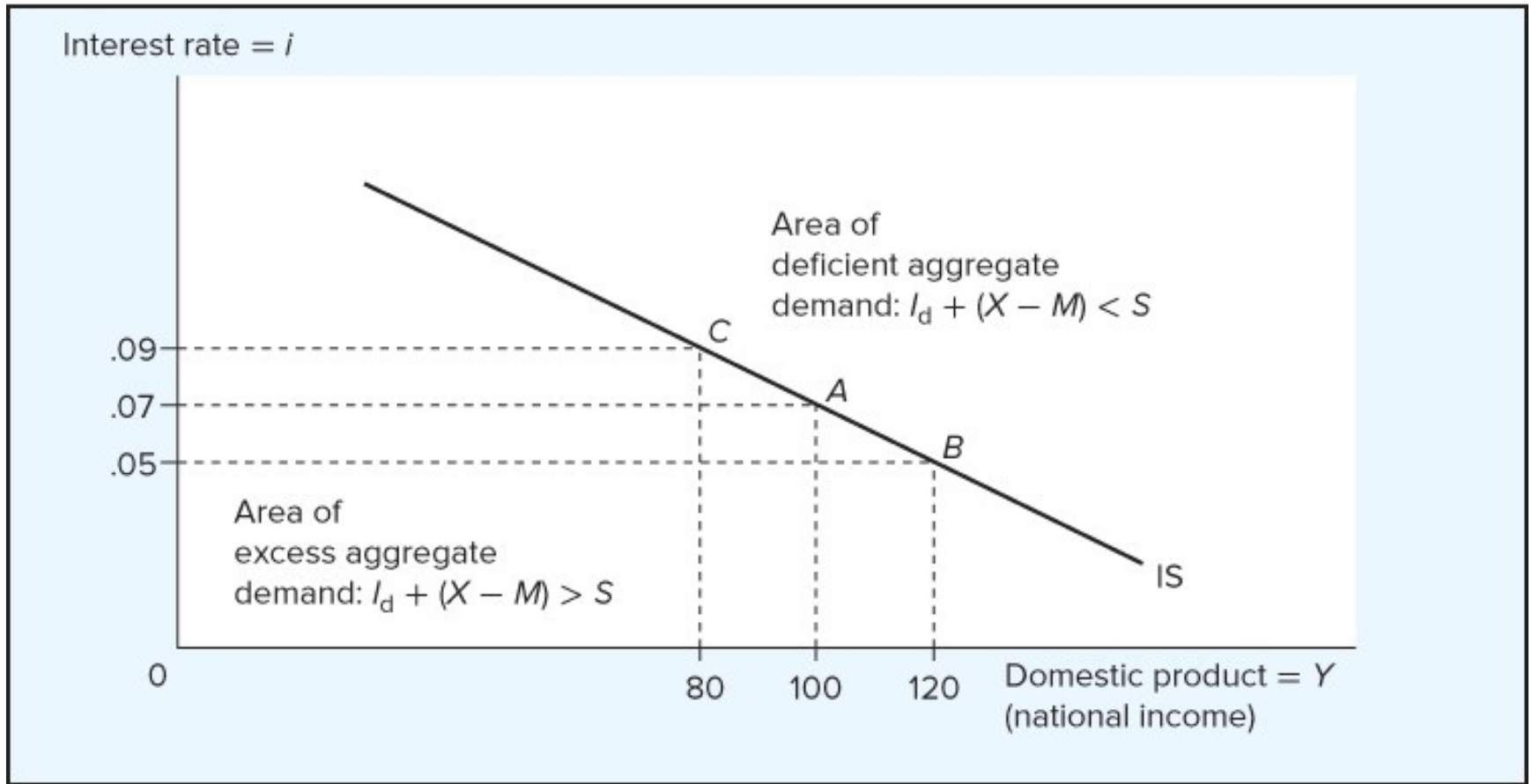
## The LM Curve (liquidity-money)

- Shows all combinations of interest rate and domestic product that are consistent with monetary equilibrium
  - It slopes upward to the right
    - Note problematic concept of “liquidity” here – no clear distinction between demand for money and very liquid assets
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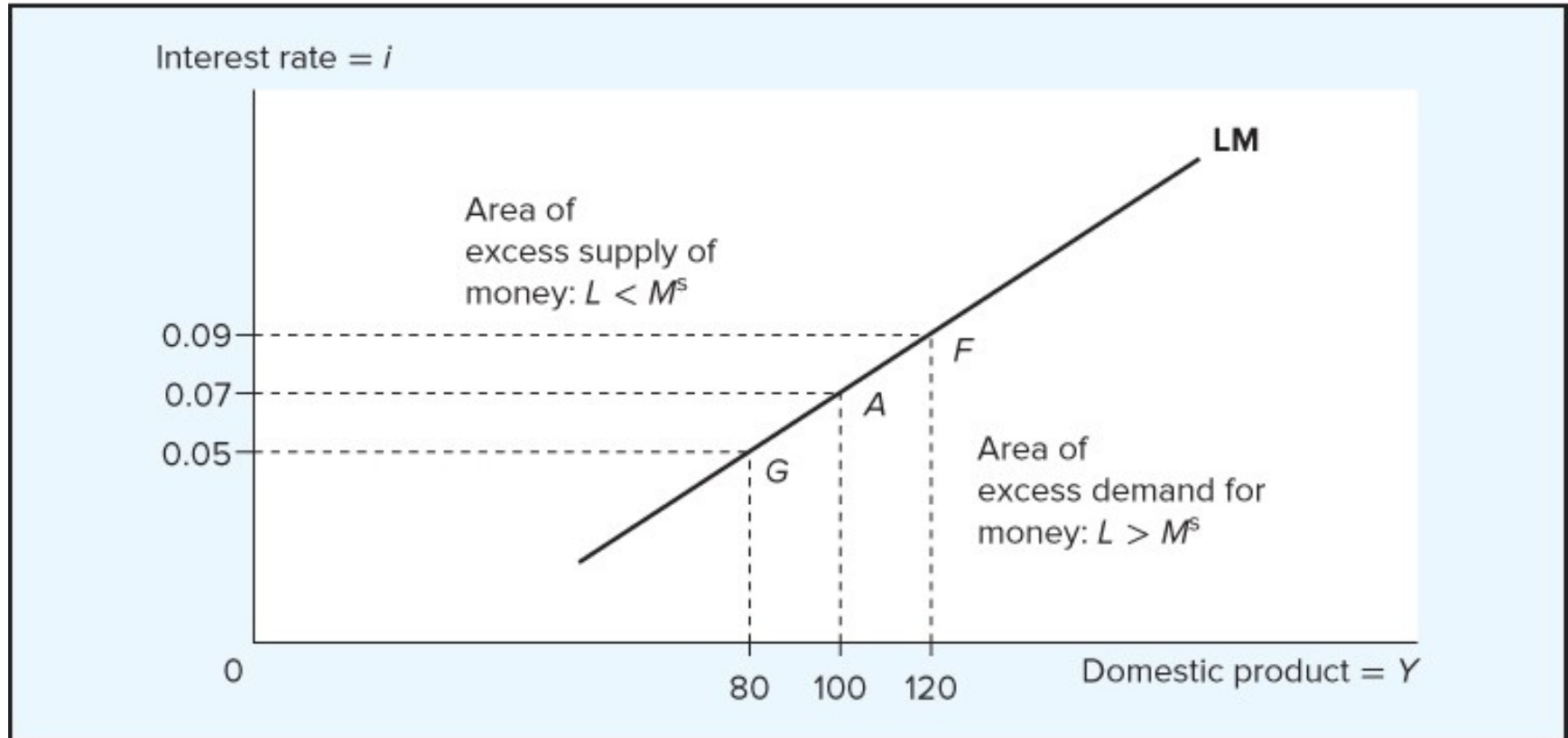
# The IS Curve

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## Two Ways to Conceptualize It

- The foreign exchange market, if we want to focus on exchange rates
- The balance of payments
- It is easier to conceive of it through the balance of payments

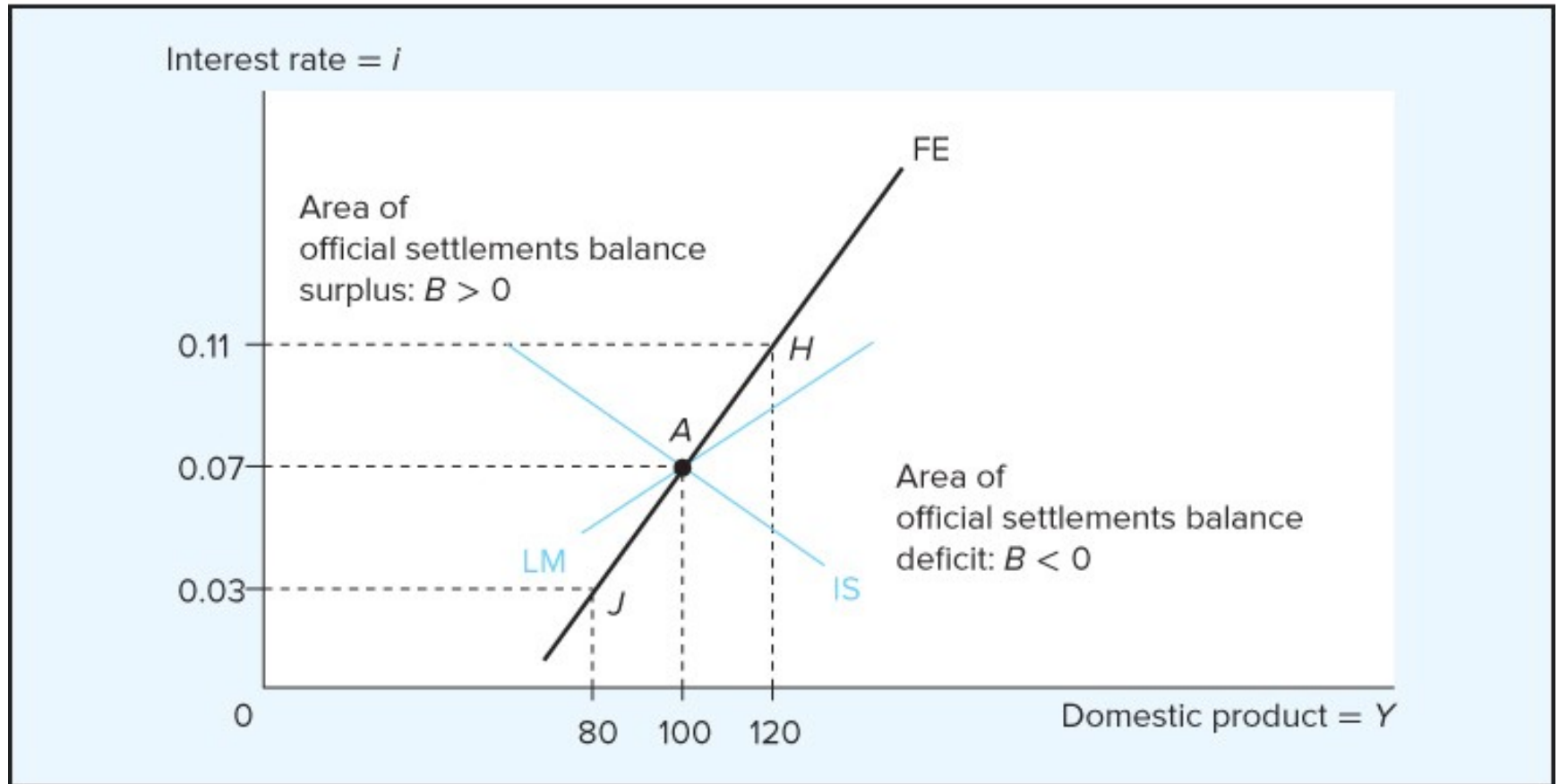
## The Balance of Payments

- The official settlements balance  $B$  is the sum of the current account  $CA$  and the financial account  $FA$ 
    - Both trade and financial flows affect  $B$
    - $B = CA(Y) + FA(i)$
  - We can link the balance of payments with  $Y$  and  $i$  by means of the *FE curve*
  - The FE curve (foreign exchange) shows all the combinations of product ~~and interest that are consistent with  $B = 0$~~
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# The FE Curve

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## Threefold Equilibrium

- When we bring the three curves together, we can see simultaneous equilibrium in all three markets
  - Determines the interest rate ( $i$ )
  - The level of domestic product ( $Y$ )
  - The overall balance of payments ( $B$ )

## Domestic Equilibrium and Foreign Trade

- The economy will gravitate toward simultaneous equilibrium in money and product markets
- The state of the balance of payments follows
  - $B$  is in surplus if the IS-LM intersection is to the left of the FE curve
  - ~~$B$  is in deficit if the IS-LM intersection is to the left of the FE curve~~





## 2. Internal and External Balance under a Fixed Exchange Rate

### Fixed Exchange Regime

- The government is committed to defend the pegged rate
- The monetary authority (central bank) must intervene in case of pressure on the rate

### Central Bank Role

- CB assets and liabilities are closely tied to the money supply and reserves
- Central bank assets consists of
  - Domestic assets: bonds, securities, loans to domestic banks
  - International reserves, holdings of foreign currency and foreign securities
- Central bank liabilities consists (inter alia) of domestic currency and deposits from banks
  - These form the monetary base (MB)



# Fed and ECB Balance Sheets

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	Federal Reserve (Consolidated System)	European Central Bank (Consolidated System)
<b>Key Assets</b>		
Securities (denominated in domestic currency)	4,368	3,229
Loans to banks (domestic currency)	0	919
Foreign-currency- denominated assets	21	402
<b>Key Liabilities</b>		
Currency (paper notes and coins)	1,571	1,407
Deposits from banks (domestic currency)	1,954	2,262

Source: Federal Reserve Board of Governors, annual report, 2017; European Central Bank, annual report, 2017.



## The Monetary Base

- The central bank can act directly on the monetary base
- It can increase (or decrease) the amount of currency in circulation
- It can increase (or decrease) the amount of bank reserves with the central bank

## Monetary Base and Money Supply

- The money supply consists mainly of currency in circulation and bank deposits held by the public
- The central bank indirectly controls the money supply
- The banks have to increase lending for an increase in bank reserves to lead to an increase in the money supply



# From the Balance of Payment to the Money Supply

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## Official Settlements Balance Surplus ( $B > 0$ )

- Surplus leads to upward pressure on the country's currency
- The central bank must intervene: buy foreign currency and sell domestic currency

## Consequences for the Central Bank Balance Sheet

- Official international reserve holdings go up
- Liabilities increase, probably an increase in bank deposits
- The monetary base increases and the money supply tends to increase
- Intervention thus tends to lead to inflation



# From the Balance of Payment to the Money Supply

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## Official Settlements Balance Deficit ( $B < 0$ )

- Deficit leads to downward pressure on the country's currency
- The central bank must intervene and sell foreign currency and buy domestic currency

## Consequences for the Central Bank Balance Sheet

- Official international reserves decrease
- Liabilities decrease, probably a decrease in bank deposits
- The monetary base decreases, money supply tends to decrease
- Intervention tends to be deflationary



# From the Money Supply Back to the Balance of Payments

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## Settlement Balance Surplus

- The central bank intervenes to buy foreign exchange and sell domestic currency
- By increasing bank reserves, the central bank stimulates the issue of new loans
  - Banks lend new money into existence

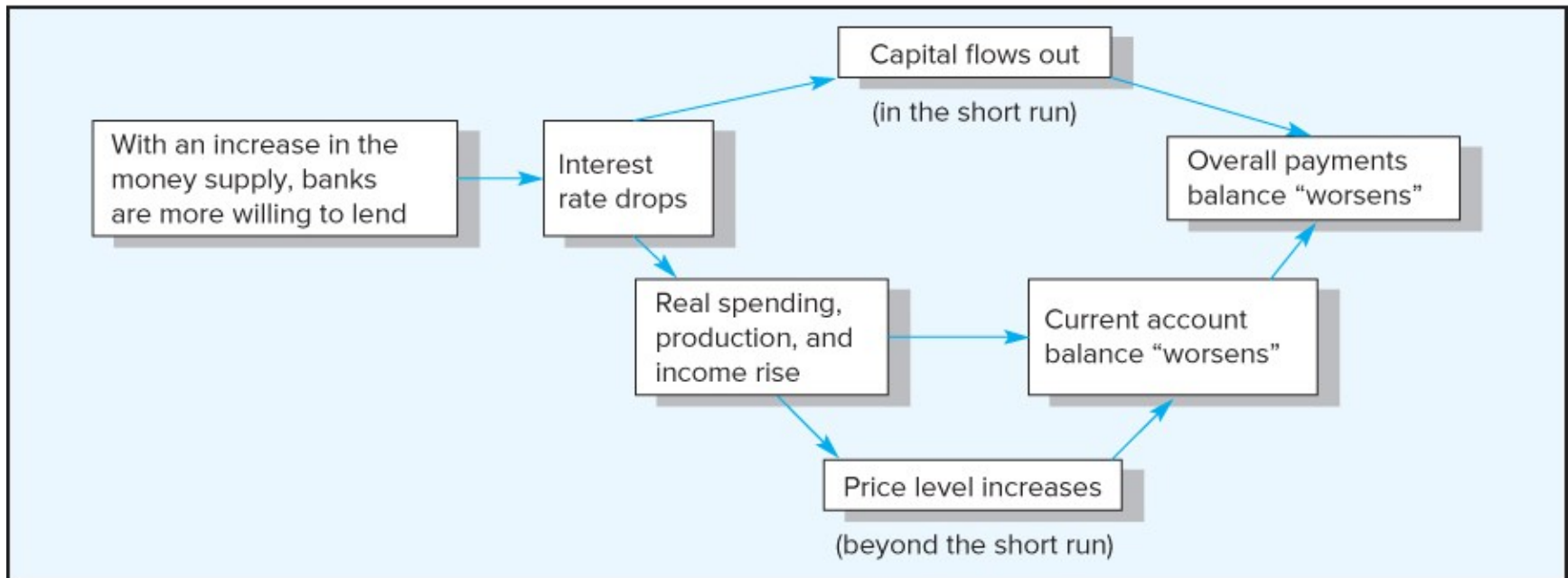
## Interest Rate Consequences

- Increased lending puts downward pressure on interest rates
  - There now is a higher supply of loanable funds
- Lower interest rates have several effects on the country's balance of payments



# From the Money Supply Back to the Balance of Payments

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# From the Money Supply Back to the Balance of Payments

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## Cantillon Effects

- The increase in the money supply increases nominal spending
- More spending in channels closest to the source of new money
  - Note that Pugel says *real* spending increases – this is a disagreement over theory we can't go into here
- Prices rise overall

## International Effects

- The decline in interest rates result in short-run outflow of capital
  - Increased income results in increased demand for imports (marginal propensity to import). CA worsens
  - Capital outflows and worsening CA leads to deficit in overall balance
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# From the Money Supply Back to the Balance of Payments

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## Settlement Balance Deficit

- All the consequences from before – in reverse
- Contraction of money supply
- Higher interest rate stimulates capital inflow
- Current account surplus develops/deficit disappears

## Key Conclusion

- Under a fixed exchange rate regime, central bank intervention to defend the rate “automatically” changes the domestic money supply
- The change in the money supply causes adjustments that move the economy back to external balance



## Sterilization

- The central bank can try to avoid any impact on domestic money supply from interventions by taking off-setting actions

## Sterilizing Expansion

- The CB sells domestic currency to defend against upward pressure
    - This would increase the money supply
  - The CB sells assets on the domestic market, e.g., sells domestic government bonds, to sterilize intervention
    - This action will tend to reduce the monetary base
  - The result is an increase in central bank holdings of international reserves and a decrease in its holdings of domestic assets
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## Sterilizing Contraction

- The central bank sells international reserves to defend against downward pressure
  - This would tend to reduce the monetary base
- The CB then buys domestic assets (e.g., government bonds)
  - This increases the monetary base
- This results in an increase in CB holdings of domestic assets, reduction in international reserves

## Aim of Sterilization

- The aim in both situations is to avoid disturbances in the domestic market
    - The LM curve does not change
  - However, there will be no adjustment toward external balance
    - It is a matter of time before reserves give out (in the case of downward pressure) or political will (in the case of upward pressure)
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- Monetary policy is very constrained under a regime of fixed exchange rates
- Monetary policy *has* to adjust to changes in the external balance
- Otherwise the peg cannot be maintained



## Surrender

- If an imbalance in the overall balance of payments is large enough or lasts long enough, the government may be unwilling to change domestic policies by enough to eliminate the imbalance
- Then the only way out is to surrender, to give up the fixed rate
- If the balance is in deficit, a devaluation will occur
- If it is in surplus, a revaluation
- Note that surrender means that the government fixes the exchange rate at a new peg
  - It does not mean a change to floating exchange rates
- Note that surrender is never necessary, strictly speaking



## Change in the Exchange Rate and Exports

- Changing the peg alters international price competitiveness
- A devaluation will lower the foreign-exchange price of exports
  - Foreign buyers are likely to buy more
  - It raises the price of imports, restricting imports
- A revaluation will work in the opposite direction
  - Foreigners buy less, reducing exports
  - It lowers the price of imports, increasing imports

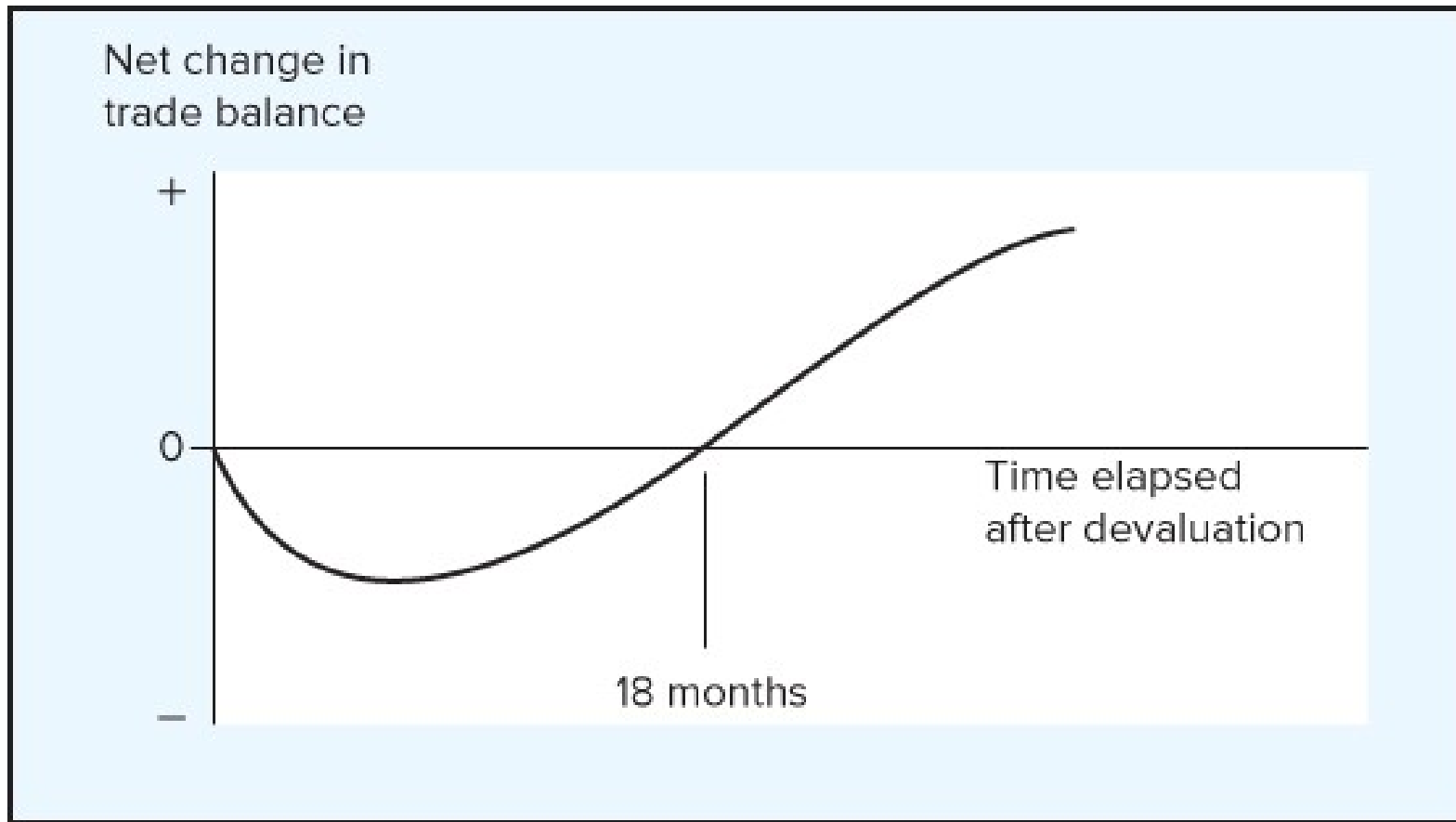
## Importance of Time

- These effects take time: changes in price first, then changes in quantities traded over time
  - Hence, devaluation will improve the current account only a little in the future after an initial worsening (the J curve)
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# The J Curve

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## A. How Devaluation Could Worsen the Trade Balance

Exchange Rate	$P_x^{\text{£}}$	$\cdot$	$X$	$-$	$P_m^{\text{£}}$	$\cdot$	$M$	$=$	$CA^{\text{£}}$
Before dollar devaluation: \$1.60/£	1.00	$\cdot$	80	$-$	1.00	$\cdot$	120	$=$	-40
After dollar devaluation: \$2.00/£	0.80	$\cdot$	80	$-$	1.00	$\cdot$	120	$=$	-56

The key to this case: Demand curves are inelastic, so the volumes of exports and imports do not change. Devaluing our currency just lowers the value of foreign exchange we earn on exports, worsening the trade deficit.

## B. The Small-Country Case

Exchange Rate	$P_x^{\text{£}}$	$\cdot$	$X$	$-$	$P_m^{\text{£}}$	$\cdot$	$M$	$=$	$CA_m^{\text{£}}$
Before dollar devaluation: \$1.60/£	1.00	$\cdot$	80	$-$	1.00	$\cdot$	120	$=$	-40
After dollar devaluation: \$2.00/£	1.00	$\cdot$	105	$-$	1.00	$\cdot$	100	$=$	+5





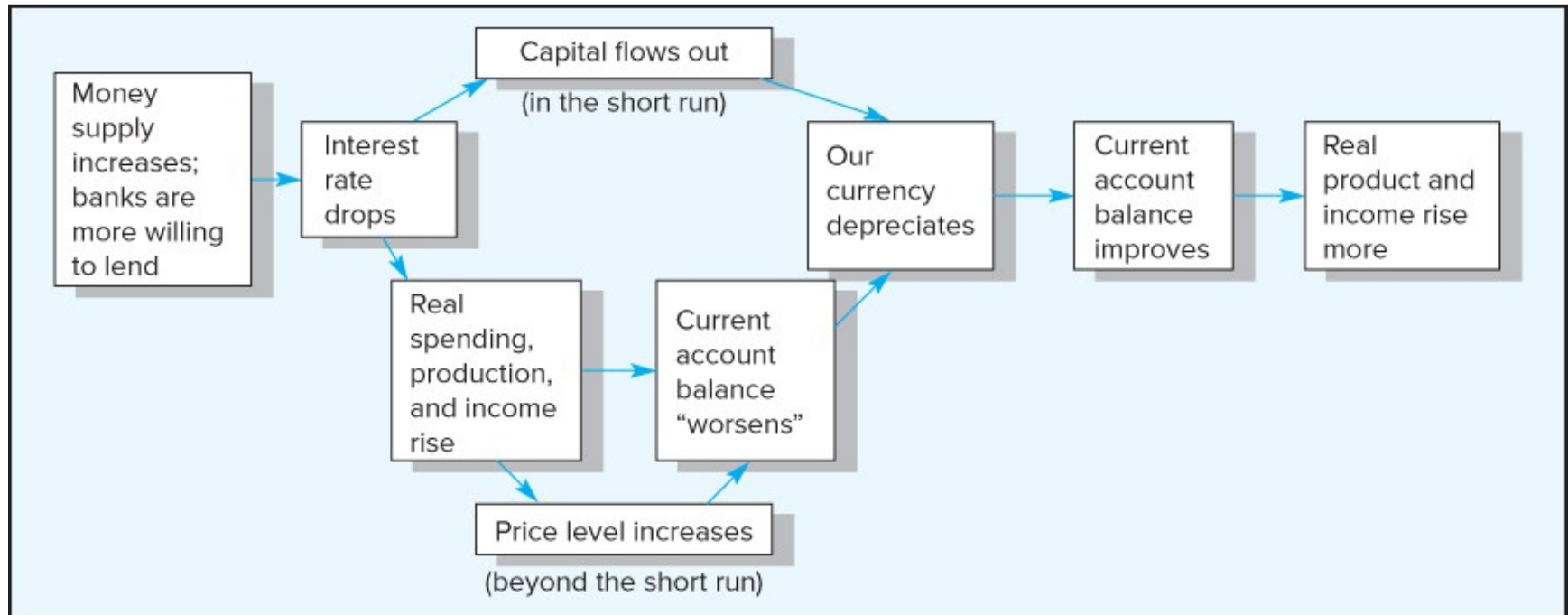
### 3. Internal Balance under a Floating Exchange Rate

- Under a floating exchange rate regime, the market takes care of the external balance
- Macroeconomic policy can then focus on the domestic economy, i.e., the internal balance
- Policies still have effects on the exchange rate and the balance of payments
  - These are resolved in the market without the need for official intervention



# Expanding the Money Supply with a Floating Exchange Rate

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# Expanding the Money Supply with a Floating Exchange Rate

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- Expanding the money supply has the same effects initially as under a fixed exchange rate regime
- However, the outflow of capital and worsening of the CA is reversed when the currency depreciates in international markets



- International capital shocks and international trade shocks have consequences for the internal balance of the economy
- A capital shock happens due to changes in investors' perceptions
  - Changes in capital flows can have effects on the internal balance by altering the exchange rate
- An international trade shock changes the country's exports or imports
  - Both the IS curve and the FE curve shift
- Under floating exchange rates, the effects of trade shocks on internal balance are mitigated by changes in the exchange rate
- E.g., an adverse trade shock can lead to depreciation



- Shocks to the economy alter both international performance and domestic performance
- Under floating exchange rates, a change in the exchange rate takes care of external balance after the shock
  - If the overall payments balance tend to go into deficit, then the currency will depreciate, reversing the tendency
  - If the overall payments balance tend to surplus, then appreciation will reverse this tendency
- Monetary and fiscal policy can then focus on internal imbalance
  - Which policies are better suited for this is beyond this course!



## 4. Conclusion

1. In the open economy, domestic performance is tightly linked to the international economy
2. The linkages are through the exchange rate and the balance of payments
3. Domestic policies – notably monetary policies – cannot be pursued without regard to exchange-rate policy
4. A fixed exchange rate regime takes monetary policy out of the hands of government: they can choose to accept the regime or not, beyond this their hands are tied
5. A floating exchange rate regime sets the government free to pursue whatever monetary policies it would like