

# 固定匯率與外匯干預 (part 1)

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†授課講義非經同意請勿引用  
[取材自Krugman, et al. (2018)  
chap. 7]

## 0 前言

- In reality, however, the assumption of complete exchange rate flexibility is not always accurate
  - the world economy operated under a system of *fixed* dollar exchange rates between the end of World War II and 1973
  - Industrialized countries now operate under a hybrid system of **managed floating exchange rates** (管理浮動匯率)—a system in which governments may attempt to moderate exchange rate movements without keeping exchange rates rigidly fixed (台灣類似)
  - A number of developing countries have retained some form of government exchange rate fixing

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## 1 為何必要研習固定匯率?

- (1) *Managed floating*
  - while the dollar exchange rates of the industrial countries' currencies are not currently fixed by governments, they are not always left to fluctuate freely, either
    - The system of partially floating dollar exchange rates is sometimes referred to as a **dirty float**, to distinguish it from a clean float
  - Because the present monetary system is a hybrid of the “pure” fixed and floating rate systems, an understanding of fixed exchange rates gives us insight into the effects of foreign exchange intervention when it occurs under floating rates

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## 1

- (2) *Regional currency arrangements*
  - Some countries belong to *exchange rate unions*, organizations whose members agree to fix their mutual exchange rates while allowing their currencies to fluctuate in value against the currencies of nonmember countries
  - for example, Denmark pegs its currency's value against the euro within the European Union's *Exchange Rate Mechanism* (歐盟(洲)匯率機制, ERM)

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- (3) *Developing countries*
  - Many developing countries try to peg or manage the values of their currencies, often in terms of the dollar, but sometimes in terms of a nondollar currency or some “basket” of currencies chosen by the authorities
  - No examination of the problems of developing countries would get very far without taking into account the implications of fixed exchange rates
- (4) *Lessons of the past for the future* (鑑往知來)
  - Today, economists and policy makers dissatisfied with floating exchange rates sometimes propose new international agreements that would resurrect a form of fixed-rate system
  - To compare the merits of fixed and floating exchange rates, we must understand the functioning of fixed rates

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## 2 央行(外匯)干預與貨幣供給

- 2-1 央行資產負債表與貨幣供給
  - A balance sheet for the central bank of the imaginary country of Pecunia

Central Bank Balance Sheet

Assets		Liabilities	
Foreign assets	\$1,000	Deposits held by private banks	\$500
Domestic assets	\$1,500	Currency in circulation	\$2,000

} (= MB)

- foreign assets make up the central bank’s official international reserves, and their level changes when the central bank intervenes in the foreign exchange market by buying or selling foreign exchange

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- Domestic assets are central bank holdings of claims to future payments by its own citizens and domestic institutions. These claims usually take the form of domestic government bonds and loans to domestic private banks (如對銀行的貼放融通)
- The liabilities side (負債面) ...liabilities the deposits of private banks and currency in circulation, both notes and coin
- The central bank’s total assets equal its total liabilities plus its net worth, which we have **assumed** in the present example to be zero

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- The additional **assumption** that net worth is constant means that the changes in central bank assets we will consider *automatically* cause equal changes in central bank liabilities
- 央行購買資產時用的2種支付方式
  - A cash payment raises the supply of currency in circulation
  - A payment by check... the private bank’s claims on the central bank rise
- 台灣央行的資產負債表(見次圖)

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### 中央銀行的資產負債表

資產	負債
1. 國外資產(主要為外匯 存底) $FA_c$ [88%] 2. 對政府債權(包括對公 營事業債權與持有政府 債券) $GS_c$ [0.0%] 3. 對銀行(即金融機 構)債權 $BO_c$ [10%]	1. 準備貨幣 MB(= (1) 銀行準備金 R [13%] + (2) 通貨淨額 $Cu$ [11%]) 2. 政府存款 GD [2%] 3. 郵政儲金轉存款 RED [20%] * 4. 定期存單 NCD [30%] * 5. 其他項目淨額 $NW_c$ (包括業主權益, 即淨值)

- 央行干預會反映至  $\Delta FA_c$   
 - 央行OMO則會反映至  $\Delta GS_c$  or/and  $(-\Delta NCD)$  }  $\Rightarrow \Delta AMB \Rightarrow \Delta MS$

[+括號]內數值係台灣於2002年12月個別項目對其央行資產總計之比率;  
 資料來源: 金融統計月報, 2003年8月]

### 2-1.1 OMO、干預操作與貨幣供給

- By definition, **open-market operations** involve the purchase or sale of domestic assets, but **official transactions in foreign assets** have the same direct effect on the **money supply**
  - 若央行購入資產, the accompanying increase in the money supply is generally *larger* than the initial asset purchase because of multiple deposit creation within the private banking system (*money multiplier effect*)
- 結論: Any central bank purchase of assets automatically results in an increase in the domestic money supply, while any central bank sale of assets automatically causes the money supply to decline

### 2-2 外匯干預與貨幣供給

- Suppose the Bank of Pecunia goes to the foreign exchange market and sells \$100 worth of foreign bonds for Pecunian money

Central Bank Balance Sheet after \$100 Foreign Asset Sale (Buyer Pays with Currency)

Assets		Liabilities	
Foreign assets	\$900	Deposits held by private banks	\$500
Domestic assets	\$1,500	Currency in circulation	\$1,900

- 若央行收受支票方式, 則 deposits ... ↓
- 無論何種支付方式, there would be a rise in the domestic money supply
- 反之, 若央行購入外國資產...

### 2-3 沖銷操作

- Central banks sometimes carry out equal foreign and domestic asset transactions in opposite directions to nullify the impact of their foreign exchange operations on the domestic money supply
  - This type of policy is called **sterilized foreign exchange intervention** (沖銷式外匯干預)

Central Bank Balance Sheet after Sterilized \$100 Foreign Asset Sale

Assets		Liabilities	
Foreign assets	\$900	Deposits held by private banks	\$500
Domestic assets	\$1,600	Currency in circulation	\$2,000

⇒ 另見次表

## 2-3

TABLE 7-1 Effects of a \$100 Foreign Exchange Intervention: Summary

Domestic Central Bank's Action	Effect on Domestic Money Supply	Effect on Central Bank's Domestic Assets	Effect on Central Bank's Foreign Assets
Nonsterilized foreign exchange purchase	+\$100	0	+\$100
Sterilized foreign exchange purchase	0	-\$100	+\$100
Nonsterilized foreign exchange sale	-\$100	0	-\$100
Sterilized foreign exchange sale	0	+\$100	-\$100

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## 2-4 BOP與貨幣供給

- the balance of payments equals the current account plus capital account balances *less* the nonreserve component of the financial account balance (金融帳), that is, the international payments gap that central banks must finance through their reserve transactions

– 基本BOP恆等式：經常帳 (+ 資本帳) = 金融帳 + 準備項目(變動)

- CA = CF，其中CA = EX – IM為經常帳餘額，CF = 金融帳 + 準備項目(變動)，為淨資本流出

- 若CA > 0，表示資本淨流出(CF > 0)，則國內的外國淨債權增加(或淨債務減少)(即[民間(金融帳)+官方(準備項目變動)的...]>0)

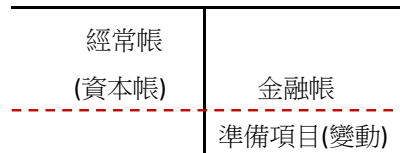
– 以T-帳呈現基本BOP恆等式...

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## 2-4



- 國際收支(BOP)若平衡(以BOP=0表示)，經常帳 (+ 資本帳) – 金融帳 = 準備項目(變動) = 0
  - 即T-account虛線以上左右相等
  - 注意：BOP平衡與基本BOP恆等式之間的差異
    - 若期間官方準備項目沒有變動，則兩者並無不同
- 若BOP逆差，亦即若(經常帳 (+ 資本帳) – 金融帳) < 0，則央行準備項目數額↓(亦即Δ準備項目<0)；反之...

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## 2-4

- If central banks are **not sterilizing** and the home country has a balance of payments **surplus**, for example, any associated increase in the home central bank's foreign assets implies an increased home money supply. Similarly, any associated decrease in a foreign central bank's claims on the home country implies a decreased foreign money supply

- 亦即，央行未沖銷時，若BOP>0，T-帳虛線以下的官方準備項目(淨)變動亦為>0 (given 金融帳餘額)

- 表示央行外國資產(淨)增加⇒MB↑(因央行資產負債表需平衡)⇒MS↑

- 實務上...對MS的影響存在不確定性

- 國內外對外匯干預與沖銷的情形

- 基於央行政策目標或是制度要求進行干預?會否為抵銷對MB衝擊而進行沖銷操作?央行有否BOP表外但影響其負債的交易?

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### 3 央行如何固定匯率

- To hold the exchange rate constant, a central bank must always be willing to trade currencies at the fixed exchange rate with the private actors in the foreign exchange market
- The central bank can succeed in holding the exchange rate fixed only if its financial transactions ensure that asset markets remain in equilibrium when the exchange rate is at its fixed level
  - asset market equilibrium is maintained is illustrated by the model of simultaneous foreign exchange and money market equilibrium
  - (想一下：這至少可讓3個資產市場保持均衡，除貨幣與外匯)

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### 3-1 匯率固定之下的外匯市場均衡

- The foreign exchange market is in equilibrium when the interest parity condition holds
- 惟固定匯率 $E^0$ 下，預期匯率變動=0，故需 $R = R^*$ 
  - i.e. the central bank must therefore hold  $R$  equal to  $R^*$
  - Note:  $R$ 由本國貨幣市場均衡決定

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### 3-2 匯率固定之下的貨幣市場均衡

- To hold the domestic interest rate at  $R^*$ , the central bank's foreign exchange intervention must adjust the money supply so that  $R^*$  equates aggregate real domestic money demand and the real money supply (given  $P$  and  $Y$ )

$$M^s/P = L(R^*, Y)$$

- When the central bank intervenes to hold the exchange rate fixed, it must *automatically* adjust the domestic money supply so that money market equilibrium is maintained with  $R = R^*$

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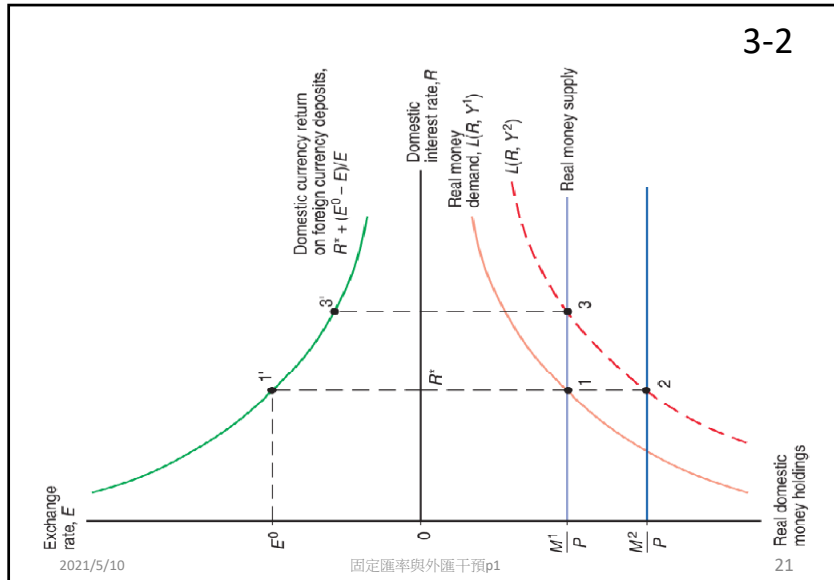
### 3-2

- 如何運作? 假設Suddenly output rises
  - What monetary measures keep the current exchange rate constant given unchanged expectations about the future exchange rate?
  - $L(., Y\uparrow) \Rightarrow R\uparrow, E\downarrow$
  - 為固定匯率於 $E^0$ ，the central bank must intervene in the foreign exchange market by buying foreign assets  $\Rightarrow MS\uparrow$ 抵銷原 $R$ 上升，以致得維持 $E = E^0$  and  $R = R^*$
- 看圖說故事...

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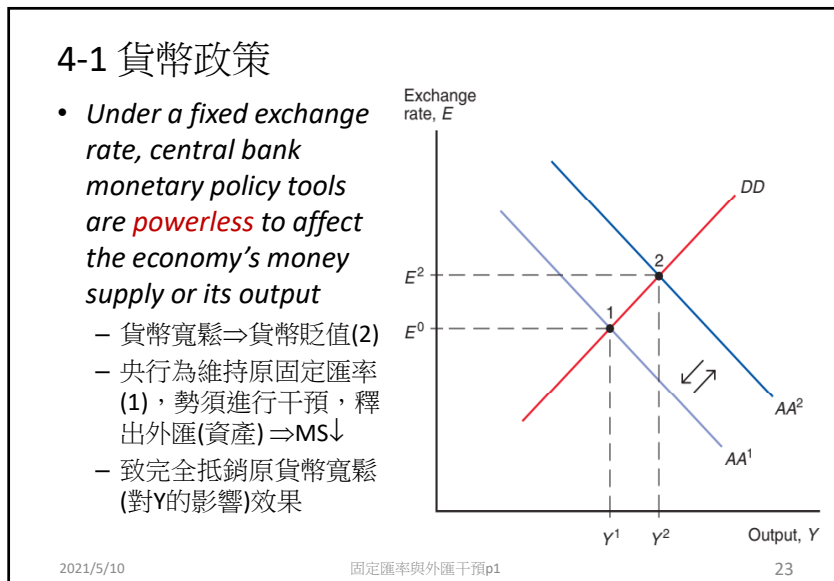
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### 4 固定匯率下的穩定政策

- we consider three possible policies: monetary policy, fiscal policy, and an abrupt change in the exchange rate's fixed level,  $E^0$ 
  - By fixing the exchange rate, the central bank gives up its ability to influence the economy through monetary policy
  - Fiscal policy, however, becomes a more potent tool for affecting output and employment
- To apply the model to the case of a permanently fixed exchange rate, we **add the assumption** that the expected future exchange rate equals the rate at which the central bank is pegging its currency

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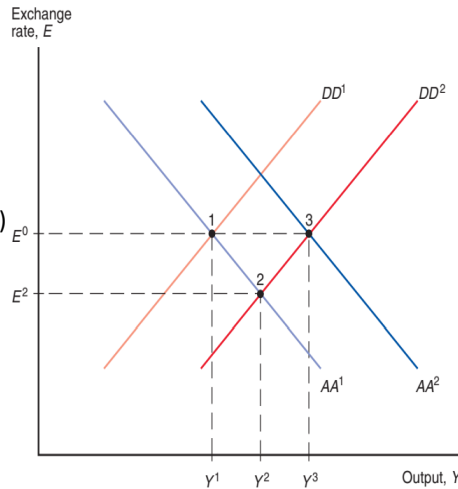
### 4-1

- By fixing an exchange rate, then, the central bank loses its ability to use monetary policy for the purpose of macroeconomic stabilization

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## 4-2 財政政策

- 原始 equilibrium is at point 1
- 若採擴張性財政政策... shifts the output market equilibrium schedule  $DD1$  to the right to  $DD2$
- 在無干預時，本幣升值(位2)
  - Note:  $L(.,Y\uparrow) \Rightarrow R\uparrow$  (given  $M_s$ )
- 央行為恢復釘住匯率  $E^0$ ，勢須干預買入外幣資產阻升本幣  $\Rightarrow M_s\uparrow$ 、 $R\downarrow$ ，資產市場均衡曲線由  $AA1$  外移至  $AA2$ 
  - 最後官方國際準備與  $M_s$  皆會增加



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## 4-2

- Unlike monetary policy, fiscal policy can affect output under a fixed exchange rate
  - it is even more effective than under a floating rate! Under a floating rate (因在固定匯率下不會發生匯率升值的排擠作用)
  - 另一方面  $M_s$  被迫增加對產出也會有額外的正面效果

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## 補充說明－沖銷操作的無效

- 在固定匯率下(且資產具完全替代性)，沖銷操作為何完全無效?
  - Note: 沖銷操作係央行同時作數量相當的外幣資產與外幣資產交易，以抵銷外匯干預對貨幣供給的影響
  - 若沖銷操作有效，則意味央行得以兼顧匯率與利率目標，亦即在固定匯率下，貨幣政策仍具自主性
- 來看看... 假設出現外生干擾使  $Y\uparrow$ ，景氣過熱...

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## 4-3 調整固定匯率水準

- A country that is fixing its exchange rate sometimes decides on a sudden change in the foreign currency value of the domestic currency
  - if the country is quickly losing foreign exchange reserves because of a big current account deficit that far exceeds private financial inflows
- A **devaluation** (調降幣值) occurs when the central bank raises the domestic currency price of foreign currency,  $E$ , and a **revaluation** (調升幣值) occurs when the central bank lowers  $E$ 
  - Cf. 貶值(depreciation)與升值(appreciation) – 市場供需運作所產生的(自發性)匯價變動(參見ftn.7, p.228)

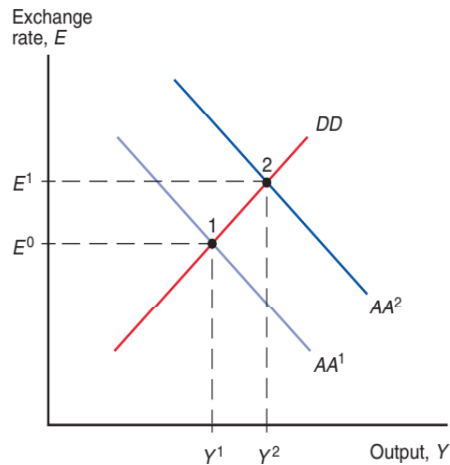
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## 4-3

- 央行調降幣值的影響效果
  - A rise in the level of the fixed exchange rate, from  $E_0$  to  $E_1$
  - makes domestic goods and services cheaper relative to foreign goods and services (given that  $P$  and  $P^*$  are fixed in the short run)
  - Output therefore moves to the higher level  $Y_2$  (如DD上位2)
  - $L(.,Y) \uparrow$  (given  $M_s$ )  $\Rightarrow R \uparrow$
  - 若AA不變，本幣會有升值壓力，故央行需干預以釘住新的匯率水準 $E_1$ ：購入外國資產， $M_s \uparrow$ ， $R \downarrow$  (抵銷前述漲幅)  $\Rightarrow$  AA外移至AA2



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## 4-3

- 3 main reasons why governments sometimes choose to devalue their currencies
  - (1) devaluation allows the government to **fight domestic unemployment** despite the lack of effective monetary policy (and) ... If government spending and budget deficits are politically unpopular or if the legislative process is slow
  - (2) the resulting improvement in **the current account**, a development the government may believe to be desirable
  - (3) their effect on the central bank's **foreign reserves** : If the central bank is running low on reserves, a sudden, one-time devaluation (one that nobody expects to be repeated) can be used to draw in more reserves

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## 4-4 財政政策與幣值調整之調整過程

- when there is full employment and the policy changes are maintained indefinitely, they will **ultimately cause the domestic price level to move** in such a way that full employment is restored
- 假設經濟原始位於充分就業狀態；財政擴張...
  - $Y \uparrow > Y_f \Rightarrow P \uparrow \Rightarrow AD \downarrow$  ( $\because (EX-IM) \downarrow$ )  $\Rightarrow$  returning output to the initial, full-employment level
  - There is no real appreciation in the short run, as there is with a floating exchange rate ( $\because P$  fixed)
  - but regardless of whether the exchange rate is floating or fixed, the real exchange rate appreciates *in the long run* by the same amount
    - real appreciation (a fall in  $EP^*/P$ ) takes the form of a rise in  $P$  rather than a fall in  $E$

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## 4-4

- Note: there is no inconsistency because fiscal expansion *does* cause a money supply increase by forcing the central bank to intervene in the foreign exchange market (in order to fix the exchange rate)
  - $\therefore$  仍舊... the price level and the money supply move proportionally in the long run
- The adjustment to a devaluation is similar...

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## 5 國際收支危機與資本外逃

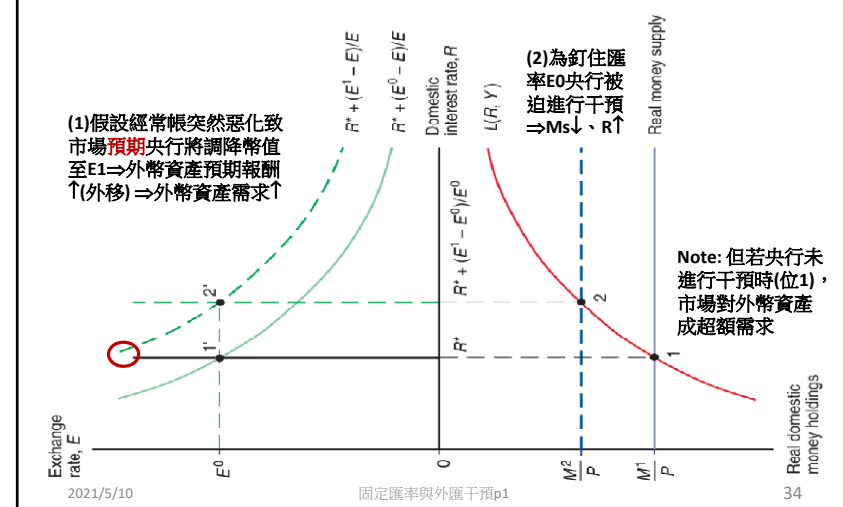
- 倘若... the central bank may find it undesirable or infeasible to maintain the current fixed exchange rate
  - The central bank may be running short on foreign reserves
  - or it may face high domestic unemployment
- 若市場認為央行終究會對前述狀況作出反應，且不得不放棄現行固定匯價，而調降幣值時...
- The market's belief in an impending change in the exchange rate gives rise to a **balance of payments crisis**
  - a sharp change in official foreign reserves sparked by a change in expectations about the future exchange rate
  - 如 the Asian crisis of 1997-98與 the crisis of the euro area periphery from 2010 to 2012

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## 資本外逃、貨幣供給與利率



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- *The expectation of a future devaluation causes a balance of payments crisis marked by a sharp fall in reserves and a rise in the home interest rate above the world interest rate*
- *Similarly, an expected revaluation causes an abrupt rise in foreign reserves together with a fall in the home interest rate below the world rate*
- The **reserve loss** accompanying a **devaluation scare** is often labeled **capital flight**
  - Residents flee the domestic currency by selling it to the central bank for foreign exchange; they then invest the foreign currency abroad
  - Foreigners convert holdings of home assets into their own currencies and repatriate the proceeds

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- When fears of devaluation arise because the central bank's reserves are low to begin with, capital flight is of particular concern to the government
  - By pushing reserves even lower, capital flight may force the central bank to devalue sooner and by a larger amount than planned
  - If aggregate demand depends on the real interest rate, capital flight reduces output by shrinking the money supply and raising the real interest rate
    - This possibly contractionary effect of capital flight is another reason why policy makers hope to avoid it

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## 5-1 通貨危機發生的原因

- 因BOP危機伴隨幣值大幅調降，故也被稱為通貨危機 (currency crisis)
- Often, a government is following policies that are not consistent with maintaining a fixed exchange rate over the longer term
  - 例如 a country's central bank may be buying bonds from the domestic government to allow the government to run continuing fiscal deficits (用貨幣融通財政)
  - ⇒ 貨幣產生貶值壓力，央行被迫干預以維持對外幣值⇒ 外匯準備持續流失
  - 最後， central bank may find itself without the means to support the exchange rate... and the fixed exchange rate is abandoned
  - (the collapse of the currency peg can be caused by a sharp *speculative attack* (投機性攻擊))

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## 5-1

- 解決之道：to avoid this fate is to stop bankrolling the government deficit, hopefully forcing the government to live within its means (類似惡性通膨情境...)
- 其他類型的通貨危機 – **self-fulfilling currency crises** (自我實現的通貨危機)
  - 但依舊... the government may ultimately be responsible for such crises by creating or tolerating domestic economic weaknesses that invite speculators to attack the currency
  - 舉例： consider an economy in which domestic commercial banks' liabilities are mainly short-term deposits, and in which many of the banks' loans to businesses are likely to go unpaid in the event of a recession
  - (即以短支長，且未來不確定性高，潛在期限錯配(duration mismatch)問題大)

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## 5-1

- 自我實現的通貨危機(舉例(cont.))
- If speculators suspect there will be a devaluation, interest rates will climb, raising banks' borrowing costs sharply while at the same time causing a recession and reducing the value of bank assets
- To prevent domestic banks from going out of business, the central bank may well lend money to the banks, in the process losing foreign reserves and possibly its ability to go on pegging the exchange rate
- In this case, it is the emergence of devaluation expectations among currency traders that pushes the economy into crisis and forces the exchange rate to be changed

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