

Monetary policy in an open economy

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Second class of International Economic Policy

- In this class we will deal with
 - the processes of creating and using money
 - the link between monetary policy and the balance of payments
 - the definition of the (intermediate and final) objectives and of the operative procedures of the main central banks

The balance sheet of the central banks and of the consolidated bank system

- The whole of the liabilities of the central bank is called Monetary Base BM . It is made of the currency ($CIRC$) and of the (either precautionary or legally compulsory) reserves (R) of the commercial banks by the central bank.
- The assets acquired by the central bank through the monetary base can be
 - treasury bills (B^d), which correspond to government borrowing L^G . Depending of the degree of independence of the central bank from the government, it can choose or not how many treasury bills to buy.
 - foreign currencies or bills (B^f), which are the official reserves of the central bank (RU)
- The financial systems, that here we assume to be made only of commercial banks
 - has the deposits as its only liability (DEP)
 - has bank credit (L^P) and reserves (R) as assets

The balance sheet of the central banks and of the consolidated bank system

- The assets of the consolidated bank system are

$$RU + L^G + L^P + R$$

- The liabilities of the consolidated bank system are

$$BM + DEP$$

- The equality between the two above is

$$RU + L^G + L^P = BM - R + DEP \quad (1)$$

The balance sheet of the central banks and of the consolidated bank system

- Recalling that $CIRC = BM - R$ and defining domestic credit as $DC = (L^G + L^P)$, (1) becomes

$$M^S = \underset{\text{money creation channels}}{RU + DC} = \underset{\text{uses of money}}{CIRC + DEP} \quad (2)$$

where M^S is money supply. Recall that DEP is a multiple of R

- Taking first differences of (2) one has that

$$\Delta M^S = \Delta RU + \Delta DC$$

Even if the central bank could perfectly control the change in the domestic credit, it would be affected by changes in the balance of payments, given that $\Delta RU = BP$, if $\Delta RU \neq 0$.

Open market operations

- Open market operations are (treasury) bills purchases and sells between the central and commercial banks:
 - Ex. 1: the central bank buys treasury bills from commercial banks for an amount of 100 Euros, increasing in this way the currency.
 - Ex. 2: the central bank buys treasury bills for an amount of 100 Euros from commercial banks, which increase the reserve holdings by the central bank. Commercial banks therefore have $100(1-rr)$ excess reserves, where $0 < rr < 1$ is the reserve/deposit ratio. Therefore, commercial banks will lend more and the stock of money will increase by a greater amount than the monetary base.

Balance of payments, monetary policy and exchange rate regimes

- Official reserves vary through time depending on the disequilibria in the demand and supply of a currency.
- Tabb. 2.1, 2.2, 2.3
 - Recall that we assume financial transactions not to exist.
 - Under flexible exchange rates, the balance of payments is always nil: money supply is not affected by the foreign channel of monetary base creation
 - Under fixed exchange rates, the balance of payments can be negative, nil or positive: the operations of the central bank on currency markets affect money supply.
- Tabb. 2.1, 2.4, 2.5
 - A sterilization consists in making an open market operation with an opposite sign with respect to the one implemented on the currency market to neutralize the effects on money supply of the intervention on the currency market.

Balance of payments, monetary policy and exchange rate regimes

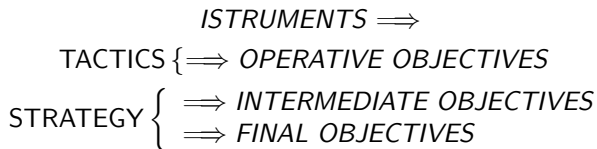
- Sterilization can have a temporary nature.
 - If the balance of payments has persistent deficits, the central banks has to buy bills not to change money supply, leading to a decline in the interest rate, inducing further capital outflows and reserve losses.
 - If the balance of payments has persistent surpluses, the cental banks has to sell treasury bills inducing a rise in the interest rate and favouring further capital inflows.
- Therefore, this kind of operations can be used for temporary and not for permanent shocks.

Capital inflows and sterilization in emerging markets

- Some emerging economies attracted in the last 20 years considerable capital inflows
- To avoid inflation pressures, central banks sold treasury bills implementing sterilization operations. However, the sell of treasury bills can be limited by the absorption capacity of the private sector, be it financial or not.
- These sterilization interventions were accompanied by
 - increases in the mandatory reserve ratios
 - forced transfer of deposits of the public sector from commercial banks to the central bank, to limit the ability of the former ones to give credit
 - removal of controls on capital outflows, to reduce the capital account balance
 - acceleration of the liberalization process, reducing the current account balance by favouring imports.

Strategy and tactics of monetary policy

- An economic system is continuously affected by different kinds of shocks. Furthermore, monetary policy influence the real economy with some lags.
- Therefore, it is important to define instruments and (operative and intermediate) objectives to guarantee a monetary policy able to achieve its final targets.
- Here we distinguish between
 - monetary policy strategy, concerning the definition of its final and intermediate objectives
 - monetary policy tactics, concerning rules and routines characterizing its daily operative procedures.



- For a long time there was not a consensus on the final objectives of monetary policy:
 - In some countries it was price stability
 - In some other the stability of the financial systems and the invariance of long-term interest rates
 - In some other full employment.
- Today there exists a widespread hierarchy of final objectives
 - 1 Price stability
 - 2 Short-term invariance of the level of economic activity
 - 3 Financial stability

Strategy: objectives and trade-offs

- Further objectives than price stability implies the existence of some trade-offs
 - a policy with frequent interventions to stabilize the level of economic activity or the financial system could cause an increase in the inflation rate
 - in an open economy,
 - a flexible exchange rate regime leaves to the central bank a greater control over monetary policy, which however could lead to a greater inflation rate
 - a fixed exchange rate leaves the central bank less discretionality, but it could anchor inflation expectations to a low level
- Given that final objectives are not immediately under the control of the central bank, it is necessary to define intermediate objective with a stable link with the final ones (e.g.: M2, M1, Deposits).

The currency board

- The currency board is a monetary regimes in which the local monetary authority
 - fixes the exchange rate with a reference currency
 - keeps $BM = RU$
- Therefore, the central bank cannot lend to either the public or the private sector and it cannot make sterilizations.
- Advantages:
 - originally the currency board was introduced in the English colonies to avoid to send back to the mainland time-worn banknotes and to let local monetary authorities enjoy the yields of official reserves
 - today countries adopting it try to import anti-inflation credibility
- Disadvantages
 - the central bank cannot intervene in bank crises, as it cannot work as lender of last resort

- Instruments: variables that under the direct control of the central bank (e.g.: repo rate, reserve coefficients, open market operations) and that have a stable link with operative objectives
- Operative objectives: variables that are influenced by instruments and that have stable link with intermediate objectives (e.g.: short term interest rates, exchange rate) and on which there exists information at high frequency (higher than for intermediate and final objectives).

- The Taylor rule

$$i = \hat{i} + \alpha (\pi - \hat{\pi}) + \beta \left(\frac{Y - \hat{Y}}{Y} \right) \quad (3)$$

Estimates of (3) show $\alpha \approx 1.5$ e $\beta \approx 0.5$.

- Monetary targetting

- let us assume a quantitative money demand

$$MV = PY$$

- let us assume further that Y is at its full employment level and that money supply and demand are equal. The percentage change in the quantity of money is given by

$$\frac{\Delta \hat{M}}{\hat{M}} = \hat{\pi} + \frac{\Delta \hat{Y}}{\hat{Y}} - \frac{\Delta V}{V} \quad (4)$$

- (4) gives the target value of money growth, from which it follows

$$i_t - i_{t-1} = \gamma \left(\frac{\Delta M}{M} - \frac{\Delta \hat{M}}{\hat{M}} \right)$$

- Inflation targeting

$$i_t - i_{t-1} = \gamma (\pi_{t+T|t-1} - \hat{\pi})$$

- Exchange rate targeting

$$i = i^* + \chi$$

- The quantity of money can be defined in different ways, depending on its functions
 - monetary base is the sum of currency and reserves

$$BM = CIRC + R$$

- generally accepted means of payment are currency and bank current account deposits

$$M1 = CIRC + DEP$$

- money as reserve of value
 - including $M1$ plus saving accounts and deposits that can be redeemed with a three month notice

$$M2 = M1 + DEP(a\ tempo) + DEP(a\ risparmio)$$

- The quantity of money can be defined in different ways, depending on its functions
 - money as reserve of value
 - $M3$ defined as

$$M3 = M2 + \text{Money market funds and bonds} + \text{Two years bonds} + \text{reverse repurchases}$$

- The ECB carefully monitors $M3$, because it can be considered a good indicator for future private sector expenditure. The ECB adopts an operative procedure of partial monetary targeting.

- The interest rate channel

$$\Delta \uparrow M \implies \Delta \downarrow i \implies \Delta \uparrow C, \Delta \uparrow I \implies \Delta \uparrow Y$$

- The asset price channel

- wealth effect

$$\Delta \uparrow M^S \implies \Delta \uparrow P_E \implies \Delta \uparrow W \implies \Delta \uparrow C \implies \Delta \uparrow Y$$

- Tobin's q effect (the Tobin's q is defined as the ratio between the market value of firms and the replacement cost of their capital)

$$\Delta \uparrow M^S \implies \Delta \uparrow P_E \implies \Delta \uparrow q \implies \Delta \uparrow I \implies \Delta \uparrow Y$$

- The credit channel

- aggregate demand

$$\Delta \uparrow M^S \implies \Delta \uparrow R \implies \Delta \uparrow L^P \implies \Delta \uparrow C, \Delta \uparrow I \implies \Delta \uparrow Y$$

- aggregate supply (lower credit cost for firms. E.g.: firms purchasing intermediate goods resort to borrowing)

$$\Delta \uparrow M^S \implies \Delta \uparrow R \implies \Delta \uparrow L^P \implies \Delta \uparrow Y$$

- The exchange rate channel

$$\Delta \uparrow M \implies \Delta \downarrow i \implies \Delta \uparrow S \implies \Delta \uparrow EX, \Delta \downarrow IM \implies \Delta \uparrow Y$$