

# Instituto Universitário de Lisboa (ISCTE-IUL) - Economics Department

Course: Macroeconomics | Program: Management

## Week VI: The Central Bank Balance Sheet and the Monetary Policy Tools

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These slides do not cover all the contents of the theoretical classes. They only provide a summary of the subjects which will be used in the practical exercises. This means you should attend theoretical classes as well.

# The balance sheet of the Federal Reserve

- The balance sheet of the Fed may be represented in the following way:

## Central Bank

Assets		Liabilities	
Foreign exchange reserves	\$\$\$	Currency	\$\$\$
Securities	\$\$\$	Reserves of commercial banks	\$\$\$
Loans to commercial banks	\$\$\$	Government account	\$\$\$
Other assets	\$\$\$	Other liabilities	\$\$\$
		Equity	\$\$\$
Total assets	\$\$\$	Total liabilities	\$\$\$

# The balance sheet of a Commercial Bank

- The balance sheet of a Commercial Bank may be represented in the following way:

## Commercial Bank

Assets		Liabilities	
Reserves	\$\$\$	Total Deposits	\$\$\$
Securities	\$\$\$	Loans from CB	\$\$\$
Loans	\$\$\$	Other liabilities	\$\$\$
Other assets	\$\$\$	Equity	\$\$\$
Total assets	\$\$\$	Total liabilities	\$\$\$

# The balance sheet of the Commercial Bank

## Using Pluto

- ☒ Exercise 1 (The Central Bank's balance sheet).
- ☒ Exercise 3 (Monetary Base vs Total Assets).
- ☒ Exercise 9 (COVID19 and monetary policy).

# Central Bank Balance Sheet Changes

- **Open market operations** – example for purchases of treasury bonds:

## Central Bank

Assets		Liabilities	
Securities	↑ €€€	Reserves	↑ €€€

## Commercial bank

Assets		Liabilities	
Securities	↓ €€€		
Reserves	↑ €€€		

# Central Bank Balance Sheet Changes

- **Foreign exchange intervention** – example for the purchase of bonds denominated in foreign currency:

Central Bank			
Assets		Liabilities	
Foreign exchange reserves	↑ €€€	Reserves	↑ €€€

Commercial bank	
Assets	Liabilities
Securities	↓ €€€
Reserves	↑ €€€

# Central Bank Balance Sheet Changes

- **Discount loan** – example for the extension of a loan to a commercial bank:

## Central Bank

Assets		Liabilities	
Loans	↑ €€€	Reserves	↑ €€€

## Commercial bank

Assets		Liabilities	
Reserves	↑ €€€	Loans from CB	↑ €€€

# The balance sheet of the Federal Reserve

## Using Pluto

- ☒ Exercise 2 (Fed operations and the Monetary Base).



## Monetary Base and Money Supply

- The Monetary Base (MB) is the total amount of money printed by the Central Bank that is outside of the Central Bank (its liabilities):

$$MB = CC + TR$$

- The total quantity of money supplied to the economy by the banking sector is much greater than the MB and is called the Money Supply (M):

$$M = CC + TD$$

- Their relationship is mediated through the money multiplier,  $\kappa$ :

$$M = \underbrace{\left( \frac{\omega + 1}{\omega + rr} \right)}_{\kappa} \times MB$$

-  $\omega = CC/TD$  and  $rr = TR/TD$

# Central Bank Balance Sheet Changes

## Using Pluto

- ☒ Exercise 3 (Monetary Base vs Total Assets).
- ☒ Exercise 4 (The Money Multiplier).

## The setting of $i$

- The Central Bank can “change”  $r$ , as a response to changes in  $\pi$ , or as a response to some strong exogenous force, through  $\bar{r}$ :

$$r = \bar{r} + \lambda\pi$$

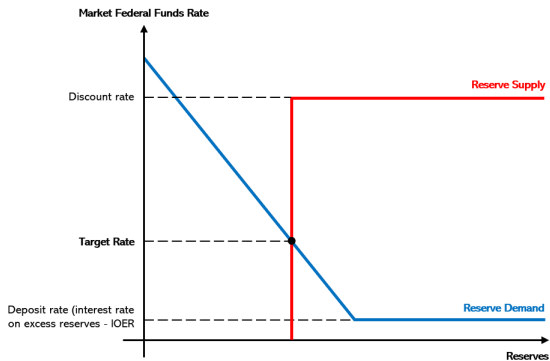
- Having defined the MP rule, the Central Bank will set its short term **nominal** interest rate  $i$ .
  - The Central Bank **can't set by law** the level of  $i$ .
- The Central Bank can set a target for the short term interest rate (Fed Funds Rate).

# Target the price of money/short term interest rate

- Target federal funds rate range:
  - As the federal funds rate is the rate at which banks borrow from other financial intermediaries overnight, it is determined in the market, not controlled by the Fed.
  - The best the Fed can do is to influence the range at which the target rate will match the market interest rate.
- Setting the FFR range:
  - **Lower bound – Interest rate on excess reserves (IOER):** paid by the Fed on reserves that banks hold in their account at the Central Bank in excess of reserve requirements.
  - **Upper bound – Discount rate:** the interest rate charged by the Fed on its loans to banks.

# Target the price of money/short term interest rate

- Graphical representation of the market for reserves:



# Target the price of money/short term interest rate

## The demand for reserves

- Banks that have excess reserves can deposit them at the Fed or make loans to other banks, and banks that want more reserves can borrow from the banks lending reserves.
- In the market for reserves, the higher the  $FFR$ , the more expensive is to borrow reserves, so the lower the demand and vice-versa.
- Demand exists for prices that are practiced. The curve becomes flat when  $FFR = IOER$ ?
  - We can't have  $FFR < IOER$ , because lending Banks would earn more by keeping reserves at the CB and not making loans.
  - It ensures that those banks can't demand themselves loans at  $FFR$  and deposit them at  $IOER$ , making a profit by something they borrowed (arbitrage is not possible).
  - So,  $IOER$  is a reservation rate. After we reach the quantity where the  $FFR$  equals  $IOER$ , any additional demand will have the  $IOER$  as borrowing cost.

# Target the price of money/short term interest rate

## The supply of reserves

- The Fed continues to be the monopoly supplier of aggregate bank reserves as it can choose the amount of reserves to supply on a particular day: the curve is vertical at that level on which the OMTD estimates demand equals the target funds rate.
- By buying or selling securities in the market through an open market operation (OMO), the Fed can increase or decrease the supply of reserves.
- To prevent the  $FFR$  from rising too far when the demand is unexpectedly high, the CB sets as maximum rate to charge on loans the discount rate making the curve flat at that rate.
  - This rate is set at a maximum premium of the  $IOER$  because the CB wants to be the lender of last resource. The borrowing bank wants to have the lowest cost possible.

# Target the price of money/short term interest rate

## Using Pluto

- ☒ Exercise 5 (Successful Fed).



# References

- Mishkin, F. S. (2014), *Macroeconomics: Policy and Practice*, 2nd Edition, Pearson, Addison-Wesley, New York.
- Cecchetti, S. & Schoenholtz, K. (2017). *Money, Banking, and Financial Markets*, 5th Edition, McGraw-Hill.