Macroeconomics

6. The Central Bank's Balance Sheet and MP Instruments

Bachelor's Degrees in Management and in Finance and Accounting

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The Federal Reserve's balance sheet

- The Fed's balance sheet can be represented as follows:

Central Bank

Assets		Liabilities	
Foreign assets	$$$	Currency in circulation	$$$
Securities	$$$	Reserves	$$$
Loans to Commercial Banks	$$$	Government account	$$$
Other assets	$$$	Other liabilities	$$$
		Net worth	$$$
Total assets	$$$	Total liabilities	$$$

The Commercial Bank's Balance Sheet

- The commercial bank's balance sheet can be represented as follows:

Commercial Bank

Assets		Liabilities	
Reserves	$$$		
Foreign reserves	$$$	Total deposits	$$$
Securities	$$$	Central Bank loans	$$$
Loans	$$$	Other liabilities	$$$
Other assets	$$$	Net worth	$$$
Total assets	$$$	Total liabilities	$$$

The commercial bank's balance sheet

Exercises in Pluto

- ☒ Exercise 1 (The central bank's balance sheet).
- ☒ Exercise 10 (COVID-19 and monetary policy).

Changes in the Central Bank's Balance Sheet

- **Open market operations** – example: purchase of securities:

Central Bank

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

Commercial Bank

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

Changes in the Central Bank's Balance Sheet

- **Foreign exchange market interventions** – example: purchase of assets denominated in foreign currency:

Central Bank

Assets		Liabilities	
Foreign assets	↑ €€€	Reserves	↑ €€€

Commercial Bank

Assets		Liabilities
Foreign reserves	↓ €€€	
Reserves	↑ €€€	

Changes in the Central Bank's Balance Sheet

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

Central Bank

Assets		Liabilities	
Loans to Commercial Banks	↑ €€€	Reserves	↑ €€€

Commercial Bank

Assets		Liabilities	
Reserves	↑ €€€	Central Bank loans	↑ €€€

Changes in the Central Bank's Balance Sheet

Exercises in Pluto

- ☒ Exercise 2 (Fed operations and the monetary base).

Monetary base and money supply

- The Monetary Base (MB) is the total quantity of banknotes printed and coins issued by the Central Bank that is outside the Central Bank (its liability):

$$MB = CC + TR$$

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

$$M = CC + TD$$

- The relationship between the two is mediated by the money multiplier, κ:

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

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

Monetary base and money supply

Exercises in Pluto

- ☒ Exercise 9 (Monetary Base vs Total Assets).
- ☒ Exercise 3 (The money multiplier).

Setting i

- The Central Bank can "change" r, in response to changes in π, or in response to a strong exogenous force, through $\bar{r}$:

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

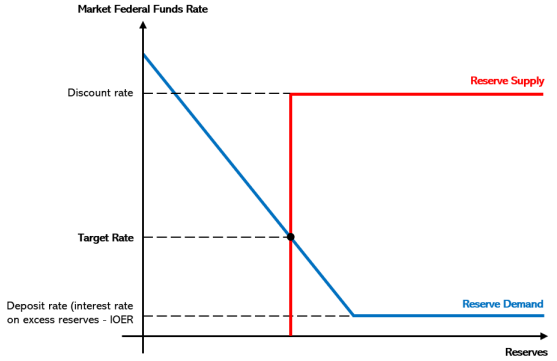
- Once the monetary policy rule is defined, the Central Bank will set its short-term **nominal** interest rate i (through the Fisher equation).
  - The Central Bank **cannot set by law** the level of i.
- The Central Bank can set a target for the short-term nominal interest rate (the Fed Funds Rate) to be achieved.

Setting the target for i

- Setting the range for the short-term nominal interest rate:
  - Since i is the rate at which banks lend reserves in *overnight* operations, it is determined in the market, not directly by the Fed.
  - The best the Fed can do is influence the range within which the target rate corresponds to the market interest rate.
- Setting the range for the FFR:
  - **Lower bound – Interest on Excess Reserves** (IOER): paid by the Fed on reserves that exceed required reserves and that banks keep in their account at the Central Bank.
  - **Upper bound – Discount rate**: the interest rate charged by the Fed when it lends money to banks.

Setting the target for i

- Graphical representation of the reserves market:



Setting the target for i

Demand for reserves

- Banks with excess reserves can either deposit them at the Fed or lend them to other banks, while banks that want more reserves can borrow from the former.
- In the reserves market, the higher the FFR, the more expensive it is to borrow reserves, and therefore the lower the demand for them, and vice versa.
- Demand exists for the prices that prevail. The curve becomes flat when $FFR = IOER$:
  - We cannot have $FFR < IOER$, because banks lending reserves would earn more by keeping them at the Central Bank instead of lending them.
  - This ensures that banks cannot borrow at the FFR and deposit at the $IOER$, profiting from borrowed funds (arbitrage is not possible).
  - Therefore, $IOER$ is a reservation rate. Once we reach the quantity at which FFR equals $IOER$, any additional demand will face $IOER$ as its cost.

Setting the target for i

Supply of reserves

- The Fed remains the monopolistic supplier of aggregate bank reserves, because it can choose the quantity of reserves to supply on a given day: the curve is vertical at the level where it estimates that demand equals the target nominal interest rate.
- By buying/selling securities in the market through an open market operation, the Fed can increase or decrease the supply of reserves.
- To prevent the FFR from rising too much when demand is unexpectedly high, the Central Bank sets the discount rate as the maximum rate charged on loans made to banks.
  - This rate is set as a maximum premium over the $IOER$ because the Central Bank wants to be the lender of last resort for banks that need reserves. Those who borrow want the lowest possible cost.

Setting the target for i

Exercises in Pluto

- ☒ Exercise 4 (Successful Fed).
- ☒ Exercise 5 (The Target Rate and the Fed Funds Rate).
- ☒ Exercise 6 (The Fed's dilemma).
- ☒ Exercise 7 (A 2022 1M-dollar question: how far would the Fed go?).
- ☒ Exercise 8 (Oil prices & Fed mistakes).

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.