

ECON UN3265 ▪ MONEY AND BANKING ▪ SUMMER 2026 ▪ SESSION 7

CHAPTER 14

The Money Supply Process

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Outline

The Three Players and the Fed's Balance Sheet

Open Market Operations and the Monetary Base

Multiple Deposit Creation

The Money Multiplier

Application: QE and the Money Supply

Wrap-up

Reading and objectives

- ▶ Mishkin, *The Economics of Money, Banking, and Financial Markets*, 13th ed.
- ▶ This deck: **Chapter 14** — The Money Supply Process.
- ▶ Chapter 13 told us *who* runs monetary policy. This chapter is the first *mechanical* step: how the Fed's actions actually change the quantity of money. We follow the money from the Fed's balance sheet, through the banking system, to the deposits in your account.

Learning objectives

- 14.1** Identify the “three players” that influence the money supply.
- 14.2–14.3** Read the Fed's balance sheet; track what moves the monetary base.
- 14.4** Use T-accounts to walk through multiple deposit creation.
- 14.5–14.6** List the factors that move the money supply and who controls each.
- 14.7** Derive, compute, and interpret the money multiplier.

PART 1

The Three Players and the Fed's Balance Sheet

Three players in the money supply process

The quantity of money is not set by the Fed alone. Three groups jointly determine it:

1. **The central bank** — the Federal Reserve, which oversees the system and controls the monetary base.
2. **Banks** — depository institutions that take deposits and make loans.
3. **Depositors** — households and firms, whose choices about holding currency versus deposits matter.

The roadmap

The Fed controls the **monetary base**. Banks and depositors then determine how much **money** a given base supports. Keep asking: *whose decision is this?*

Mishkin Ch. 14, Section 14.1.

The Fed's balance sheet

Everything in this chapter is read off the Fed's balance sheet. Two assets, two liabilities.

Assets

- ▶ **Securities** — government bonds the Fed holds; the principal lever on the money supply, and a source of interest income.
- ▶ **Loans to financial institutions** — discount loans that supply reserves and earn the discount rate.

Liabilities (“monetary liabilities”)

- ▶ **Currency in circulation** — cash in the hands of the public.
- ▶ **Reserves** — bank deposits at the Fed plus vault cash.

Why these two liabilities matter

The Fed's two monetary liabilities are the raw material of the money supply — increases in either tend to raise the quantity of money.

The monetary base: high-powered money

Definition

$$MB = C + R$$

where C = currency in circulation and R = total reserves in the banking system.

- ▶ The monetary base is also called **high-powered money** — each dollar of base can support several dollars of deposits.
- ▶ Reserves split into two parts: **required reserves** ($= r \times D$, the ratio times checkable deposits) and **excess reserves** (anything held above the requirement).
- ▶ The Fed exerts much tighter control over the base than over reserves alone.

Mishkin Ch. 14, Section 14.3.

PART 2

Open Market Operations and the Monetary Base

Open market purchase from a bank

The Fed buys \$100m of securities from a bank. Follow the T-accounts:

Banking System	
Assets	Liabilities
Securities −\$100m	
Reserves +\$100m	

Federal Reserve	
Assets	Liabilities
Securities +\$100m	Reserves +\$100m

Result

Reserves rise by \$100m; currency is unchanged; the **monetary base rises by \$100m**.

Mishkin Ch. 14, Section 14.3.

Open market purchase from the nonbank public

Now the seller is a member of the public. The result depends on what they do with the check.

Case A — deposits the check

Banking System			
Assets		Liabilities	
Reserves	+\$100m	Checkable deposits	+\$100m

Case B — cashes the check

Nonbank Public	
Assets	Liabilities
Securities	−\$100m
Currency	+\$100m

The key lesson

Reserves rise (Case A) or currency rises (Case B) — the split into **reserves** is uncertain. But the **monetary base** rises by the full \$100m either way.

Open market sale, currency shifts, and discount loans

- ▶ **Open market sale** of \$100m: the monetary base *falls* by \$100m. Again the effect on the base is far more certain than the effect on reserves alone.
- ▶ **Shift from deposits into currency:** the public withdraws cash. Currency up, reserves down by the same amount — net effect on the monetary base is **zero**. (Depositors reshuffle the base; they don't change its size.)
- ▶ **Discount loan:** when a bank borrows \$100m from the Fed, both reserves and the base rise by \$100m. Repaying the loan reverses it.

Mishkin Ch. 14, Section 14.3.

What the Fed can and cannot control

- ▶ **Open market operations are fully under the Fed's control** — it decides the volume of purchases and sales.
- ▶ But the Fed **cannot dictate borrowing** by banks at the discount window — that is the banks' choice.
- ▶ So it is useful to split the base:

Borrowed vs. nonborrowed base

$$MB = MB_n + BR$$

The **nonborrowed monetary base** MB_n (set by open market operations) plus **borrowed reserves** BR (discount loans, chosen by banks). The money supply is positively related to both.

Other factors: float, Treasury deposits at the Fed, and foreign-exchange interventions also nudge the base — but they are mostly outside the Fed's policy control.

PART 3

Multiple Deposit Creation

Deposit creation: a single bank

Start from the open market purchase: First National Bank has \$100m in **new excess reserves**.

- ▶ The bank does not want idle reserves — it **loans out the \$100m**, crediting the borrower's checking account.
- ▶ The borrower spends the funds; the check clears; the \$100m of reserves leaves First National and lands at another bank.
- ▶ Net result: Securities $-\$100\text{m}$, Loans $+\$100\text{m}$ — it is loaned up.

First National (net change)

First National Bank		
	Assets	Liabilities
Securities	$-\$100\text{m}$	
Loans	$+\$100\text{m}$	

The seed

A single bank can lend out *only* its excess reserves. But those reserves do not vanish — they become a deposit somewhere else, and the process repeats.

Deposit creation: the banking system

Assume a 10% reserve requirement and no excess reserves held (\$ millions):

Bank	Δ Deposits	Δ Loans	Δ Reserves
A	100.00	90.00	10.00
B	90.00	81.00	9.00
C	81.00	72.90	8.10
$\vdots$	$\vdots$	$\vdots$	$\vdots$
Total	1,000.00	900.00	100.00

The geometric sum: $\$100 \times \frac{1}{0.10} = \$1,000\text{m}$

A \$100m rise in reserves creates \$1,000m in deposits — **multiple deposit creation**.

The simple deposit multiplier

With no excess reserves and no currency drain, required reserves equal total reserves:

$$R = RR = r \times D \implies D = \frac{1}{r} R$$

Taking changes:

$$\Delta D = \frac{1}{r} \Delta R$$

- ▶ With $r = 0.10$, the **simple deposit multiplier** is $1/r = 10$.
- ▶ This is the upper bound on deposit expansion — it assumes every dollar is fully re-lent and none leaks into cash.

Mishkin Ch. 14, Section 14.4.

Why the simple model is too simple

The simple multiplier ignores the choices of depositors and banks. Two leakages slow the process:

- ▶ **Currency holdings.** If a borrower holds part of the loan as cash, those dollars leave the banking system — currency gets *no* multiple expansion. More currency held $\Rightarrow$ smaller money supply.
- ▶ **Excess reserves.** If banks choose to sit on excess reserves rather than lend, the chain stops early. More excess reserves $\Rightarrow$ smaller money supply.

The upshot

The money supply depends not just on the Fed, but on **depositors' currency decisions** and **banks' excess-reserve decisions**. We need a richer multiplier.

Mishkin Ch. 14, Section 14.4.

PART 4

The Money Multiplier

Factors that determine the money supply

Pulling the pieces together, five factors move M — one per player decision:

Player	Variable	Change	Money supply M
Federal Reserve	Nonborrowed base MB_n	↑	↑
Banks / Fed	Borrowed reserves BR	↑	↑
Federal Reserve	Required reserve ratio r	↑	↓
Banks	Excess-reserves ratio e	↑	↓
Depositors	Currency ratio c	↑	↓

Read it as “who and which way”

The Fed controls MB_n and r ; banks control excess reserves (and trigger BR); depositors control currency. Each has a sign — memorize the direction, not just the list.

Deriving the money multiplier

Goal: write $M = m \times MB$, where $M = C + D$. Assume currency and excess reserves are fixed fractions of deposits: $C = cD$ (currency ratio c) and $ER = eD$ (excess-reserve ratio e).

Step 1 — base in terms of deposits. Reserves $R = RR + ER = rD + eD$, so

$$MB = C + R = (r + e + c)D \implies D = \frac{MB}{r + e + c}.$$

Step 2 — money in terms of the base. Since $M = C + D = (1 + c)D$,

$$M = \frac{1 + c}{r + e + c} MB.$$

The money multiplier m

$$m = \frac{1 + c}{r + e + c} \quad \longleftarrow \quad r \text{ (Fed)}, \quad e \text{ (banks)}, \quad c \text{ (depositors)}$$

Intuition behind the multiplier

A numerical example with $r = 0.10$, $C = \$400\text{B}$, $D = \$800\text{B}$, $ER = \$0.8\text{B}$:

$$c = \frac{400}{800} = 0.5, \quad e = \frac{0.8}{800} = 0.001$$

$$m = \frac{1 + 0.5}{0.10 + 0.001 + 0.5} \approx 2.5$$

- ▶ This is well below the simple multiplier of 10. Why? Currency receives **no** multiple expansion — every dollar the public holds as cash is a dollar that never gets re-lent.
- ▶ Higher c or higher e both shrink m : leakages out of deposits weaken the engine.

Mishkin Ch. 14, Section 14.7.

PART 5

Application: QE and the Money Supply

Quantitative easing, 2007–2020

The crisis era is the great natural experiment in this chapter's machinery.

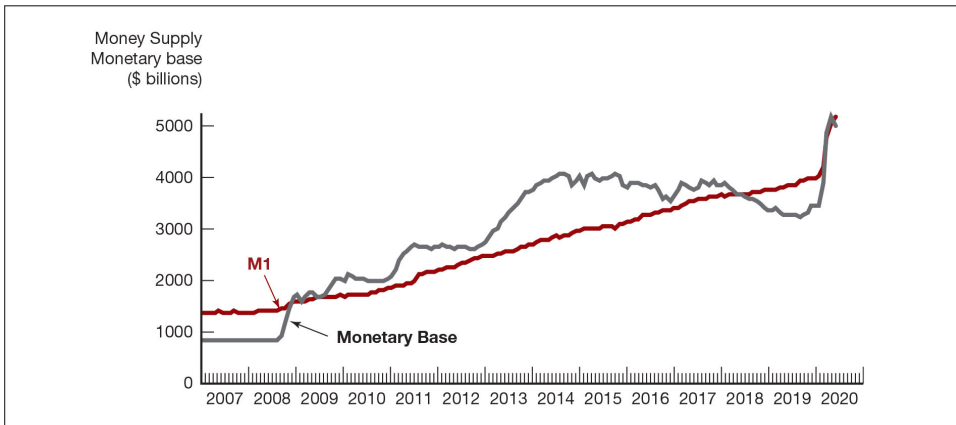
- ▶ From fall 2007, the Fed launched lending and **large-scale asset purchases** — “quantitative easing.” By fall 2017 its balance sheet had **quintupled** and the monetary base was up about **350%**.
- ▶ The COVID shock in March 2020 triggered another massive round.
- ▶ Yet the money supply did *not* rise proportionally. The reason is the multiplier: banks parked the new base as **excess reserves** (e soared), so m collapsed.

The chapter's payoff

A huge increase in the base need not mean a huge increase in money. The multiplier is the missing link — and in a crisis it can fall sharply.

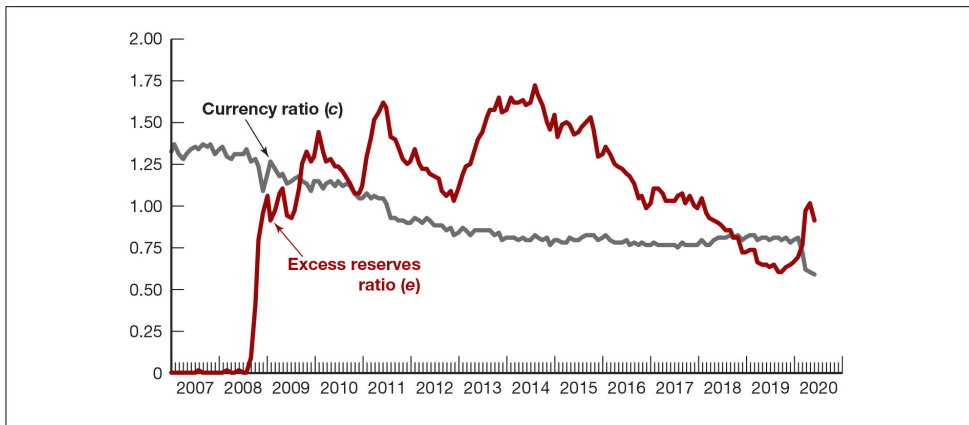
Mishkin Ch. 14, “Quantitative Easing and the Money Supply, 2007–2017.”

Figure 1 — M1 and the monetary base, 2007–2020



Mishkin Ch. 14, Figure 1 (FRED). The monetary base explodes with QE, but M1 rises far less — visual proof that the multiplier fell.

Figure 2 — Excess reserves and the currency ratio, 2007–2020



Mishkin Ch. 14, Figure 2 (FRED). Excess reserves balloon after 2008 — the e term in the multiplier — explaining why so much base failed to become money.

PART 6

Wrap-up

Key terms from Chapter 14

- ▶ three players: Fed, banks, depositors
- ▶ monetary base; high-powered money
- ▶ currency in circulation; reserves
- ▶ required vs. excess reserves
- ▶ open market operations
- ▶ nonborrowed base; borrowed reserves
- ▶ T-account; deposit creation
- ▶ simple deposit multiplier $1/r$
- ▶ required reserve ratio r
- ▶ currency ratio c ; excess-reserve ratio e
- ▶ money multiplier m
- ▶ quantitative easing

The one idea to take away

The Fed controls the base; everyone controls the money

$$M = m \times MB, \quad m = \frac{1 + c}{r + e + c}$$

The Fed sets the **monetary base** through open market operations. But the quantity of **money** that base supports depends on the reserve ratio it sets, on *banks'* appetite for excess reserves, and on *depositors'* appetite for cash.

- ▶ This is why QE could swell the base fivefold without a matching surge in money: the multiplier absorbed the difference.
- ▶ Next: **Chapter 15** — the *tools* the Fed uses to set its policy rate and steer this whole process.