

Ajax deposits the check in its account with the Surprise bank. The Surprise bank increases Ajax’s checkable deposits by \$50,000 when Ajax deposits the check. Ajax is now paid in full. Bradshaw is pleased with his new machinery.

Now the Surprise bank has Bradshaw’s check. This check is simply a claim against the assets of the Wahoo bank. The Surprise bank will collect this claim by sending the check (along with checks drawn on other banks) to the regional Federal Reserve Bank. Here a bank employee will clear, or collect, the check for the Surprise bank by increasing Surprise’s reserve in the Federal Reserve Bank by \$50,000 and decreasing the Wahoo bank’s reserve by that same amount. The check is “collected” merely by making bookkeeping notations to the effect that Wahoo’s claim against the Federal Reserve Bank is reduced by \$50,000 and Surprise’s claim is increased by \$50,000.

Finally, the Federal Reserve Bank sends the cleared check back to the Wahoo bank, and for the first time the Wahoo bank discovers that one of its depositors has drawn a check for \$50,000 against his checkable deposit. Accordingly, the Wahoo bank reduces Bradshaw’s checkable deposit by \$50,000 and notes that the collection of this check has caused a \$50,000 decline in its reserves at the Federal Reserve Bank. All the balance sheets balance: The Wahoo bank has reduced both its assets (reserves) and its liabilities (checkable deposits) by \$50,000. The Surprise bank has \$50,000 more in both assets (reserves) and liabilities (checkable deposits). Ownership of reserves at the Federal Reserve Bank has changed—with Wahoo owning \$50,000 less and Surprise owning \$50,000 more—but total reserves stay the same.

Whenever a check is drawn against one bank and deposited in another bank, collection of that check will reduce both the reserves and the checkable deposits of the bank on which the check is drawn. Conversely, if a bank receives a check drawn on another bank, the bank receiving the check will, in the process of collecting it, have its reserves and deposits increased by the amount of the check. In our example, the Wahoo bank loses \$50,000 in both reserves and deposits to the Surprise bank. But there is no loss of reserves or deposits for the banking system as a whole. What one bank loses, another bank gains.

If we bring all the other assets and liabilities back into the picture, the Wahoo bank’s balance sheet looks like this at the end of transaction 5:

Clearing a Check			
Balance Sheet 5: Wahoo Bank			
Assets		Liabilities and net worth	
Reserves	\$ 60,000	Checkable deposits	\$ 50,000
Property	240,000	Stock shares	250,000

Verify that with a 20 percent reserve requirement, the bank’s excess reserves now stand at \$50,000.

QUICK REVIEW 32.1

- When a bank accepts deposits of cash, the composition of the money supply is changed, but the total supply of money is not directly altered.
- Commercial banks and thrifts are obliged to keep required reserves equal to a specified percentage of their own checkable-deposit liabilities as cash or on deposit with the Federal Reserve Bank of their district.
- The amount by which a bank’s actual reserves exceed its required reserves is called excess reserves.
- A bank that has a check drawn and collected against it will lose to the recipient bank both reserves and deposits equal to the value of the check.

Money-Creating Transactions of a Commercial Bank

The next two transactions are crucial because they explain (1) how a commercial bank can literally create money by making loans and (2) how banks create money by purchasing government bonds from the public.

Transaction 6: Granting a Loan

In addition to accepting deposits, commercial banks grant loans to borrowers. What effect does lending by a commercial bank have on its balance sheet?

Suppose the Gristly Meat Packing Company of Wahoo decides it is time to expand its facilities. Suppose, too, that the company needs exactly \$50,000—which just happens to be equal to the Wahoo bank’s excess reserves—to finance this project.

Gristly goes to the Wahoo bank and requests a loan for this amount. The Wahoo bank knows the Gristly Company’s fine reputation and financial soundness and is convinced of its ability to repay the loan. So the loan is granted. In return, the president of Gristly hands a promissory note—a fancy IOU—to the Wahoo bank. Gristly wants the convenience and safety of paying its obligations by check. So, instead of receiving a bushel basket full of currency from the bank, Gristly gets a \$50,000 increase in its checkable-deposit account in the Wahoo bank.

The Wahoo bank has acquired an interest-earning asset (the promissory note, which it files under “Loans”) and has created checkable deposits (a liability) to “pay” for this asset. Gristly has swapped an IOU for the right to draw an additional \$50,000 worth of checks against its checkable deposit in the Wahoo bank. Both parties are pleased.

At the moment the loan is completed, the Wahoo bank's position is shown by balance sheet 6a:

When a Loan Is Negotiated			
Balance Sheet 6a: Wahoo Bank			
Assets		Liabilities and net worth	
Reserves	\$ 60,000	Checkable deposits	\$100,000
Loans	50,000	Stock shares	250,000
Property	240,000		

All this looks simple enough. But a close examination of the Wahoo bank's balance statement reveals a startling fact: When a bank makes loans, it creates money. The president of Gristly went to the bank with something that is *not* money—her IOU—and walked out with something that *is* money—a checkable deposit.

Contrast transaction 6a with transaction 3, in which checkable deposits were created but only as a result of currency having been taken out of circulation. There was a change in the *composition* of the money supply in that situation but no change in the *total supply* of money. But when banks lend, they create checkable deposits that *are* money. By extending credit, the Wahoo bank has “monetized” an IOU. Gristly and the Wahoo bank have created and then swapped claims. The claim created by Gristly and given to the bank is not money; an individual's IOU is not acceptable as a medium of exchange. But the claim created by the bank and given to Gristly *is* money; checks drawn against a checkable deposit are acceptable as a medium of exchange.

Much of the money we use in our economy is created through the extension of credit by commercial banks. This checkable-deposit money may be thought of as “debts” of commercial banks and thrift institutions. Checkable deposits are bank debts in the sense that they are claims that banks and thrifts promise to pay “on demand.”

But certain factors limit the ability of a commercial bank to create checkable deposits (“bank money”) by lending. The Wahoo bank can expect the newly created checkable deposit of \$50,000 to be a very active account. Gristly would not borrow \$50,000 at, say, 7, 10, or 12 percent interest for the sheer joy of knowing that funds were available if needed.

Assume that Gristly awards a \$50,000 building contract to the Quickbuck Construction Company of Omaha. Quickbuck, true to its name, completes the expansion promptly and is paid with a check for \$50,000 drawn by Gristly against its checkable deposit in the Wahoo bank. Quickbuck, with headquarters in Omaha, does not deposit this check in the Wahoo bank but instead deposits it in the Fourth National Bank of Omaha. Fourth National now has a \$50,000 claim against the Wahoo bank. The check is collected in the manner described in transaction 5. As a result,

the Wahoo bank loses both reserves and deposits equal to the amount of the check; Fourth National acquires \$50,000 of reserves and deposits.

In summary, assuming a check is drawn by the borrower for the entire amount of the loan (\$50,000) and is given to a firm that deposits it in some other bank, the Wahoo bank's balance sheet will read as follows after the check has been cleared against it:

After a Check Is Drawn on the Loan			
Balance Sheet 6b: Wahoo Bank			
Assets		Liabilities and net worth	
Reserves	\$ 10,000	Checkable deposits	\$ 50,000
Loans	50,000	Stock shares	250,000
Property	240,000		

After the check has been collected, the Wahoo bank just meets the required reserve ratio of 20 percent (= \$10,000/\$50,000). The bank has *no* excess reserves. This poses a question: Could the Wahoo bank have lent more than \$50,000—an amount greater than its excess reserves—and still have met the 20 percent reserve requirement when a check for the full amount of the loan was cleared against it? The answer is no; the bank is “fully loaned up.”

Here is why: Suppose the Wahoo bank had lent \$55,000 to the Gristly company and that the Gristly company had spent all of that money by writing a \$55,000 check to Quickbuck Construction. Collection of the check against the Wahoo bank would have lowered its reserves to \$5,000 (= \$60,000 – \$55,000), and checkable deposits would once again stand at \$50,000 (= \$105,000 – \$55,000). The ratio of actual reserves to checkable deposits would then be \$5,000/\$50,000, or only 10 percent. Because the reserve requirement is 20 percent, the Wahoo bank could not have lent \$55,000.

By experimenting with other amounts over \$50,000, you will find that the maximum amount the Wahoo bank could lend at the outset of transaction 6 is \$50,000. This amount is identical to the amount of excess reserves the bank had available when the loan was negotiated.

A single commercial bank in a multibank banking system can lend only an amount equal to its initial preloan excess reserves. When it lends, the lending bank faces the possibility that checks for the entire amount of the loan will be drawn and cleared against it. If that happens, it will lose (to other banks) reserves equal to the amount it lends. So, to be safe, it limits its lending to the amount of its excess reserves.

Bank creation of money raises an interesting question: If banks create checkable-deposit money when they lend

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W 32.1

Single bank accounting

their excess reserves, is money destroyed when borrowers pay off their loans? The answer is yes. When loans are paid off, the process just described works in reverse. Checkable deposits decline by the amount of the loan repayment.

Transaction 7: Buying Government Securities

When a commercial bank buys government bonds from the public, the effect is substantially the same as lending. New money is created.

Assume that the Wahoo bank's balance sheet initially stands as it did at the end of transaction 5. Now suppose that instead of making a \$50,000 loan, the bank buys \$50,000 of government securities from a securities dealer. The bank receives the interest-bearing bonds, which appear on its balance statement as the asset "Securities," and gives the dealer an increase in its checkable-deposit account. The Wahoo bank's balance sheet appears as follows:

Buying Government Securities			
Balance Sheet 7: Wahoo Bank			
Assets		Liabilities and net worth	
Reserves	\$ 60,000	Checkable deposits	\$100,000
Securities	50,000	Stock shares	250,000
Property	240,000		

Checkable deposits, that is, the supply of money, have been increased by \$50,000, as in transaction 6. Bond purchases from the public by commercial banks increase the supply of money in the same way as lending to the public does. The bank accepts government bonds (which are not money) and gives the securities dealer an increase in its checkable deposits (which *are* money).

Of course, when the securities dealer draws and clears a check for \$50,000 against the Wahoo bank, the bank loses both reserves and deposits in that amount and then just meets the legal reserve requirement. Its balance sheet now reads precisely as in 6b except that "Securities" is substituted for "Loans" on the asset side.

Finally, the *selling* of government bonds to the public by a commercial bank—like the repayment of a loan—reduces the supply of money. The securities buyer pays by check, and both "Securities" and "Checkable deposits" (the latter being money) decline by the amount of the sale.

Profits, Liquidity, and the Federal Funds Market

The asset items on a commercial bank's balance sheet reflect the banker's pursuit of two conflicting goals:

- **Profit** One goal is profit. Commercial banks, like any other businesses, seek profits, which is why the bank makes loans and buys securities—the two major earning assets of commercial banks.
- **Liquidity** The other goal is safety. For a bank, safety lies in liquidity, specifically such liquid assets as cash and excess reserves. A bank must be on guard for depositors who want to transform their checkable deposits into cash. Similarly, it must guard against more checks clearing against it than are cleared in its favor, causing a net outflow of reserves. Bankers thus seek a balance between prudence and profit. The compromise is between assets that earn higher returns and highly liquid assets that earn no returns.

An interesting way in which banks can partly reconcile the goals of profit and liquidity is to lend temporary excess reserves held at the Federal Reserve Banks to other commercial banks. Normal day-to-day flows of funds to banks rarely leave all banks with their exact levels of required reserves. Also, funds held at the Federal Reserve Banks are highly liquid, but they do not draw interest. Banks therefore lend these excess reserves to other banks on an overnight basis as a way of earning additional interest without sacrificing long-term liquidity. Banks that borrow in this Federal funds market—the market for immediately available reserve balances at the Federal Reserve—do so because they are temporarily short of required reserves. The interest rate paid on these overnight loans is called the **Federal funds rate**.

We would show an overnight loan of reserves from the Surprise bank to the Wahoo bank as a decrease in reserves at the Surprise bank and an increase in reserves at the Wahoo bank. Ownership of reserves at the Federal Reserve Bank of Kansas City would change, but total reserves would not be affected. Exercise: Determine what other changes would be required on the Wahoo and Surprise banks' balance sheets as a result of the overnight loan. (**Key Questions 4 and 8**)

QUICK REVIEW 32.2

- Banks create money when they make loans; money vanishes when bank loans are repaid.
- New money is created when banks buy government bonds from the public; money disappears when banks sell government bonds to the public.
- Banks balance profitability and safety in determining their mix of earning assets and highly liquid assets.
- Banks borrow and lend temporary excess reserves on an overnight basis in the Federal funds market; the interest rate on these loans is the Federal funds rate.

The Banking System: Multiple-Deposit Expansion

Thus far we have seen that a single bank in a banking system can lend one dollar for each dollar of its excess reserves. The situation is different for all commercial banks as a group. We will find that the commercial banking system can lend—that is, can create money—by a multiple of its excess reserves. This multiple lending is accomplished even though each bank in the system can lend only “dollar for dollar” with its excess reserves.

How do these seemingly paradoxical results come about? To answer this question succinctly, we will make three simplifying assumptions:

- The reserve ratio for all commercial banks is 20 percent.
- Initially all banks are meeting this 20 percent reserve requirement exactly. No excess reserves exist; or, in the parlance of banking, they are “loaned up” (or “loaned out”) fully in terms of the reserve requirement.
- If any bank can increase its loans as a result of acquiring excess reserves, an amount equal to those excess reserves will be lent to one borrower, who will write a check for the entire amount of the loan and give it to someone else, who will deposit the check in another bank. This third assumption means that the worst thing possible happens to every lending bank—a check for the entire amount of the loan is drawn and cleared against it in favor of another bank.

The Banking System’s Lending Potential

Suppose a junkyard owner finds a \$100 bill while dismantling a car that has been on the lot for years. He deposits the \$100 in bank A, which adds the \$100 to its reserves. We will record only changes in the balance sheets of the various commercial banks. The deposit changes bank A’s balance sheet as shown by entries (a_1):

Multiple-Deposit Expansion Process			
Balance Sheet: Commercial Bank A			
Assets		Liabilities and net worth	
Reserves	\$+100 (a_1)	Checkable deposits	\$+100 (a_1)
	−80 (a_3)		+80 (a_2)
Loans	+80 (a_2)		−80 (a_3)

Recall from transaction 3 that this \$100 deposit of currency does not alter the money supply. While \$100 of checkable-deposit money comes into being, it is offset by the \$100 of currency no longer in the hands of the public (the junkyard owner). But bank A *has* acquired excess reserves of \$80. Of the newly acquired \$100 in currency, 20 percent, or \$20, must be earmarked for the required reserves on the new \$100 checkable deposit, and the remaining \$80 goes to excess reserves. Remembering that a single commercial bank can lend only an amount equal to its excess reserves, we conclude that bank A can lend a maximum of \$80. When a loan for this amount is made, bank A’s loans increase by \$80 and the borrower gets an \$80 checkable deposit. We add these figures—entries (a_2)—to bank A’s balance sheet.

But now we make our third assumption: The borrower draws a check (\$80) for the entire amount of the loan, and gives it to someone who deposits it in bank B, a different bank. As we saw in transaction 6, bank A loses both reserves and deposits equal to the amount of the loan, as indicated in entries (a_3). The net result of these transactions is that bank A’s reserves now stand at +\$20 (= \$100 − \$80), loans at +\$80, and checkable deposits at +\$100 (= \$100 + \$80 − \$80). When the dust has settled, bank A is just meeting the 20 percent reserve ratio.

Recalling our previous discussion, we know that bank B acquires both the reserves and the deposits that bank A has lost. Bank B’s balance sheet is changed as in entries (b_1):

Multiple-Deposit Expansion Process			
Balance Sheet: Commercial Bank B			
Assets		Liabilities and net worth	
Reserves	\$+80 (b_1)	Checkable deposits	\$+80 (b_1)
	−64 (b_3)		+64 (b_2)
Loans	+64 (b_2)		−64 (b_3)

When the borrower’s check is drawn and cleared, bank A loses \$80 in reserves and deposits and bank B gains \$80 in reserves and deposits. But 20 percent, or \$16, of bank B’s new reserves must be kept as required reserves against the new \$80 in checkable deposits. This means that bank B has \$64 (= \$80 − \$16) in excess reserves. It can therefore lend \$64 [entries (b_2)]. When the new borrower draws a check for the entire amount and deposits it in bank C, the reserves and deposits of bank B both fall by \$64 [entries (b_3)]. As a result of these transactions, bank B’s reserves now stand at +\$16 (= \$80 − \$64), loans at +\$64, and checkable deposits at +\$80 (= \$80 + \$64 − \$64). After all this, bank B is just meeting the 20 percent reserve requirement.