Chapter 33

Money Creation

The Commercial Bank's Balance Sheet:

Is a statement of assets and claims on assets that summarizes the financial position of the bank at a certain time.

Every balance sheet must be balance; this means that the value of assets must equal the amount of claims against those assets.

The claims shown on a balance sheet are divided into two groups: the claims of nonowners against the firm's assets, called *liabilities*, and the claims of the owners of the firm against the firm's assets, called *net worth*.

Total Assets = Total liabilities + capital or *Assets = Liabilities + Net worth.*

Every $1 change in assets must be offset by a $1 change in liabilities + net worth.

تتضمن الميزانية العمومية لأي مصرف تجاري من جانبين ، الجانب الأيمن منها يمثل الموجودات (أواستخدامات أموال المصرف) ، والجانب الأيسر منها يمثل المطلوبات(أو مصادر أموال المصرف) .

وتظهر مكونات الموجودات (الأصول) في الميزانية العمومية متسلسلة حسب سيولتها ، فتظهر الأصول الأشد سيولة (أرصدة نقدية سائلة) في مقدمة الموجودات ، تليها الأقل سيولة ثم الأقل وهكذا ، أما مكونات المطلوبات (الخصوم) فإنها تنظم حسب كلفتها وحجمها ، فتظهر الودائع في البدء فالأصول المقترضة ثم رأس المال الممتلك.

How Banks Create Money

A Single Commercial Bank:

Commercial banks create money by making *loans*.

Let's a series of bank transactions involving balance sheet to establish how individual bank can create money:

Transaction 1: Creating a Bank

Suppose people of the town of Birzeit decide their town needs a new commercial bank to provide banking services for that growing community. Suppose the bank sell, say, $250,000 worth of stock (equity shares) to buyers. What does its balance sheet look like at this stage?

The bank now has $250,000 in cash on hand and $250,000 worth of stock shares outstanding. The cash is an asset to the bank. Cash held by a bank is sometimes called *vault cash* or till money.

Vault cash: cash held by the bank

Creating a bank
Balance Sheet 1: Birzeit Bank

Assets		*Liabilities and net worth*	
Cash	*$250,000*	*Stock shares*	*$250,000*

Transaction 2: Acquiring Property and Equipment

Suppose the directors' purchases a building and office equipment for $240,000.

Cash ↓ by 240,000 and new assets; property = 240,000

Acquiring Property and Equipment
Balance Sheet 2: Birzeit Bank

Assets		*Liabilities and net worth*	
Cash	*$10,000*	*Stock shares*	*$250,000*
Property	*$240,000*		

Transaction 3: Accepting Deposits

Commercial banks have two basic functions:

- To accepting deposits of money
- To make loans to individuals

Suppose that the citizens and businesses of Birzeit decide to deposits $100,000 in the Birziet bank. What happens to the bank's balance sheet?

The bank receives cash, which is an asset to the bank (cash ↑ 100,000).

Suppose this money is deposited in the bank as checkable deposits. These newly created checkable deposits constitute claims that the depositors have against the assets of the bank. (New liability account: checkable deposits = 100,000).

Accepting Deposits
Balance Sheet 3: Birzeit Bank

Assets		*Liabilities and net worth*	
Cash	*$110,000*	*Checkable deposits*	*$ 100,000*
Property	*$240,000*	*Stock shares*	*$250,000*

Transaction 4 : Depositing reserves in a Central bank

All commercial banks and thrift institutions that provide checkable deposits must keep required reserves.

يمكن تعريف الإحتياطي الإلزامي بأنه نسبة تفرض على ودائع البنوك التجارية من قبل البنك المركزي لحماية أصحاب الودائع من إفلاس هذه البنوك في المستقبل من ناحية احترازية، ومن ناحية أخرى تستخدم هذه النسبة التحكم في الاقتصاد وكمية النقد في الأسواق عن طريق زيادة النسبة أو تقليلها.

Required Reserves: are an amount of funds equal to a specified percentage of the bank's own deposits liabilities.

Reserves ratio: the specified percentage of checkable deposit liabilities that a commercial bank must keep as reserves.

$$Reserves\ ratio = \frac{Commercial\ bank's\ required\ reserves}{Commercial\ bank's\ checkable\ deposits}$$

يقوم البنك المركزي بإلزام البنوك التجارية بالاحتفاظ بنسبة معينة من الودائع كاحتياطي قانوني، حيث لا يمكن للبنك التجاري التصرف بهذا المبلغ. وتسمى هذه النسبة بنسبة الاحتياطي القانوني أو الاحتياطي المطلوب (Required Reserve Ratio).

If the reserves ration is %10, the Birzeit bank, having accepted $100,000 in deposits from the public, would have to keep $10,000 as reserves.

Excess Reserves: a bank's excess reserves are found by subtracting its required reserves from its actual reserves.

Excess reserves (ER) = actual reserves (AR) – required reserves (RR)

After the Birzeit bank deposits $110,000 of reserves at the central bank, its balance sheet becomes:

Cash ↓ by required reserves (110,000) and new assets; reserves = 110,000

Depositing reserves in a Central bank
Balance Sheet 4: Birzeit Bank

Assets		*Liabilities and net worth*	
Cash	*0*	*Checkable deposits*	*$ 100,000*
Reserves	*$110,000*	*Stock shares*	*$250,000*
Property	*$240,000*		

Example

Suppose the National Bank of Commerce has excess reserves of $8000 and outstanding checkable deposits of $150,000. If the reserves ratio is 20%, what is the size of the banks actual reserves?

Required Reserves = reserves ratio x checkable deposits = 150,000 x 20% = $30,000

Excess reserves (ER) = actual reserves (AR) – required reserves (RR)

8000 = AR – 30,000

AR = 30,000 + 3000 = $38,000

Example

The Third National Bank has reserves of $20,000 and checkable deposits of $100,000. The reserves ratio is 20%. Households deposit $5000 in currency into the bank that is added to reserves. What level of excess reserves does the bank now have?

After deposit: new actual reserves = 20,000 + 5000 = 25,000

New checkable deposits = 100,000 + 5000 = 105,000

Required reserves = 20% x 105,000 = 21,000

Excess reserves = actual reserves – required reserves = 25,000 – 21,000 = 4,000

Transaction 5: Clearing a Check Drawn against the Bank

Assume that Fadi, a Birzeit farmer, deposited in the Birzeit Bank. Suppose that Fadi buys $50,000 of farm machinery from the AC farm company of Surprise, Fadi pays for this machinery by writing a $50,000 check against his deposit in the Birzeit Bank. He gives the check to the AC Company. What are the results?

- AC company deposits the check in its account with the Surprise bank
- The Surprise bank increases AC company checkable deposits by $50,000 when AC deposits the check.
- Now the Surprise bank has Fadi's check. This check is simply a claim against the assets of the Birzeit Bank.
- The Surprise bank will collect this claim by sending the check to the central bank.
- A bank employee will clear, or collect, the check for the Surprise bank by increasing Surprise's reserves in the central bank by $50,000 and decreasing the Birzeit bank's reserves by that same amount.
- Finally, the central bank sends the cleared check back to the Birzeit Bank and for the first time the Birzeit bank discovers that one of its deposits has drawn a check for $50,000 against his checkable deposit. According, the Birzeit bank reduces Fadi'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 central bank.

Reserves ↓ by 50,000 and Checkable deposits ↓ by 50,000

Clearing a Check Drawn against the Bank

Balance Sheet 5: Birzeit Bank

Assets		*Liabilities and net worth*	
Reserves	*$60,000*	*Checkable deposits*	*$ 50,000*
Property	*$240,000*	*Stock shares*	*$250,000*

Money Creating Transactions of a Commercial Bank

Commercial banks create money by: *Making loans* and by *purchasing government bonds from the public*.

Transaction 6: Granting a Loan

Suppose the Packing Company decides it is time to expand its facilities. Suppose, too, that the company needs exactly $50,000. The company goes to the Birzeit bank and requests loans for this amount.

Checkable deposits ↑ by 50,000 and new asset: Loans = 50,000

When a loan is Negotiated

Balance Sheet 6a : Birzeit Bank

Assets		*Liabilities and net worth*	
Reserves	*$60,000*	*Checkable deposits*	*$ 100,000*
Loans	*$ 50,000*	*Stock shares*	*$250,000*
Property	*$240,000*		

In summary, assuming a check is drawn by the borrower for the entire amount of the loan ($50,000). The Birzeit bank's balance sheet will read as follows after the check has been cleared against it:

Reserves ↓ by 50,000 and Checkable deposits ↓ by 50,000

After a Check is Drawn on the Loan

Balance Sheet 6b : Birzeit Bank

Assets		*Liabilities and net worth*	
Reserves	*$10,000*	*Checkable deposits*	*$ 50,000*
Loans	*$ 50,000*	*Stock shares*	*$250,000*
Property	*$240,000*		

- Banks creates money when they make loans
- A single commercial bank in a banking system can lend only an amount equal to its excess reserves.
- A single bank can lend money to customers only if it has excess reserves.
- Deposits of currency does not alter (تغير) money supply

For example, if a person deposits $75 of currency in his checking account (demand deposits) with a commercial bank. This transaction by itself causes the money supply in the economy to *remain the same*.

Example

If you deposits $80 in a commercial bank which has a 15% reserves ratio, what is the additional amount that bank will be able to lend?

Required reserves = reserves ratio x deposits = 0.15 x 80 = $12

Excess reserves = 80 – 12 = $68

A single commercial bank can lend only an amount equal to its excess reserves = $68

Example

Suppose that commercial bank has the balance sheet shown below and that the reserve ratio is 20%.

Assets		(1)	(2)	Liabilities and net worth		(1)	(2)
Reserves	$22,000	----------	---------	Checkable deposits	$100,000	----------	----------
Loans	$ 40,000	----------	----------				
Securities -	$38,000	----------	---------				

a. What is the maximum amount of new loans that is bank can make?

Required reserves = reserves ratio x Checkable deposits = 0.20 x 100,000 = $20,000

Excess reserves = actual reserves – required reserves = 22,000 – 20,000 = $2,000

A single commercial bank can lend only an amount equal to its excess reserves = $2,000

b. Show in column 1 how the bank's balance sheet will appear after the bank gas lent this additional amount.

Loans ↑ by 2000 and Checkable deposits ↑ by 2000

Assets		*(1)*	*(2)*	*Liabilities and net worth*		*(1)*	*(2)*
Reserves	*$22,000*	*$22,000*	---------	*Checkable deposits*	*$100,000*	*102,000*	----------
Loans	*$40,000*	*$42,000*	---------				
Securities	*$38,000*	*$38,000*	---------				

c. How will the bank's balance sheet appear after checks drawn for the entire amount of the new loans have been cleared against the bank? Show the new balance sheet in column 2.

Reserves ↓ by 2000 and Checkable deposits ↓ by 2000

Assets		*(1)*	*(2)*	*Liabilities and net worth*		*(1)*	*(2)*
Reserves	*$22,000*	*$22,000*	*$20,000*	*Checkable deposits*	*$100,000*	*102,000*	*$100,000*
Loans	*$40,000*	*$42,000*	*$42,000*				
Securities	*$38,000*	*$38,000*	*$38,000*				

Transaction 7: Buying Government Securities

When a commercial bank buys government bonds (securities) form the public new money is created.

Assume that the Birzeit bank's balance sheet initially stands as it did at the end of transaction 5. Now suppose the bank buys $50,000 of government securities.

Buying Government Securities

Balance Sheet 7 : Birzeit Bank

Assets		*Liabilities and net worth*	
Reserves	*$60,000*	*Checkable deposits*	*$ 100,000*
Securities	*$ 50,000*	*Stock shares*	*$250,000*
Property	*$240,000*		

- 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).

- The selling of government bonds to the public by a commercial bank reduces the supply of money.

The Banking System: Multiple Deposit Expansion

- A single bank in a banking system can lend one dollar for each dollar of its excess reserves.
- The commercial banking system can lend (can create money) by a multiple of its excess reserves.

Suppose Ahmad deposits $100 in bank A. if the reserves ratio for all commercial banks is 20%.
The deposit changes bank's A balance sheets as shown by entries (a1)

Multiple deposits expansion process

Balance Sheet : Commercial Bank A

Assets		**Liabilities and net worth**	
Reserves	+ $100	Checkable deposits	+ $100
(a1)		(a1)	
	- $80		+ $80 (a2)
(a3)			- $80
		(a3)	
Loans	+ $80 (a2)		

Required reserves = reserves ratio x deposits = 20% x 100 = $20

Excess reserves = 100 – 20 = $80

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 loans increase by $80 and the borrower gets an $80 checkable deposits. The bank's A balance sheets as shown by entries (a2).

If the borrower draws a check ($80) for the entire amount of the loan, and gives it to someone who deposits it in bank B. Bank A loses both reserves and deposits equal to the amount of the loan, as indication in entries (a3).

The net results of these transactions:

Reserves = + 100 – 80 = $20.
Loans + 80
Checkable deposits = + 100 + 80 – 80 = $100.

When a borrower deposits $80 in bank B. Bank B balance sheet is changed as in entries (b1).

Multiple deposits expansion process

Balance Sheet : Commercial Bank B

Assets		Liabilities and net worth	
Reserves	+ $80	Checkable deposits	+ $80
(b1)		(b1)	
	- $64		+ $64
(b3)		(b2)	
Loans	+ $64		- $64
(b2)		(b3)	

Required reserves = reserves ratio x deposits = 20% x 80 = $16

Excess reserves = 80 – 16 = $64

A single commercial bank can lend only an amount equal to its excess reserves, we conclude that bank B can lend a maximum of $64.

When a loan for this amount is made, bank B loans increase by $64 and the borrower gets an $64 checkable deposits. The bank's B balance sheets as shown by entries (b2).

If the borrower draws a check ($64) for the entire amount of the loan, and gives it to someone who deposits it in bank C. Bank B loses both reserves and deposits equal to the amount of the loan, as indication in entries (b3).

Expansion of the money supply by the commercial banking system:

Bank	(1) Acquired Reserves and Deposits	(2) Required Reserves (Reserve Ratio = .2)	(3) Excess Reserves (1)-(2)	(4) Amount Bank Can Lend; New Money Created = (3)
Bank A	$100.00	$20.00	$80.00	$80.00
Bank B	80.00	16.00	64.00	64.00
Bank C	64.00	12.80	51.20	51.20
Bank D	51.20	10.24	40.96	40.96
Bank E	40.96	8.19	32.77	32.77
Bank F	32.77	6.55	26.21	26.21
Bank G	26.21	5.24	20.97	20.97
Bank H	20.97	4.20	16.78	16.78
Bank I	16.78	3.36	13.42	13.42
Bank J	13.42	2.68	10.74	10.74
Bank K	10.74	2.15	8.59	8.59
Bank L	8.59	1.72	6.87	6.87
Bank M	6.87	1.37	5.50	5.50
Bank N	5.50	1.10	4.40	4.40
Other Banks	21.99	4.40	17.59	17.59
				$400.00

The Money Multiplier

The monetary multiplier or *checkable deposits multiplier* exists because the reserves and deposits lost by one bank become reserves of another bank.

$$\textbf{Monetary multiplier } (m) = \frac{1}{\textbf{Required reserves ratio } (RRR)}$$

Monetary multiplier (m) represents the maximum amount of new checkable deposits money that can be created by a single dollar of excess reserves.

Multiplying the excess reserves (E) by ***m***, we can find the maximum amount of new checkable deposit money that can be created by the banking system.

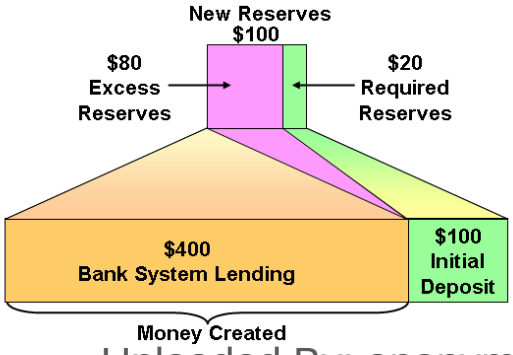
Maximum Checkable Deposit Creation = excess reserves x money multiplier.

For example, a deposit of $10 into a checking account creates an initial checkable deposit of $100. if the reserves ratio is 20%.

Required reserves = reserves ratio x deposits = 20% x 100 = $20

Excess reserves = 100 – 20 = $80
Money multiplier = 1/0.2 = 5

Maximum Checkable (change in money supply) = excess reserves x money multiplier = 80 x 5 = $400 Deposit Creation



- Total money supply = initial deposits + money creation = 100 + 400 = $5

- Higher reserves ratio means lower monetary multiplier (m) and thus less creation of new checkable deposits.

- Smaller reserves ratio means higher monetary multiplier (m) and thus more creation of new checkable deposits.

Example

Suppose the simplified consolidated (تجميعية) balance sheet shown below is for the entire commercial banking system. All figures are in billions. The reserves ratio is 25%.

Assets		(1)	Liabilities and net worth		(1)
Reserves	$52	----------	Checkable deposits	$200	----------
Loans	$ 100	----------			
Securities	$48	----------			

a. *What amount of excess reserves does the commercial banking system have?*

Required reserves = reserves ratio x C.D = 25% x 200 = $50.

ER = AR – RR = 52 – 50 = $2

b. *What is the maximum amount the banking system might lend? Show in column 1 how the consolidated balance sheet would look after this amount has been lent.*

Δ Money supply = money multiplier x ER

Money multiplier (m) = 1 / 0.25 = 4

Δ Money supply = 4 x 2 = $8 (the maximum amount the banking system might lend).

Assets			Liabilities and net worth		
Reserves	$52	**$ 52**	Checkable deposits	$200	**$ 208**
Loans	$ 100	**$108**			
Securities	$48	**$48**			

Example:

Consider the following data:

Assets		Liabilities and net worth	
Actual Reserves	$ 50,000	Checkable deposits	$ 180,000
Loans	$ 380,000		
Securities	$ 150,000	net worth	$ 400,000

Assume that the required reserves ratio = 25%.

First, if the above balance sheet id for **one commercial bank** (Bank One)

a. *How much is the excess reserves in this bank?*

RR = Resaves ratio x CD = 25% X 180,000 = 45,000

ER = AR – RR = 50,000 – 45,000 = $5,000

b. *Can this bank lend any money? If yes, how much? If not, why?*

Yes it can lend, since a single commercial bank can lend only an amount equal to its excess reserves = $5,000

Second, if the above balance sheet is for the **whole banking system**.

c. *What is the value of the money multiplier?*

Money multiplier (m) = 1 / reserves ratio = 1/0.25 = 4

d. *By how much money supply can be increased or decreased in this economy?*

When a bank make loans its creates money ⇨ money supply increase

Δ Money supply = money multiplier x ER = 4 x 5000 = $20,000 increase in money supply.