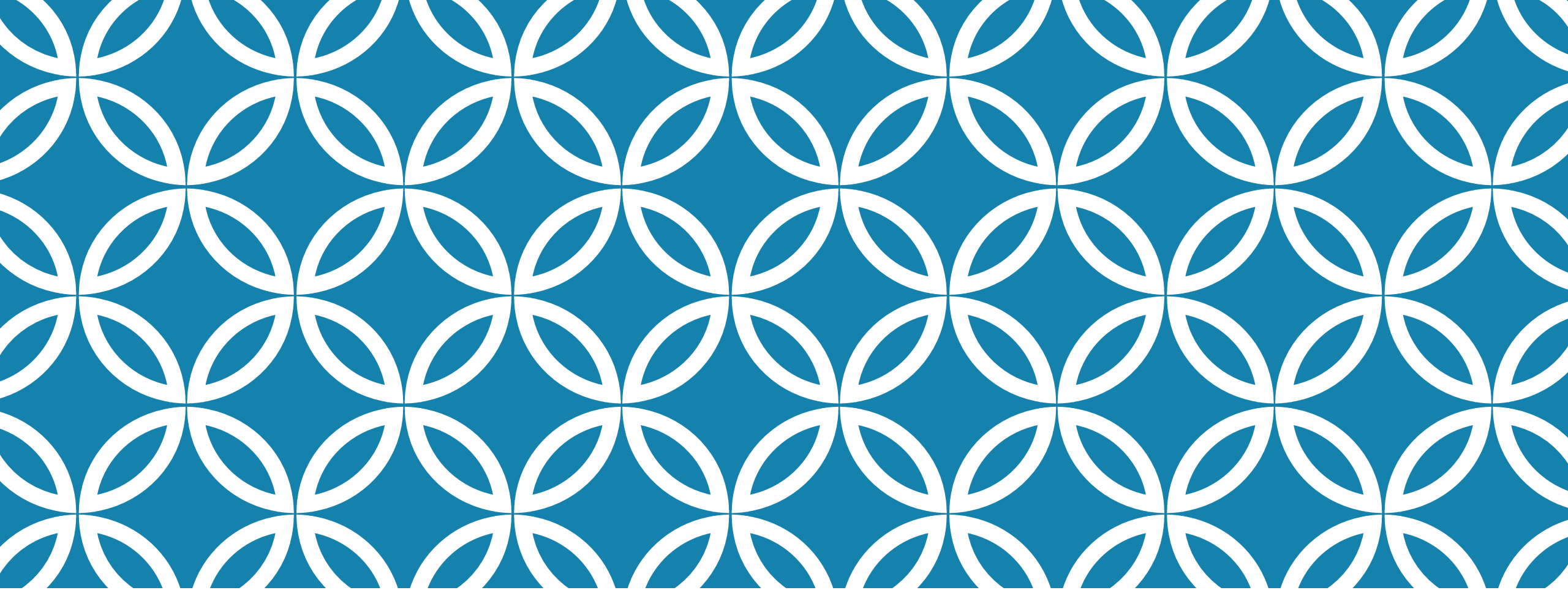

MONEY, FINANCIAL SYSTEM AND MONETARY POLICY

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AGENDA

- Money and financial system
- **Deposit creation process**
- Interest rate determination
- A primer on monetary policy

FUNCTIONS OF COMMERCIAL BANKS: DEPOSIT CREATION

- **Commercial banks**
  - **Take deposits:** *checking deposit*, saving deposit and time deposit
  - **Originate loan:** grant loan to potential borrowers
  - **Facilitate the payments:** branching network
  - **Creation and destruction of deposit**

DEPOSIT CREATION PROCESS

- **What is the creation and destruction of deposit?**
  - Bank can accept deposit from households/firms.
    - The deposit is called "*primary deposit*"
  - The impact of "*primary deposit*" on bank is profound.
    - First, bank has more funding to create loan.
    - Second, most loans are created in terms of "*credit line*" – i.e. the type of credit loan granted in terms of *checking account balance*
    - Thirdly, the loan creation can be created in *multiple rounds* in the banking system, as well as checking account balance created

DEPOSIT CREATION PROCESS: BANK'S BALANCE SHEET

- Understanding deposit creation/destruction is important for *the control of money supply*
  - e.g. Controlling the amount of cash and *checking account* combined
- To understand how commercial banks create/destroy deposit in the financial system, we need to understand *basic of banking operations*
- The best to understand about banking operations is to look at the *bank's balance sheet*

DEPOSIT CREATION PROCESS: BANKS OPERATION

- **Bank's balance sheet**

  - Balance sheet is a financial account that summarizes the *end-of-period* financial status of a corporate or a household's *financial investment*
    - **Financial investment:** Obtain funding to invest, and hence generate return
  - The balance sheet comprises of two parts: *Assets and Liabilities*
    - **Liabilities:** source of funding and cost of funding
    - **Assets:** how one generates return on investment out of the funding acquired

DEPOSIT CREATION PROCESS: BANKS OPERATION

- A simplified bank's balance sheet

Assets	Liabilities
Loans	Deposits
Market-table securities	Borrowings
Reserve	

DEPOSIT CREATION PROCESS: BANKS OPERATION

Assets	Liabilities
Loans	Deposits
Market-table securities	Borrowings
Reserve	

- What is **reserve?**
  - Cash collected on banks
  - Used to handle with the *deposit outflows!*
  - Usually placed in the *vault cash of commercial banks* or *deposited at the central bank*

- **Type of reserve holding**
  - *Required reserve:* legal reserve requirement
  - *Excess reserve: The amount of actual reserve that exceeds the required level*
    - *Benefit and cost of excess reserve?*

DEPOSIT CREATION PROCESS: BANKS OPERATION

Assets	Liabilities
Loans	Deposits
Market-table securities	Borrowings
Reserve	

- Assumptions:

  - Banking system comprises of a number of banks: Bank-A, Bank-B, Bank-C, ..etc
  - Each bank does not hold excess reserve
  - No cash withdrawal along the deposit creation process

DEPOSIT CREATION PROCESS: PRIMARY DEPOSIT AND CHANGE IN AVAILABLE RESERVE

- **Suppose that bank-A takes a primary deposit = ($10,000) a household (Mr.One)**
  - The direct impact is that Bank-A deposit will rise by $10,000, as well as the reserve
  - The direct impact is to cause ***an increase in reserve by $10,000***.

Bank-A

Assets	Liabilities
Reserve = + $10,000	Deposits = +$10,000

- What would bank-A do for the additional reserve of $10,000?

DEPOSIT CREATION PROCESS: AVAILABLE RESERVE AND CREDIT LOAN ORIGINATED

- **Suppose that bank-A takes a primary deposit = ($10,000) a household**
  - Bank-A will adjust its investment; it will hold reserve equal to $1,000, i.e. required reserve is 10%
  - The remaining (+$9,000) is allocated to loan creation
    - Suppose that the loan is granted to "Mr.A"

bank-A

Assets	Liabilities
Reserve = +$1,000	Deposits = +$10,000
Loans = +$9,000	

DEPOSIT CREATION PROCESS: DEPOSIT WITH ANOTHER BANK

- As Mr. A has credit line equal to $9,000, he can presumably use the credit line to purchase goods and service from others (say "Mr.B")
  - Mr.A may pay Mr.B by writing him a check.
- When Mr. B receives the payment from Mr.A, he can deposit the check into his checking account opened at Bank-B
  - Suppose the value of transaction is worth $9,000. Bank-B will be receiving a new deposit from Mr.B, equal to $9,000

Bank-B

Assets	Liabilities
Reserve = +$9,000	Deposits = +$9,000

DEPOSIT CREATION PROCESS: LOAN CREATED AT ANOTHER BANK

- With additional funding, bank-B can make use the deposit to create loan
- Given the 10% reserve requirement, the maximum amount of loan that Bank-B can create is equal to $8,100
  - Bank-B holds reserve worth of $900

bank-B

Assets	Liabilities
Reserve = +$900	Deposits = +$9,000
Loans = +$8,100	

DEPOSIT CREATION PROCESS: DEPOSIT WITH OTHER BANKS

- Suppose that Bank-B granted loan to a borrower, say Mr.C.
- Mr.C can use the credit loan to make payments to the purchase of goods and service from a seller, say Mr.D.
- Suppose that Mr.D has a checking account opened at Bank-C
  - Bank-C will receive a new funding in terms of the deposit made by Mr.D, equal to $8,100

Bank-C

Assets	Liabilities
Reserve = +$8,100	Deposits = +$8,100

DEPOSIT CREATION PROCESS: THINGS GET REPEATED!

- Things will get repeating!
- Bank-C can create a new credit loan to a borrower; the maximum amount of loan created is equal to $7,290
- The amount will find its way to other banks, causing an increase in funding of those banks, and hence resulting in many more rounds of credit and checking deposit created.
- The whole storyline described captures the concept of *(multiple) deposit creations*

MULTIPLE DEPOSIT CREATION PROCESS

	Holding Reserve	Loan created	Deposit
Bank-A	+1,000	+9,000	+10,000
Bank-B	+900	+8,100	+9,000
Bank-C	+810	+7,290	+8,100
Bank-D	+729	+6,561	+7,290

→ $+10{,}000*(1-0.1)$

→ $+10{,}000*(1-0.1)^2$

→ $+10{,}000*(1-0.1)^3$

Total Deposit $= 10{,}000 + 10{,}000*(1-0.1) + 10{,}000*(1-0.1)^2 + 10{,}000*(1-0.1)^3 + \ldots$

$= 10{,}000*\frac{1}{(1-(1-0.1))} = 10{,}000*\frac{1}{0.1} =$ **$100,000**

DEPOSIT MULTIPLIER

- Given the initial deposit placed at Bank-A, banking system can create new loans and deposits for many rounds.

- The total change of deposits will be equal to $\frac{1}{rr} \times R$
  - R = initial change in the reserve
  - rr = reserve requirement ratio

DEPOSIT MULTIPLIER: DERIVATION

	Reserve	Loan created	Deposit
Bank-A	$+rr * R$	$+\mathrm{R} * (1 - rr)$	$+\mathrm{DD} = +\mathrm{R}$
Bank-B	$+\mathrm{R} * (1 - rr) * rr$	$+\mathrm{R} * (1 - rr)^2$	$+\mathrm{R} * (1 - rr)$
Bank-C	$+\mathrm{R} * (1 - rr)^2 * rr$	$+\mathrm{R} * (1 - rr)^3$	$+\mathrm{R} * (1 - rr)^2$
Bank-D	$+\mathrm{R} * (1 - rr)^3 * \mathrm{rr}$	$+\mathrm{R} * (1 - rr)^4$	$+\mathrm{R} * (1 - rr)^3$

Total Deposit $= 10{,}000 + 10{,}000*(1 - rr) + 10{,}000*(1 - rr)^2 + 10{,}000*(1 - rr)^3$

DEPOSIT DESTRUCTION

- **Deposit destruction**: opposite of the deposit creation

  - While a new deposit, and hence the increase in reserve, can create multiple deposits in banking system, *a deposit outflow or reserve short-fall can generate the multiple deposits destruction*