1. **Bank balance sheets**

2. **Reserve Management**
   - Holding reserves
   - Borrowing from other banks => Fed-funds market
   - Borrowing from the Fed => Discount loans (regular and term auction)

3. **Asset & Liability Management**
   Issues: Risk, Return & Liquidity  (Like Mishkin ch.5)
   - **Credit risk**: The economic role of banks is to evaluate borrowers
   - **Interest Rate Risk**: Short-term deposits and longer-term loans
   - **Liquidity Risk** => Reserve management
The Essence of Banking: Deposits & Loans

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans L</td>
<td>Deposits D</td>
</tr>
<tr>
<td>Reserves R</td>
<td>Bank Capital</td>
</tr>
</tbody>
</table>

- **Deposits D.** Pay interest rate $i_D$ => Cost of deposit-taking: $[i_D + \text{expenses}] \cdot D$
- **Loans L.** Pay interest rate $i_L$ => Earnings: $[i_L - \text{(monitoring cost)} - \text{(default rate)}] \cdot L$
- After adjusting for: Credit risk => Monitoring cost
- Deposit taking & lending is profitable if $(i_L - i_D)$ exceeds the cost

- **Reserves R** = Vault cash or balance in a Federal Reserve account
  - Reserves do not pay interest. They reduce deposits that can be loaned out
    => Task of reserve management: Keep R low.
  - U.S. currently: Required reserve ratio $rr = 10\% = \frac{R}{D}$ (with loopholes)

- **Bank Capital**: protection against loan losses, but expensive: leverage raises ROE. Regulated to prevent deposit insurance losses.
The Economics of a Simple Bank

• **Credit Risk**: common to all lenders
  - Adverse selection. Moral Hazard. Should banks avoid credit risk? (No!)
  - Risk reduction: screening; monitoring; loan covenants; collateral; long-term relations (+information across business lines, e.g. checking transactions)
  - Risk management: diversification; sufficient equity capital; securitization.

• **Interest Rate Risk**: threat to many lenders
  - Long-term loans & short-term deposits. Should banks avoid this risk? (Yes!)

• **Liquidity Risk**: specific to banks as deposit-taking institutions
  - Deposits can be withdrawn any time => Threat of a **Bank Run**
    - Conflict between maintaining liquidity and minimizing cost of reserves.
    - Gives the Fed power over the banking system as provider of liquidity
  - Need to maintain liquidity explains most other items on banks’ balance sheets
# Bank Balance Sheets

**TABLE 1**

<table>
<thead>
<tr>
<th>Assets (Uses of Funds)*</th>
<th>Liabilities (Sources of Funds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves and cash items</td>
<td>Checkable deposits</td>
</tr>
<tr>
<td>Securities</td>
<td>Nontransaction deposits</td>
</tr>
<tr>
<td>U.S. government and agency</td>
<td>Small-denomination time deposits</td>
</tr>
<tr>
<td>State and local government and other securities</td>
<td>($&lt;100,000) + savings deposits</td>
</tr>
<tr>
<td>Loans</td>
<td>Large-denomination time deposits</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>Borrowings</td>
</tr>
<tr>
<td>Real estate</td>
<td>Bank capital</td>
</tr>
<tr>
<td>Consumer</td>
<td></td>
</tr>
<tr>
<td>Interbank</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Other assets (for example, physical capital)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
</tbody>
</table>

*In order of decreasing liquidity.


[Notes on Banking - P.4]
**Liquidity Management Perspective**

- Balance sheet items motivated by liquidity management:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans to customers (L)</td>
<td>Deposits (D)</td>
</tr>
<tr>
<td>Reserves (R)</td>
<td>Loans from the Fed (BR)</td>
</tr>
<tr>
<td>Loans to other banks</td>
<td>Loans fr. other banks</td>
</tr>
<tr>
<td>Liquid securities</td>
<td>Negotiable CDs</td>
</tr>
<tr>
<td>Bank Capital</td>
<td></td>
</tr>
</tbody>
</table>

- Overnight loans between banks = The Fed-funds market

- The Fed balance sheet:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans to Banks</td>
<td>$</td>
</tr>
<tr>
<td>Reserve Account - Bank#1</td>
<td>$$</td>
</tr>
<tr>
<td>Reserve Account - Bank#2</td>
<td>$$</td>
</tr>
<tr>
<td>Reserve Account - Bank#3</td>
<td>$$</td>
</tr>
</tbody>
</table>
Bank Runs and Bank Regulation

- Economics of demand deposits:
  Depositors value the option of immediate withdrawal, but most deposits are not withdrawn quickly. Banks can use a large fraction of their deposit volume as funding source for longer-term, illiquid assets (bank loans).

- **Bank Run**: game situation with multiple equilibrium outcomes.
  - Normal play: Expect the bank to be solved. Withdraw balances only when needed. Bank is solvent.
  - Run equilibrium: Expect the bank to fail. Everyone wants to withdraw. Bank is forced to sell illiquid assets at “fire sale” prices. Bank is insolvent.
  - Common solutions for banks: Discount Loans. Deposit Insurance.

- Problem:
  - Guarantees create incentives to make risky investments. If returns are high, stockholders/managers profit. If low, government/taxpayers pay.
  - Common solutions: Regulations imposing minimum capital requirements.
**Bank Capital Requirements**

- Expressed as minimum ratio equity/assets, or maximum leverage (assets/equity)
- Basic U.S rules: ratio $\geq 5\%$ is well capitalized; regulatory restrictions if ratio $< 3\%$
  - Problems: ratio based on book values; incentive to hold risky assets.

- International rules ("Basel" standards): ratios based on risk-weighted assets
  - Basel I (1988): risks measured by credit rating & asset type (for most banks).
  - Problems: Low weight on AAA. Zero on governments debt (=the regulators!).
    - $\Rightarrow$ Incentives to “engineer” AAA securities; lending to governments.
  - Basel III (by 2019): higher capital requirements – more sophisticated?
    - Promising: higher capital buffer for large institutions.
The Financial Crisis: Runs on Non-Banks & The TBTF problem

• **Can bank runs occur at non-bank institutions?** (Investment banks etc.)
  - Traditional answer: No. Investment banks hold liquid assets (securities), so they can and do provide collateral to their “depositors”.
  - **Repo** = Overnight loans structured as sale and repurchase of securities. Typically “rolled over” daily. Normally provides stable funding source.
  - Crisis: Liquid securities turn illiquid (e.g., MBS). Repo lenders expect failure of future rollovers => Everyone stops lending. Result: run equilibrium.

• **Too Big To Fail** (TBTF): Concern about “systemic risk” = chain reaction of failures. Motivates government interventions. Key distinction:
  - Central Bank as **Lender of Last Resort**: emergency loans at penalty rates. [Note: Fed interventions in 2007-09 have been profitable.]
  - **Bailout**: Government payment without expectation of full repayment.

• Sensible mitigation measures: capital requirements; relation to size/TBTF risk