

# BANKING



## **Tutorial 08 – Liquidity**

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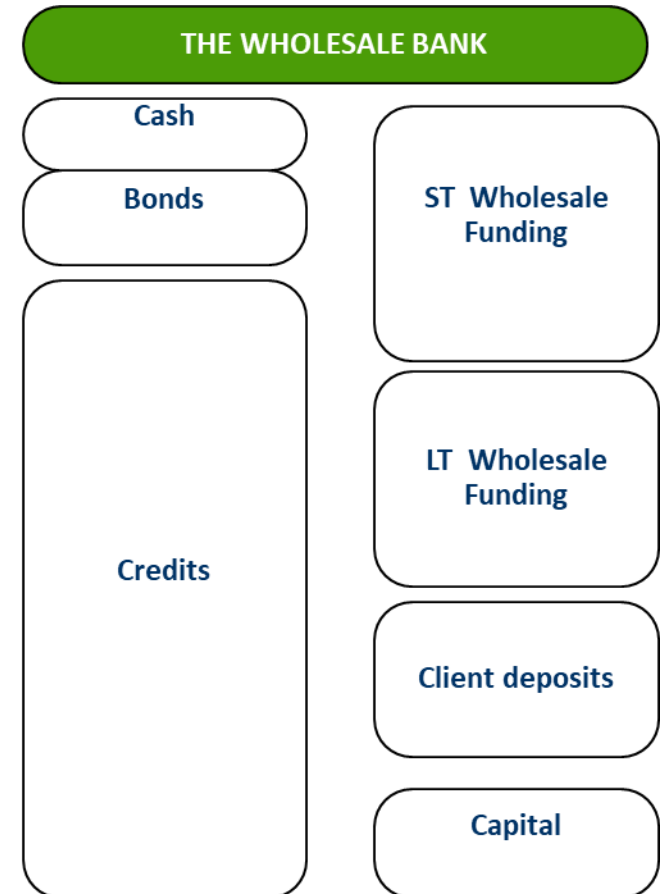
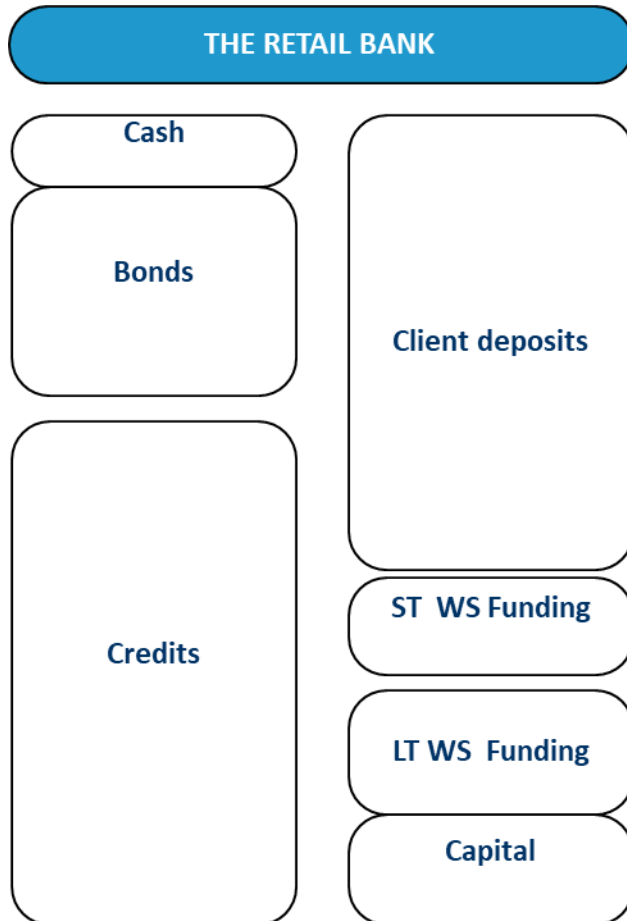
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2. Liquidity management
3. Exercises



# Liquidity & Funding – basic terms

## Two archetypes of banks



## Wholesale versus retail

### THE RETAIL BANK

- Excess deposits
- Large investments in government bonds
- Loans to deposits < 100
- ‘Liability driven’ = find a profitable investment of client deposits
- Czech banks
- Belgian (<2004 & >2012)
- German landesbanken

### THE WHOLESALE BANK

- Structural shortage of funding
- No ‘natural’ investment portfolio
- LTD > 100
- ‘Asset driven’ = find suitable funding for credit portfolio
- ABN, Rabobank, ING, SocGen
- Extreme case: Dexia

## General liquidity / liquidity of a bank

*Illiquidity, rather than poor asset quality is the immediate cause of most bank failures.*

*Robert Morris Associates*

**General liquidity** represents ability to meet proper obligations (short-term) in a corresponding volume and time structure

**Banking liquidity** is its ability to react upon demand on the requests of depositors (generally creditors) to withdraw their deposits (in cash or by an order)

## Liquidity & Funding – basic terms

# Further definitions of liquidity

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*IMF (2008): Ability of a solvent institution to make agreed-upon payments in a timely fashion.*

*Borio (2000), Brunnermeier and Pedersen (2007): Ability to raise cash at short notice either via asset sales or new borrowing.*

*Drehmann and Nikolaou (2009): Ability of an institution to settle obligations with immediacy*

# Satisfactory liquidity

**Satisfactory liquidity** is the ability to refinance liabilities at or below market rates (or to be financed without excessive costs).

We distinguish three types of liquidity:

- short-term liquidity (up to 1 month),
- medium-term liquidity (1 month to 1 year),
- long-term liquidity (over 1 year).

# Liquidity risk

**Liquidity risk** is a probability of the situation when a bank cannot meet its proper (both cash and payment) obligations as they become due.

Liquidity risk arises from different timing of cash flows of assets and liabilities.

Liquidity risk is closely related to interest rate risk and therefore these two risks occur together in bank management.

*Can be mitigated via holding highly liquid assets that can be sold in case of a stressed outflow of non-term funding.*



## Liquidity & Funding – basic terms

# Liquid assets

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**Liquid assets** can be turned into cash quickly and at a low transaction cost with little or no loss in principal value:

- cash
- overnight lending
- repos
- T-bills
- ...

## Liquidity & Funding – basic terms

### Question 1

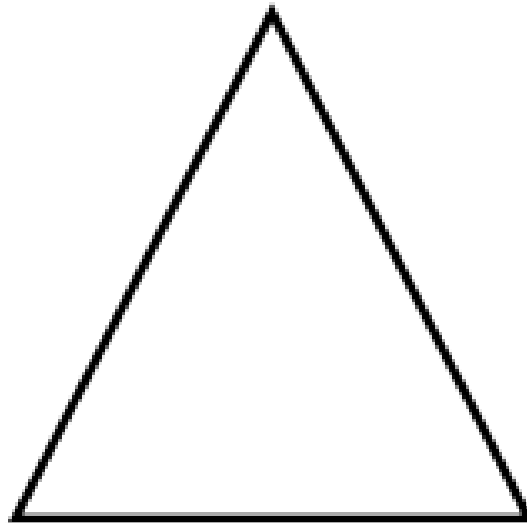
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Which department in a bank is responsible for a bank to be within liquidity limits?

# Liquidity & Funding – basic terms

## Question 2

Which items are at the points of magical(/impossible/holy) triangle? Explain the concept.



## Liquidity & Funding – basic terms

### Question 3

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Explain, why does Basel III introduce two liquidity measures. Why using only one measure may be insufficient?

## Liquidity & Funding – basic terms

# Liquidity versus Funding

### Liquidity:

Can a company generate sufficient liquidity to service its short term debt ?

### Funding:

Attract own equity and funding to fund LT credit portfolios

# Funding risk

**Funding risk** is a risk that bank's activities are funded with insufficiently stable funding.

Can be mitigated via attracting more stable funding, but this comes at a cost that needs to be earned by the business.

*For example funding through short-term wholesale funding may dry up and the bank has to either sell the portfolio at a loss or finance with more expensive alternatives.*

## Liquidity under Basel III

Two central measures:

### 1) Liquidity Coverage Ratio (LCR)

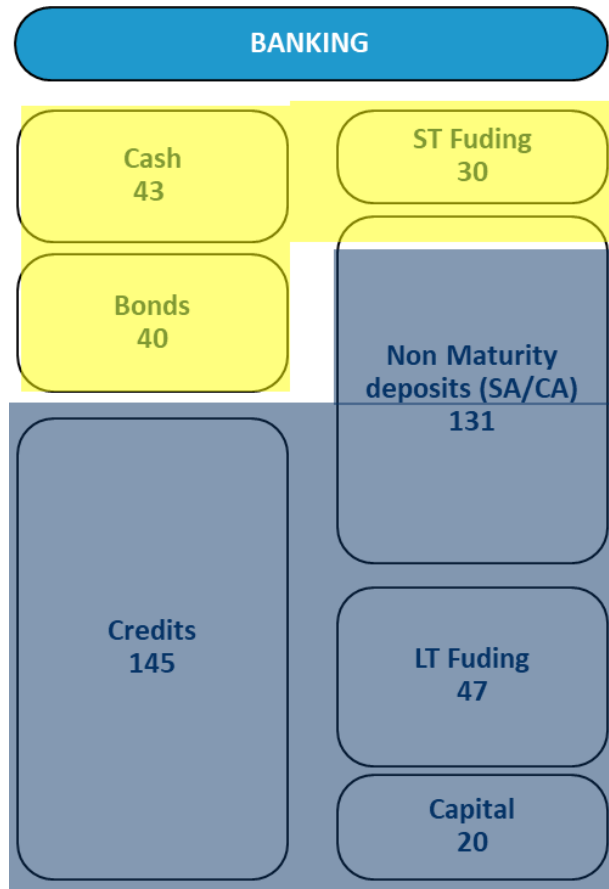
$$\text{LCR} = \frac{\text{stock of high-quality liquid assets}}{\text{total net cash outflows over the next 30 days}} \geq 100\%$$

### 2) Net Stable Funding Ratio (NSFR)

$$\text{NSFR} = \frac{\text{available amount of stable funding}}{\text{required amount of stable funding}} \geq 100\%$$

# Liquidity & Funding – basic terms

## Liquidity under Basel III



LCR

**LCR = Stress Test**

Outflows over 30days to be covered by liquid assets (cash and bonds)



NSFR

**NSFR (Net Stable Funding Ratio)** regulation, which requires banks to hold sufficient stable funding (>1y) to cover long term assets (>1y).

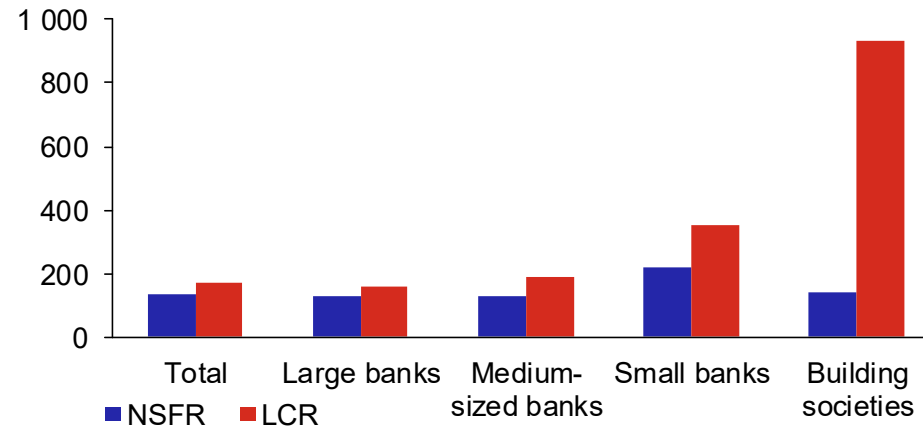


# Liquidity & Funding – basic terms

## Liquidity in the Czech Banking sector

**Chart III.14**  
**Comparison of selected indicators of bank balance-sheet liquidity**

(%; as of 31 March 2020)



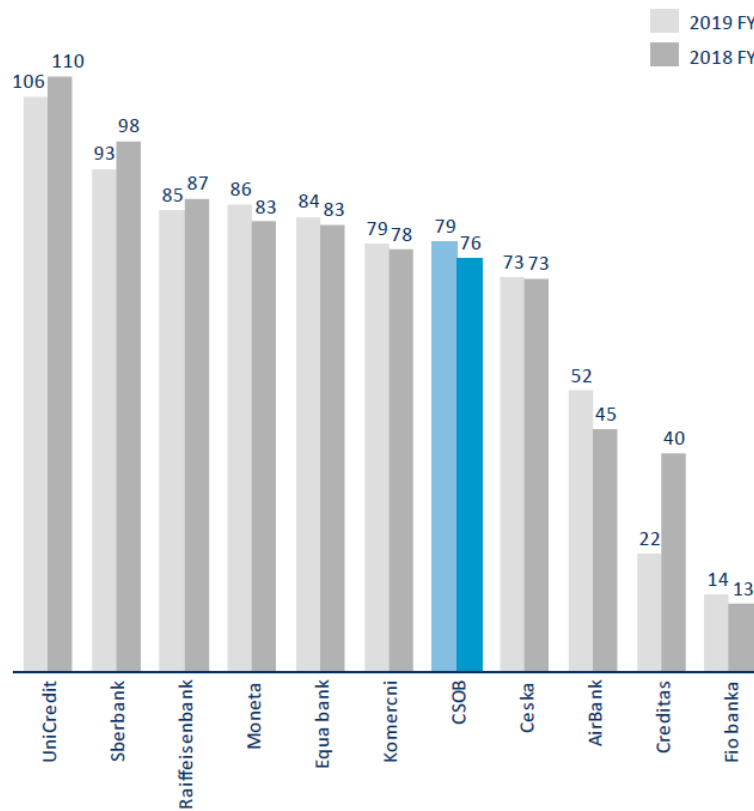
Source: CNB

Note: The LCR is the ratio of the liquidity buffer to the net liquidity outflow of banks over a 30-day stress horizon as defined by EC Regulation 2015/61. The NSFR is the ratio of available stable funding to required stable funding as defined by Basel III. The results take liquidity subgroups into account and exclude state-owned institutions.

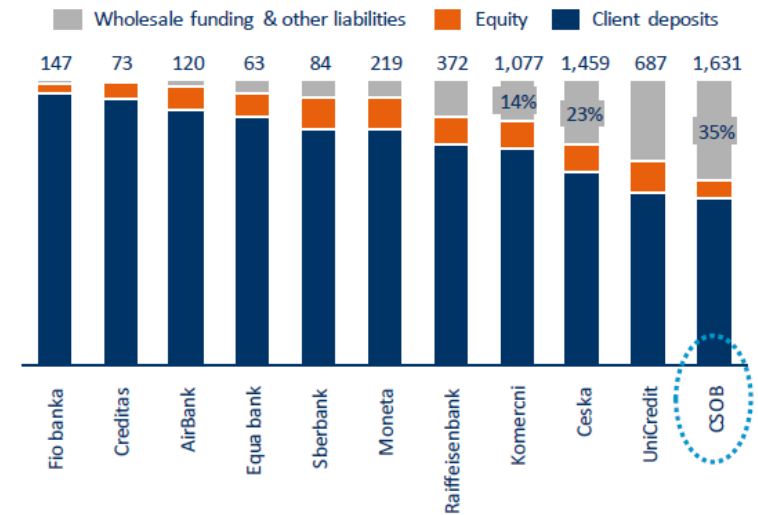
# Liquidity & Funding – basic terms

## Liquidity in the Czech Banking sector

L/D (loan-to-deposit ratio), (%)



Balance sheet (CZKbn)



Source: SCALPing Czech banks FY 2019, presentation prepared by ČSOB Investor relations

## Liquidity & Funding – basic terms

### Question 4 – Funding or liquidity?



Jean Valjean has no assets and a limited income.  
He found a job in Paris and needs to buy a car of EUR 8000 to get to work.

Is Jean Valjean facing liquidity or funding issue?

## Liquidity & Funding – basic terms

# Question 5 – Funding or liquidity?



The Trump family owns the following assets: Tower in New York, mansion in Florida, seven golf courses, five boats, one jet, different loans given to Russian Oligarchs to fund Moscow real estate, limited cash (100.000 EUR) at KBC to profit from the European Deposit Scheme.

In December 2019, US congress publishes the tax returns from the Trump family and sees no taxes were paid for the last 15 years. The IRS gives the Trump family a fine of USD 1.2 bn.

Is Mr. Trump facing liquidity or funding issue?

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# Liquidity management

## Question 6

Consider the assets (in millions) of two banks, A and B. Each bank is funded by \$120 million in deposits and \$20 million in equity.

- Which bank has the stronger liquidity position?
- Which bank probably has a higher profit?

### Bank A Asset

Cash	\$10
Treasury securities	\$40
Commercial loans	<u>\$90</u>
Total Assets	<u><u>\$140</u></u>

### Bank B Assets

Cash	\$20
Consumer loans	\$30
Commercial loans	<u>\$90</u>
Total Assets	<u><u>\$140</u></u>

# Two sides of liquidity risk

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A bank is facing two main liquidity risks of the balance sheet:

- **Liability-side liquidity risk:** the deposit drain or even runs on banks, or a limited access to an inter-bank market.
- **Asset-side liquidity risk:** OBS activities appear on the balance sheet (commitments)

# Liquidity management

## Liability side causes

- Reliance on **demand deposits**
  - Depository institutions need to be able to predict distribution of net deposit drains
    - Seasonality effects in net withdrawal patterns (salaries, mortgage payment days, holidays, Black Fridays)
  - Existence of core deposits
    - on-demand deposits may have longer duration (demand deposit modelling)
    - Distinguish transaction and savings deposits (interest rate sensitivity)
- Reliance on **wholesale funding**
  - In order to raise leverage, the banks started to use also other sources, often provided on short-term, roll-over basis (repos, interbank money market)
  - Interbank market may disappear during crisis



# Liquidity management

## Question 7

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Rank demand deposits (current accounts) according to the expected (real) duration:

- a) private current accounts,
- b) SME current account,
- c) big international company current account

Explain.

# Liquidity management

## Asset side causes

- Unexpected flows of funds:
  - May result from off-balance sheet loan commitments (credit lines, letters of credit: Risk that many borrowers will take down commitments at the same time and strain bank liquidity)
  - Stock market crash in early 2000s – big cash inflow from shares to accounts
- May be forced to liquidate assets too rapidly
  - It may be impossible to sell some assets
  - Faster sale may require much lower price
  - Prevention: minimal reserves, liquidity requirements (Basel III)

## Liquidity management

# Basic liquidity management techniques

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In general, a bank can solve its liquidity problems either through:

**Purchased liquidity management** (e.g. raising funds from inter-bank markets) or

**Stored liquidity management** (e.g. a decrease in cash/liquid assets)

## Liquidity management

# Purchased liquidity management

**Purchased Liquidity** - increase in **borrowed funds** to offset deposit outflow, e.g. Fed Funds, inter-bank market, CDs or notes

- **Advantage:** Balance Sheet remains the same size. Entire adjustment takes place on liability side, maintaining the asset amounts
- **Disadvantage:** The new borrowed funds might be at a higher interest rate than the original deposits, lowering bank income/profits

## Liquidity management

# Stored liquidity management

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**Stored Liquidity** – decrease in **assets** (cash, reserves, loans, securities) to counteract deposit outflow

- **Advantage:** Bank can adjust to deposit outflow internally, no need to go outside of the bank
- **Disadvantage:** Effect on Net Income

## Liquidity management

# Example: stored vs. purchased liquidity

Assume there will be a deposit outflow of \$2m from core deposits, which pay 6%. Loans pay 8%, and new short-term deposit money (subordinated debt is 7.5%).

**Stored Liquidity:** Reduce loans by \$2m to meet deposit outflow, assume sale of loans at book value, no capital loss. Bank will lose \$2m, profit spread of 2% (8%-6%), for a loss of -\$40,000 income.

**Purchased Liquidity:** Bank will have to pay 7.5% on new funds to replace 6% deposits, for a decrease in net income of -1.5% (higher interest expense) x \$2m = -\$30,000.

### **Conclusion:**

In this case, purchased liquidity is the better option: -\$30,000 vs. -\$40,000.

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## Liquidity management

# Exercise I (Bank run)

- a) What is a bank run? (e.g. IPB bank in 2000, BAWAG in 2007)
- b) What are some possible withdrawal shocks that could initiate a bank run?
- c) What feature of the demand deposit contract provides deposit withdrawal momentum that can result in a bank run? (disregard deposit insurance schemes)



## Liquidity management

# Exercise I (Bank run) - solution

- a) A bank run is an unexpected increase in deposit withdrawals from a bank.
- b) Bank runs can be triggered by several economic events including:
  - 1) concern's about solvency relative to other banks
  - 2) failure of related banks
  - 2) sudden changes in investor preferences regarding the holding of nonbank financial assets.
- c) The first come, first serve (full pay or no pay) nature of a demand deposit contract encourages priority positions in any line for payment of deposit accounts. Thus, even though money may not be needed, customers have incentive to withdraw their funds.

# Liquidity management

## Exercise 2 (Liability side liquidity risk)

The following tables show the balance sheet of Students Bank before and after an unexpected deposit drain worth CZK 5 billion. Prepare a balance sheet if:

- The bank will react through a purchase of funds in an inter-bank market.
- The bank will cut the cash volume.

<b>Before the Drain</b>			
<b>Assets</b>		<b>Liabilities</b>	
Cash	10	Deposits	75
Loans	60	Borrowed funds	15
Other assets	<u>30</u>	Capital	<u>10</u>
	<b>100</b>		<b>100</b>

<b>After the Drain</b>			
<b>Assets</b>		<b>Liabilities</b>	
Cash	10	<b>Deposits</b>	<b>70</b>
Loans	60	Borrowed funds	15
Other assets	<u>30</u>	Capital	<u>10</u>
	<b>100</b>		<b>95</b>

# Liquidity management

## Exercise 2 – solution a)

**Ad a)** The balance sheet's structure indicates that loans from inter-bank markets are included in borrowed funds, hence they will increase by CZK 5 billion

### Adjustment through Liability Management

Assets		Liabilities	
Cash	10	<b>Deposits</b>	<b>70</b>
Loans	60	<b>Borrowed funds</b>	<b>20</b>
Other assets	30	Capital	10
	<u>100</u>		<u>100</u>

# Liquidity management

## Exercise 2 – solution b)

**Ad b)** In the case of stored liquidity management, a bank will cut the cash volume by CZK 5 billion

<b>Adjustment through Reserve Assets</b>			
<b>Assets</b>		<b>Liabilities</b>	
Cash	5	<b>Deposits</b>	<b>70</b>
Loans	60	Borrowed funds	15
Other assets	30	Capital	10
	<u>95</u>		<u>95</u>

# Liquidity management

## Exercise 3

Consider a small bank with assets worth CZK 15 billion consisting of CZK 2 billion in cash and CZK 13 billion in loans. On the liability side, it has core deposits of CZK 8 billion, short-term debt of CZK 6 billion, and equity of CZK 1 billion. It is expected that changes in interest rates will cause a drain of CZK 5 billion in core deposits over the year.

a) The average cost of deposits is 3% p.a. and the average yield on loans is 6% p.a. To adjust to the decline in deposits the bank decides to reduce its loan portfolio through securitization. What will be the effect on net interest income and the size of the bank after taking such action?

b) If the interest cost of issuing new short-term debt is expected to be 5.5% p.a., what would be the effect on net interest income of offsetting the expected deposit drain with an increase in short-term debt? What will be the size of the bank after the drain if the bank uses this strategy?

## Liquidity management

### Exercise 3 - solution

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a)

Cost of drain =  $(0.06 - 0.03) * \text{CZK } 5 \text{ bn} = \text{CZK } 150 \text{ m}$

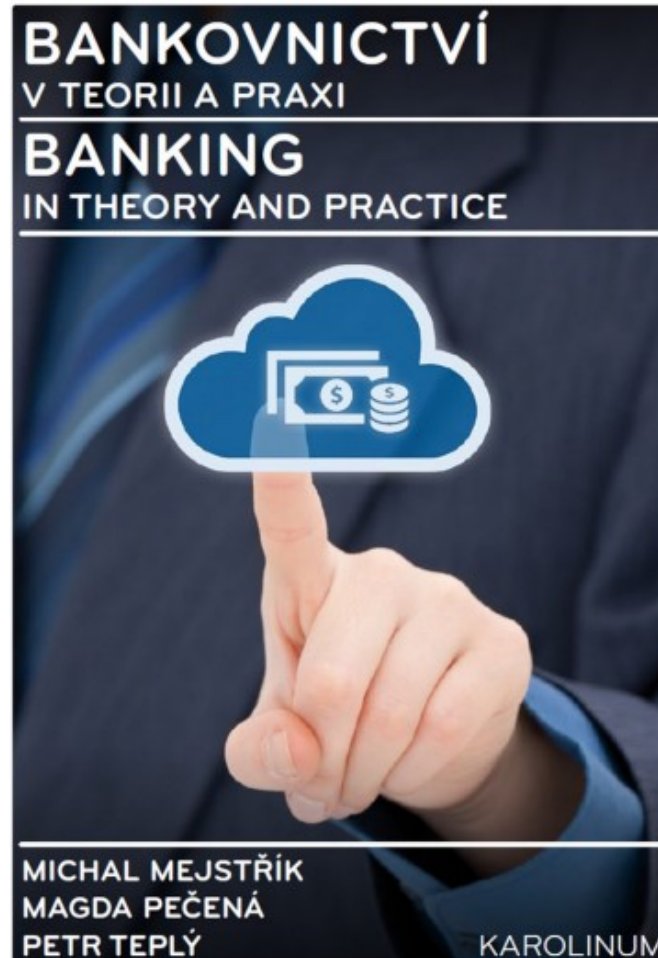
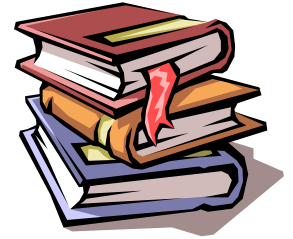
Balance sheet size will decrease by CZK 5 bn to CZK 10bn.

b)

Cost of drain =  $(0.055 - 0.03) * \text{CZK } 5 \text{ bn} = \text{CZK } 125 \text{ m}$

Balance sheet size will stay at CZK 15 bn.

# Source





Thank you for your attention.