

BANKING



Lecture 2 – Basic Principles of Banking

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Key terms of Lecture I and Tutorial I

- Administrative info, CA info, deadlines
- Introduction to world financial market, importance of banking market
- Trends in the world financial market
- Recap of financial mathematics (i. r. calculation standards, PV and annuity calculations)

Current challenges in banking

Business side

- Low interest rate level (in Euroarea (zero or negative monetary policy rates); picking up since 2017 in the Czech Republic, sudden drop during the spring wave of COVID 19)
 - Lower margins, lower fee income
 - Higher volumes (thanks to solid economic growth), stagnating or decreasing volumes in 2020 (depending on fiscal stimulus)
 - Higher operational efficiency
- ➡ constant or growing profit, ROA above 1 % in CZ (until 2019)
- Search for other revenue opportunities (revenue sources) - „Related activities“ (bancosurance, sell of energy, telecommunication products, tax and legal advice on financial services, securities brokerage etc)
 - Fintech, PSD 2 (Payment system directive)
 - In CZ – continuous shift to retail banking (corporate segment grows at lower pace than retail banking (mortgage and consumer banking))

Observed changes in banks' business models

..... are already reflected in

- new products and service innovations
- digitization, robotic process automation (RPA)
- changes in the distribution network (including possible reduction of physical branches) or outsourcing of branch network
- establishment, co-operation with or control of new FinTech companies
- centralization of some activities to parent bank or group

Acceleration of automation and on-line services during and after COVID 19 pandemic

Current challenges in banking

Regulatory side

- High complexity of regulation (CRD V/CRR II and many RTS and ITS) - (Regulatory technical standards and Implementation technical standards)
- EBA Guidelines
- BIS Recommendations
- Supervision of
 - solo institutions
 - consolidated groups (incl. non-bank financial institutions within the group, incl. financial holdings)

Current challenges in banking

Regulatory side during COVID 19 pandemic

EU Commission introduced „Banking package“ containing a draft amendment of CRR („CRR-COVID“)

- application of „**flexibility**“ in the regulatory and accounting frameworks, e.g.:
 - **extension** of the transition period for incorporating changes arising from IFRS 9 into regulatory capital
 - **postponing** the date of application of the leverage ratio from 1 January 2023
 - **extends** the preferential treatment of non-performing exposures to a broader set of public guarantee providers

Content



1. Bank definition
2. Banking sector
3. Traditional operations of banks
4. Banking risks, efficiency and profitability
5. Approaches to bank valuation
6. Bank heterogeneity, competing institutions



Definition of a bank

- „EU“ definition - EU Directive 2013/16/EU defines a credit institution (which a bank is), as a) an undertaking whose business it is to receive deposits and other repayable funds from the public and to grant credits for its own account, or b) an electronic money institution within the meaning of Directive 2009/110/EC.
- „Act on Banks“ definition (No. 21/1992 Coll.) - a bank is a joint-stock company accepting deposits from the public and granting loans, licensed by the Czech National Bank

The key functions of a bank

- Effective transformation of capital
- Effective investment of deposits into earning assets
- Maturity transformation (short-term liabilities are transformed into long-term assets)
- Dealing with information asymmetry

- Non-cash money supply
- Cash and non-cash payment services

The aim of bank's management is to manage the bank with the goal of maximizing its value for shareholders under risk conditions

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Bank-oriented vs. capital market oriented financial system



| | Bank-oriented financial system | Capital-market-oriented financial system |
|---|--|---|
| Liquidity transformation | <ul style="list-style-type: none"> • Via transformation of lots and terms | <ul style="list-style-type: none"> • Savings flow into the economic cycle directly via various investment instruments (bonds, stocks, funds, derivatives) |
| Risk transformation | <ul style="list-style-type: none"> • Banks offset risk • Risk-offsetting tends to be inter-temporal • Restricted to a few risk carriers | <ul style="list-style-type: none"> • Investors offset risk • Risk-offsetting tends to be inter-sectoral • Investors assume risk in line with their readiness to take risks |
| Information transformation | <ul style="list-style-type: none"> • Internalization of information by banks, leading to duplication • Restricted information transparency | <ul style="list-style-type: none"> • Externalization of information via brokers and media • High information transparency |
| Corporate control | <ul style="list-style-type: none"> • Controlling orientation (relationship lending) • Maximization of stakeholder value | <ul style="list-style-type: none"> • Liquidity orientation/maximization of returns • Maximization of shareholder value |
| Legislation/supervisory authorities protection | <ul style="list-style-type: none"> • Strong culture of creditor and depositor protection | <ul style="list-style-type: none"> • Increased level of shareholder and investor protection |

Source: Mejstřík et al. (2015)



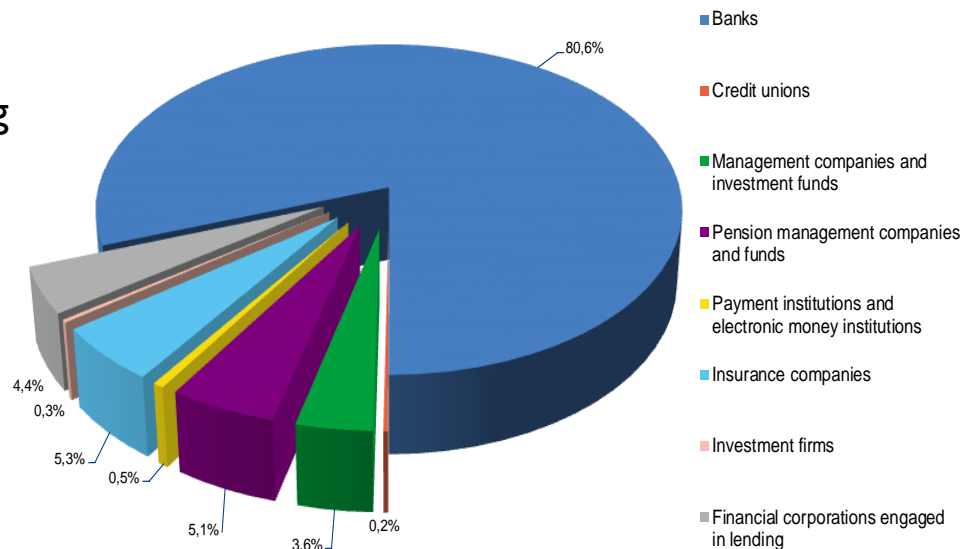
Banking sector structure in CZ

- ✦ **Czech banking sector – ca 80 % of the whole financial sector (2020), measured by assets**
- ✦ **As of end 2019 - direct and indirect foreign control accounted for more than 92 % of banking assets (stable since 2001, after completion of Komeční banka privatization)**

As of 09/2020 – 49 banking institutions

- ◆ 24 banks (out of these 5 building societies)
- ◆ 25 branches of foreign banks (out of these 2 non-European)

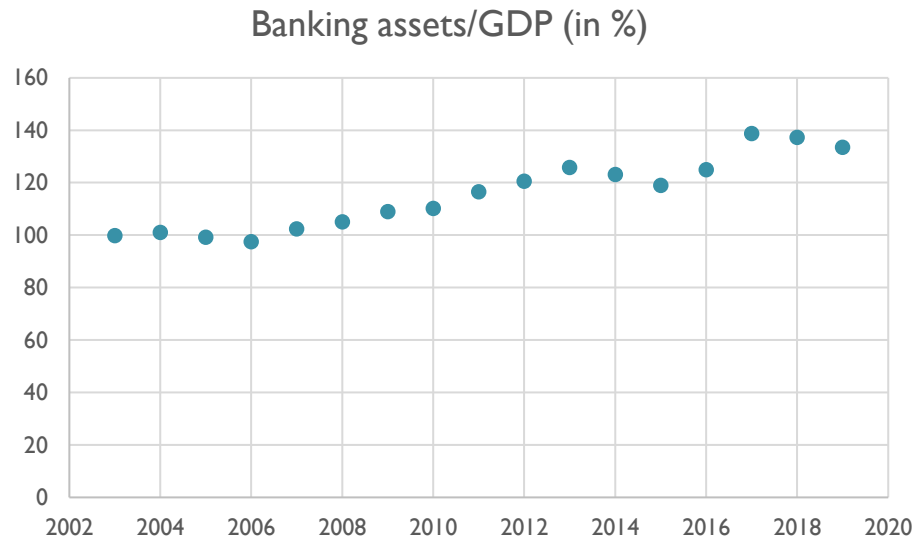
and 9 negligible cooperatives



Source: Financial Market Supervision Report, 2002, 2019, ARAD Database, www.cnb.cz



Banking sector as % of GDP



Source: Financial Stability Reports, www.cnb.cz, own calculations



Banking sector structure in CR

Czech banking sector consists of 49 banks of which 5 operates as building societies and 25 as branches of foreign banks.

- **Czech ownership** prevails only in 2 state-owned banks (CEB – support of CZ exporters, CMZRB – support of SMEs) and three other mid-sized and small banks (Fio banka, PPF banka, Air Bank) have also Czech owners; **however, all other banks are direct or indirect subsidiaries of foreign banks**
- All parent banks of CZ subsidiaries are coming from EU countries
 - Except of one middle-sized bank (Sberbank – Russia/ (through Sberbank EU)) and one small bank (Expobank CZ – Russia)
 - Distribution of ownership is diversified across EU countries. The largest banks are owned by banks from Austria, France, Belgium and Italy
- The foreign bank branches in the Czech Republic are mainly from EU countries (based on single licence principle) – just 2 are indirectly owned by Japanese, 1 by Chinese and 1 by the US bank, 2 branches are from a third country (China)

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Operations of banks

Asset side - Active banking operations reflect the **use** of funds, operations in which a bank grants credits to third parties or purchase securities (the bank as **creditor**).

Liability and equity side - Passive banking operations, bank as **debtor**, operations linked to **acquiring new sources/funds** (collection of deposits, issuing bonds, CD's and inter-bank loans, issuing shares (equity) and setting up reserve funds and other funds from the profit).

Off-Balance sheet - represent

- a) certain receivables (assets) or obligations (liabilities) in the future or
- b) uncertain receivables (assets) or obligations (liabilities) contingent upon certain conditions occurring (e.g.CDS).

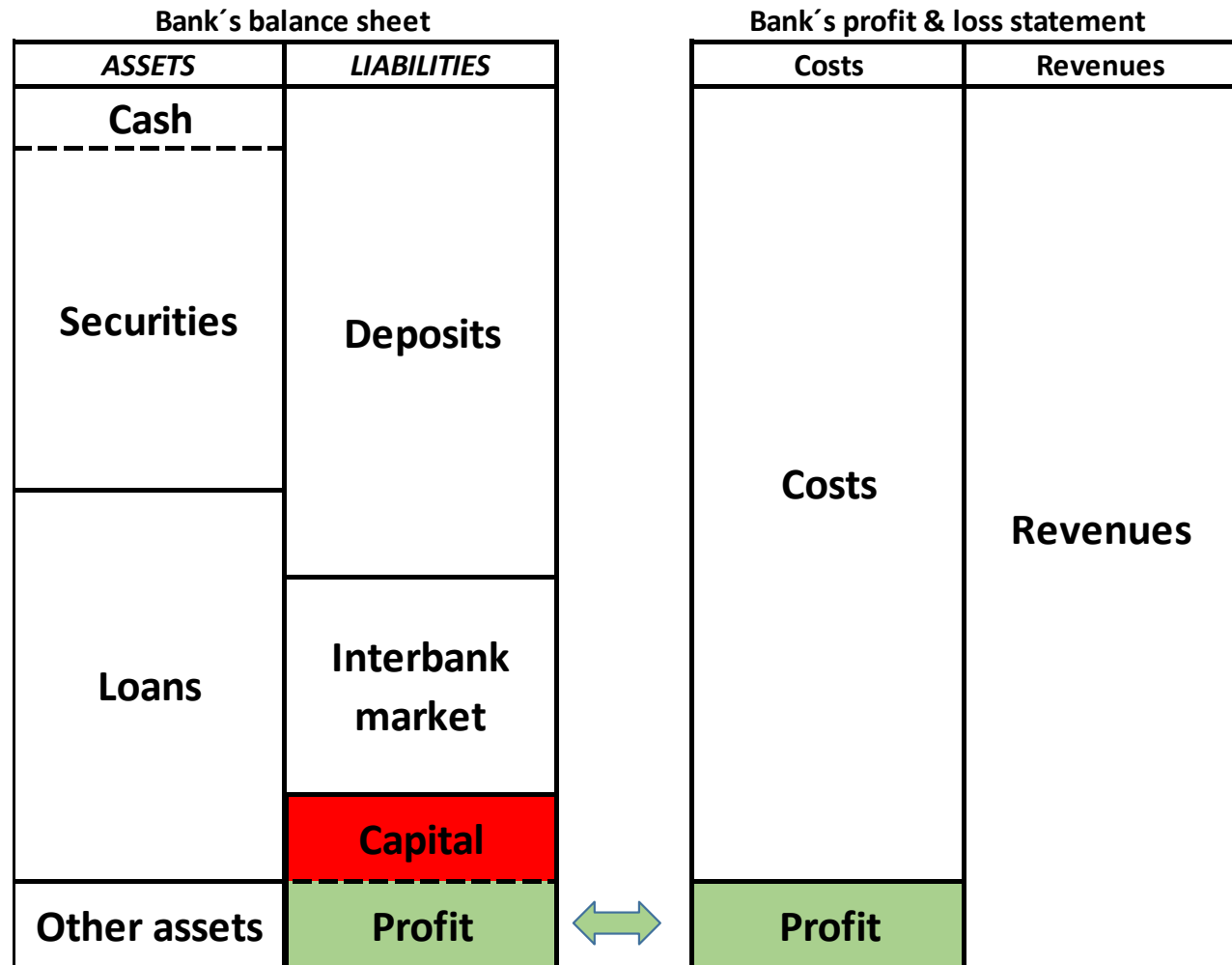
| Assets | Total Liabilities |
|---------------|--------------------------|
| Assets | Liabilities |
| | Equity |

Basic operations of banks

| Bank's balance sheet | |
|----------------------|--------------------|
| <i>ASSETS</i> | <i>LIABILITIES</i> |
| Loans | Deposits |
| Securities | Interbank market |
| Other assets | Capital |

| Non-financial firm's balance sheet | |
|------------------------------------|-----------------------|
| <i>ASSETS</i> | <i>LIABILITIES</i> |
| Current assets | Current liabilities |
| Investments | Long-term liabilities |
| Property, plant, equipment | Capital (Equity) |
| Intangible assets | |
| Other assets | |

Basic operations of banks



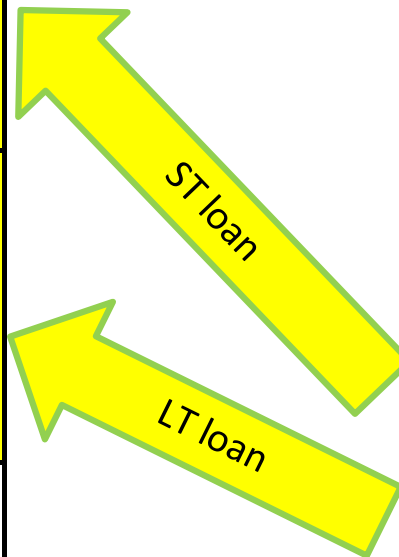
Basic operations of banks

Non-financial firm's balance sheet

| ASSETS | LIABILITIES |
|----------------------------|-----------------------|
| Current assets | Current liabilities |
| Investments | Long-term liabilities |
| Property, plant, equipment | Equity |
| Intangible assets | |
| Other assets | |

Bank's balance sheet

| ASSETS | LIABILITIES |
|--------------|------------------|
| Cash | Deposits |
| Securities | |
| Loans | Interbank market |
| Other assets | Capital |



Czech banking sector assets



| | 31.03.2020 | 31.12.2019 | 31.12.2018 | 31.12.2017 | 31.12.2016 | 31.12.2015 |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
| Assets, total | 8 441 895 | 7 547 246 | 7 279 166 | 7 001 932 | 5 960 422 | 5 468 515 |
| 1. Cash, cash balances at central banks and other demand deposits | 338 010 | 224 332 | 270 065 | 664 636 | 833 025 | 736 326 |
| 2. Financial assets held for trading | 204 923 | 95 695 | 92 493 | 81 601 | 107 141 | 119 948 |
| 2.1. Derivatives | 174 153 | 81 839 | 65 655 | 60 826 | 61 365 | 61 324 |
| 2.2. Equity instruments | 900 | 949 | 839 | 1 474 | 2 290 | 3 492 |
| 2.3. Debt instruments | 24 511 | 12 906 | 25 998 | 19 300 | 36 235 | 55 033 |
| 2.4. Loans and advances | 5 358 | - | 1 | - | 7 251 | 100 |
| 3. Non-trading financial assets mandatorily at fair value through profit or loss | 12 606 | 12 442 | 8 431 | 388 | 17 | 38 |
| 3.1. Equity instruments | 9 398 | 8 992 | 7 352 | 388 | 17 | 38 |
| 3.2. Debt securities | 2 314 | 1 043 | 337 | - | - | - |
| 3.3. Loans and advances | 894 | 2 407 | 742 | - | - | - |
| 4. Financial assets designated at fair value through profit or loss | 2 371 | 2 438 | 1 849 | 4 767 | 9 825 | 11 092 |
| 4.1. Debt securities | 2 344 | 2 415 | 1 835 | 4 702 | 9 763 | 11 092 |
| 4.2. Loans and advances | 26 | 23 | 14 | 65 | 63 | - |
| 5. Financial assets at fair value through other comprehensive income | 178 659 | 167 526 | 190 685 | 275 499 | 388 503 | 443 634 |
| 5.1. Equity instruments | 2 359 | 2 518 | 3 848 | 8 618 | 8 112 | 11 138 |
| 5.2. Debt securities | 168 396 | 155 806 | 178 734 | 266 872 | 380 382 | 432 496 |
| 5.3. Loans and advances | 7 904 | 9 203 | 8 103 | 9 | 9 | - |
| 6. Financial assets at amortised cost | 7 420 677 | 6 814 403 | 6 513 053 | 5 769 594 | 4 406 365 | 3 927 718 |
| 6.1. Debt securities | 863 243 | 804 360 | 782 045 | 657 468 | 659 884 | 649 839 |
| 6.2. Loans and advances | 6 557 433 | 6 010 043 | 5 731 008 | 5 112 126 | 3 746 481 | 3 277 879 |
| 7. Derivatives - Hedge accounting | 62 055 | 32 822 | 33 007 | 31 961 | 43 058 | 44 587 |
| 8. Fair value changes of the hedged items in portfolio hedge of interest rate risk | 15 560 | 7 134 | 5 727 | 6 913 | 1 404 | 1 276 |
| 9. Investments in subsidiaries, joint ventures and associates | 108 776 | 108 342 | 97 076 | 95 274 | 92 519 | 95 458 |
| 10. Tangible assets | 43 435 | 44 477 | 24 800 | 24 924 | 23 141 | 25 914 |
| 11. Intangible assets | 29 903 | 29 816 | 27 562 | 24 765 | 21 557 | 18 848 |
| 12. Tax assets | 3 223 | 3 573 | 4 154 | 4 884 | 3 922 | 4 303 |
| 13. Other assets | 21 488 | 18 117 | 21 434 | 30 133 | 29 087 | 32 448 |
| 14. Non-current assets and disposal groups classified as held for sale | 210 | 398 | 285 | 419 | 856 | 6 926 |

„Commercial banking“ business

„Investment banking“ business

Source: www.cnb.cz, ARAD database

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Czech banking sector liabilities



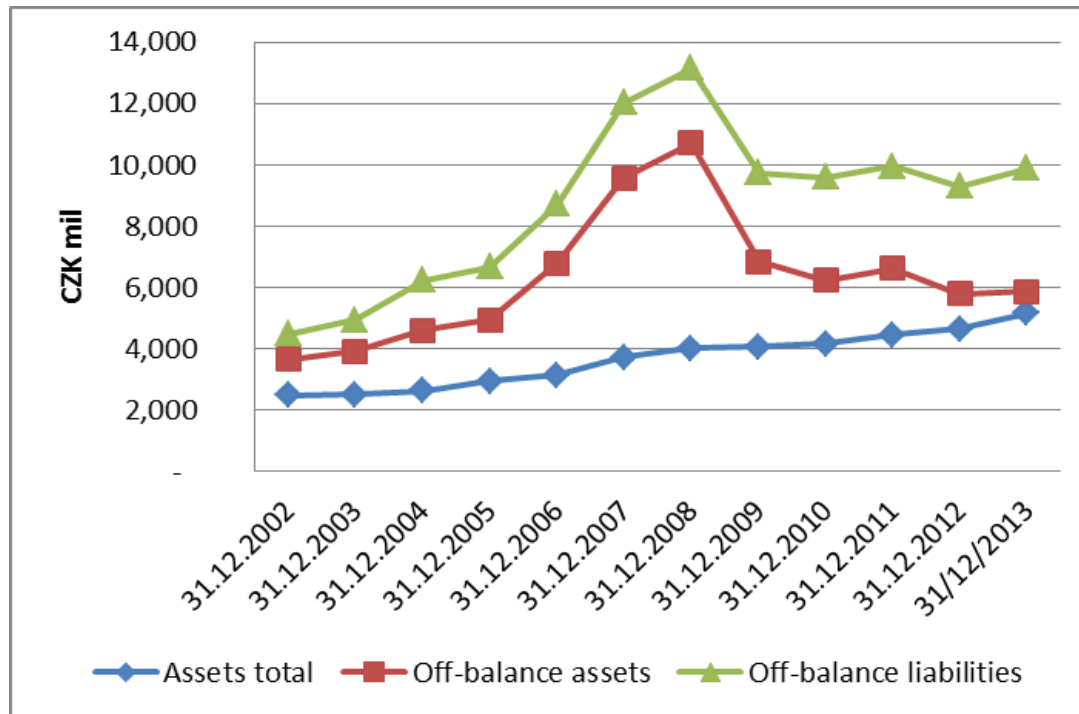
| | 31.03.2020 | 31.12.2019 | 31.12.2018 | 31.12.2017 | 31.12.2016 | 31.12.2015 |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
| Liabilities and equity, total | 8 441 895 | 7 547 246 | 7 279 166 | 7 001 932 | 5 960 422 | 5 468 515 |
| 1. Liabilities, total | 7 801 745 | 6 925 341 | 6 702 802 | 6 445 550 | 5 419 603 | 4 941 432 |
| 1.1. Financial liabilities held for trading | 193 751 | 117 608 | 102 168 | 99 962 | 106 965 | 93 077 |
| 1.1.1. Derivatives | 165 096 | 84 400 | 64 203 | 63 657 | 60 532 | 63 683 |
| 1.1.2. Short positions | 6 968 | 10 913 | 32 153 | 28 530 | 27 731 | 17 200 |
| 1.1.3. Deposits | 17 270 | 17 618 | 1 272 | 2 454 | 7 261 | 1 581 |
| 1.1.4. Debt securities issued | 4 382 | 4 662 | 4 540 | 5 317 | 11 413 | 10 061 |
| 1.1.5. Other financial liabilities | 35 | 15 | 2 | 4 | 28 | 551 |
| 1.2. Financial liabilities designated at fair value through | 42 953 | 45 789 | 28 049 | 10 738 | 3 618 | 4 019 |
| 1.2.1. Deposits | 3 543 | 3 557 | 1 935 | 1 240 | 1 997 | 4 019 |
| 1.2.2. Debt securities issued | 39 410 | 42 231 | 26 114 | 9 498 | 1 620 | - |
| 1.2.3. Other financial liabilities | - | - | - | - | - | - |
| 1.3. Financial liabilities measured at amortised cost | 7 400 844 | 6 670 353 | 6 481 297 | 6 234 296 | 5 200 320 | 4 728 211 |
| 1.3.1. Deposits | 6 569 091 | 5 815 494 | 5 686 440 | 5 439 621 | 4 504 183 | 4 057 867 |
| 1.3.2. Debt securities issued | 779 395 | 806 256 | 762 162 | 759 975 | 670 338 | 641 513 |
| 1.3.3. Other financial liabilities | 52 359 | 48 603 | 32 696 | 34 700 | 25 799 | 28 831 |
| 1.4. Derivatives - hedge accounting | 50 511 | 35 459 | 33 500 | 32 348 | 26 809 | 27 391 |
| 1.5. Fair value changes of the hedged items in portfolio | 25 006 | 8 780 | 5 668 | 7 848 | 7 154 | 6 311 |
| 1.6. Provisions | 15 282 | 13 113 | 14 777 | 12 749 | 12 282 | 11 759 |
| 1.7. Tax liabilities | 3 095 | 3 372 | 2 706 | 2 928 | 7 002 | 8 896 |
| 1.8. Share capital repayable on demand | - | - | - | - | - | - |
| 1.9. Other liabilities | 70 303 | 48 427 | 45 973 | 60 377 | 55 454 | 44 520 |
| 1.10. Liabilities included in disposal groups classified as | - | - | - | - | - | 17 249 |
| 2. Equity, total | 640 150 | 621 905 | 576 364 | 556 382 | 540 819 | 527 083 |
| 2.1. Capital | 112 563 | 112 563 | 100 858 | 99 846 | 98 241 | 97 687 |
| 2.2. Share premium | 59 264 | 59 264 | 63 763 | 63 421 | 62 646 | 62 645 |
| 2.3. Equity instruments issued other than capital | 23 104 | 23 104 | 13 298 | 13 298 | 12 617 | 11 763 |
| 2.4. Other equity | 2 290 | 2 285 | 1 688 | 2 883 | 1 538 | 1 317 |
| 2.5. Accumulated other comprehensive income | 5 926 | 460 | 1 907 | 7 276 | 28 909 | 35 807 |
| 2.6. Retained earnings | 352 087 | 263 313 | 251 779 | 239 321 | 213 093 | 199 201 |
| 2.7. Revaluation reserves | 592 | 573 | 559 | 737 | 110 | 112 |
| 2.8. Other reserves | 70 686 | 70 639 | 62 330 | 55 439 | 50 662 | 53 073 |
| 2.9. (-) Treasury shares | - 900 | - 898 | - 895 | - 895 | - 895 | - 895 |
| 2.10. Profit or loss attributable to owners of the parent | 14 537 | 91 121 | 81 426 | 75 354 | 73 898 | 66 373 |

„Commercial banking“ business

Source: www.cnb.cz, ARAD database



Off-balance sheet vs. Balance sheet



In the new reporting only loan commitments and guarantees are reported as part of off-balance sheet, so the size of „off-balance sheet“ has been dramatically reduced since 2014 !!!

Source: www.cnb.cz

Note, that off-balance sheet assets do not have to equal off-balance sheet liabilities



Example I - Bank balance sheet structure

You have balance sheets and several additional information on 5 different commercial banks A – B – C – D – E, which one is:

1. Development bank, focusing on support of local producers, guarantees small and developing businesses and trade
2. Mortgage bank
3. Commercial bank focusing on consumer credits and loans to households
4. Commercial bank financing small and medium enterprises (in a limited way), the main focus is on providing payment services
5. Commercial bank with certain features of investment bank



Example I - Bank balance sheet structure

To be provided in Excel during the lecture

| | 3Q2019 | A | 3Q2019 | B | 3Q2019 | C | 3Q2019 | D |
|--|-------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|
| Assets | 156 568 848 | 100.0% | 321 493 425 | 100.0% | 26 678 993 | 100.0% | 221 257 413 | |
| 1. Cash, cash balances at central banks and other demand deposits | 4 639 405 | 2.9% | 2 272 345 | 0.7% | 24 672 | 0.1% | 7 341 406 | |
| 2. Financial assets held for trading | 143 442 | 0.1% | - | - | 9 481 | 0.0% | 11 572 683 | |
| 3. Non-trading financial assets measured at fair value through profit or loss | 0 | 0.0% | - | - | 21 896 | 0.1% | 0 | |
| 4. Financial assets designated at fair value through profit or loss | 0 | 0.0% | - | - | 186 510 | 0.7% | 0 | |
| 5. Financial assets at fair value through other comprehensive income | 34 973 | 0.0% | - | - | 11 841 381 | 44.4% | 18 664 932 | |
| 6. Financial assets at amortized cost | 150 408 222 | 96.1% | 317 119 033 | 98.6% | 16 392 092 | 61.9% | 187 635 438 | |
| 6.1. Debt securities | 4 361 408 | 2.8% | - | - | 5 558 899 | 20.8% | 4 186 005 | |
| 6.2. Loans and advances | 146 047 118 | 93.3% | 317 119 033 | 98.6% | 9 833 213 | 37.1% | 178 449 433 | |
| 7. Derivatives - hedge accounting | 0 | 0.0% | 1 845 632 | 0.6% | 0 | 0.0% | 0 | |
| 8. Fair value changes of the hedged items in portfolio hedge of interest rate risk | 0 | 0.0% | -623 869 | -0.2% | 0 | 0.0% | 0 | |
| 9. Investments in subsidiaries, joint ventures and associates | 159 413 | 0.1% | - | - | 2 538 | 0.0% | 135 017 | |
| 10. Tangible assets | 220 814 | 0.1% | 389 807 | 0.1% | 131 863 | 0.5% | 176 341 | |
| 11. Intangible assets | 6 165 | 0.0% | 432 827 | 0.1% | 17 802 | 0.1% | 179 066 | |
| 12. Tax assets | 16 610 | 0.0% | 8 268 | 0.0% | 0 | 0.0% | 0 | |
| 13. Other assets | 1 459 279 | 0.9% | 48 477 | 0.0% | 50 757 | 0.2% | 752 550 | |
| Liabilities and equity, total | 156 568 848 | 100.0% | 321 493 425 | 100.0% | 26 678 993 | 100.0% | 221 257 413 | |
| 1. Liabilities, total | 152 670 827 | 97.5% | 277 611 695 | 86.4% | 21 713 203 | 81.5% | 207 700 653 | |
| 1.1. Financial liabilities held for trading | 31 | 0.0% | - | - | 19 496 | 0.1% | 11 961 475 | |
| 1.1.1. Derivatives | 31 | 0.0% | - | - | 19 496 | 0.1% | 7 110 276 | |
| 1.2. Financial liabilities designated at fair value through profit or loss | 0 | 0.0% | - | - | 0 | 0.0% | 0 | |
| 1.3. Financial liabilities measured at amortized cost | 152 719 930 | 96.9% | 275 918 821 | 86.0% | 17 775 095 | 66.6% | 194 917 977 | |
| 1.3.1. Deposits | 150 410 393 | 96.1% | 105 043 | 0.0% | 17 744 532 | 66.5% | 187 896 215 | |
| 1.3.2. Debt securities issued | 0 | 0.0% | 276 577 863 | 86.4% | 0 | 0.0% | 3 664 079 | |
| 1.3.3. Other financial liabilities | 1 309 437 | 0.8% | 1 236 915 | 0.4% | 30 710 | 0.1% | 9 360 383 | |
| 1.4. Derivatives - hedge accounting | 0 | 0.0% | 1 402 117 | 0.4% | 9 897 | 0.0% | 0 | |
| 1.5. Fair value changes of the hedged items in portfolio hedge of interest rate risk | 0 | 0.0% | - | - | 0 | 0.0% | 0 | |
| 1.6. Provisions | 294 190 | 0.2% | 58 804 | 0.0% | 1 649 216 | 6.2% | 180 156 | |
| 1.7. Tax liabilities | 6 767 | 0.0% | 41 594 | 0.0% | 26 951 | 0.1% | 170 509 | |
| 1.8. Share capital repayable on demand | 649 410 | 0.4% | 190 938 | 0.1% | 252 527 | 0.9% | 470 136 | |
| 2. Equity, total | 3 898 021 | 2.5% | 43 881 730 | 13.6% | 4 965 790 | 18.6% | 13 556 760 | |
| 2.1. Capital | 760 000 | 0.5% | 3 076 336 | 1.6% | 2 631 626 | 9.9% | 769 004 | |
| 2.2. Share premium | 27 376 | 0.0% | 24 589 069 | 7.6% | 0 | 0.0% | 412 545 | |
| 2.3. Accumulated other comprehensive income | 0 | 0.0% | 86 729 | 0.0% | 149 900 | 0.6% | 543 511 | |
| 2.4. Retained earnings | 1 862 156 | 1.2% | 1 780 | 0.0% | 793 863 | 3.0% | 10 388 511 | |
| 2.5. Other reserves | 0 | 0.0% | 13 415 270 | 4.2% | 1 500 500 | 5.6% | 1 316 | |
| 2.10. Profit or loss attributable to owners of the parent | 1 248 487 | 0.8% | 1 730 545 | 0.5% | 20 374 | 0.1% | 1 442 040 | |
| | | Performing exposures | Non-performing exposures | Performing exposures | Non-performing exposures | Performing exposures | Non-performing exposures | Performing exposures |
| Debt securities | 4 361 408 | - | - | - | 17 529 146 | 0 | 27 601 833 | |
| - Debt securities of non-financial institutions | 145 089 699 | 1 615 003 | 317 463 426 | 3 342 377 | 8 189 222 | 2 252 728 | 176 173 670 | |
| - Loans to non-financial institutions | 10 675 742 | 1 787 838 | 137 733 | 0 | 2 903 478 | 2 057 280 | 18 249 176 | |
| - Loans to households | 7 080 729 | 28 186 | 308 361 430 | 3 342 377 | 134 857 | 193 839 | 152 710 | |
| - Off-balance sheet exposures | 10 395 689 | - | 24 836 138 | 6 555 | 23 786 336 | 519 359 | 12 903 997 | |
| - Off-balance sheet exposures to non-financial institutions and households | 7 776 285 | - | 24 836 138 | 6 555 | 23 211 471 | 519 359 | 7 702 187 | |

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Basic goal of banking activity is...

- ✦ to maximise bank's **value for shareholders under risk conditions**
- ✦ to manage assets and liabilities (**ALM**) in a way that ensures the **liquidity, solvency and profitability** (efficiency) of the bank,
 - ✦ in the sense of **capital management**: capital structure (small depositors who invest more but have less power and can leave vs. big creditors management that have more power),
 - ✦ in the sense of **asset management**: liquidity, profitability and risk,
 - ✦ in the sense of **asset and liability management and off-balance sheet management**.

Financial ratios specific to banks

Most important prudential/capital ratio:

Capital adequacy ratio (CAR or CAD)

Tier I capital ratio

Other:

NPL (non-performing loans) / total loans (quality of portfolio)

Profitability measures

NIM (Net interest margin)

ROAA or ROA (return on (average) assets)

ROAE or ROE (return on (average) equity)

Liquidity ratios

LCR (Short term measure),

NSFR (Long term measure)

Leverage ratio (Capital/Total assets) —+— indebtedness

Profitability ratios

ROAA or ROA (return on (average) assets) $ROAA(\%) = \frac{net_profit}{(assets_t + assets_{t+1})/2} * 100$

ROAE or ROE (return on (average) equity) $ROAE(\%) = \frac{net_profit}{(equity_t + equity_{t+1})/2} * 100$

NIM (Net interest margin) $NIM(\%) = \frac{NII}{(i.e.assets_t + i.e.assets_{t+1})/2} * 100$

C/I (Cost-income ratio) $C/I = \frac{OPEX}{gross_income}$

ROE decomposition (DuPont decomposition) $ROE = \frac{net_income}{sales} \cdot \frac{sales}{assets} \cdot \frac{assets}{equity}$

Financial ratios specific to banks – example CSOB

Measures of sustainable performance

**Net profit decrease due to loan impairments and higher base in 2019.
Robust capital and liquidity.**

| ČSOB group key indicators | | 2017 | 2018 | 2019 | 1H 2019 | 1H 2020 |
|---------------------------|--------------------------------|--------|--------|--------|---------|---------|
| Profitability | Net profit (CZK bn) | 17.5 | 15.8 | 19.7 | 10.9 | 3.5 |
| | Return on equity | 19.3% | 17.5% | 20.7% | 23.7% | 6.9% |
| Liquidity | Loan to deposit ratio | 77.7% | 76.3% | 79.4% | 77.3% | 73.8% |
| | Net stable funding ratio | 146.0% | 161.4% | 161.5% | 165.3% | 168.9% |
| Capital | Tier 1 (CET1) ratio | 17.2% | 18.0% | 19.2% | 18.7% | 21.1% |
| Impairments | Credit cost ratio ¹ | 0.02% | 0.03% | 0.04% | 0.02% | 0.62% |
| Cost efficiency | Cost / income ratio | 43.7% | 47.9% | 44.9% | 43.1% | 52.2% |

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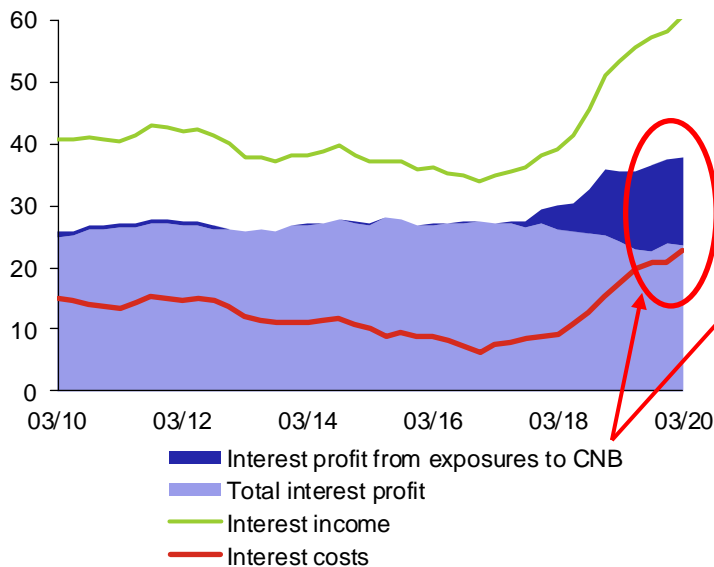
¹ Collective COVID-19 ECL excluded from annualization





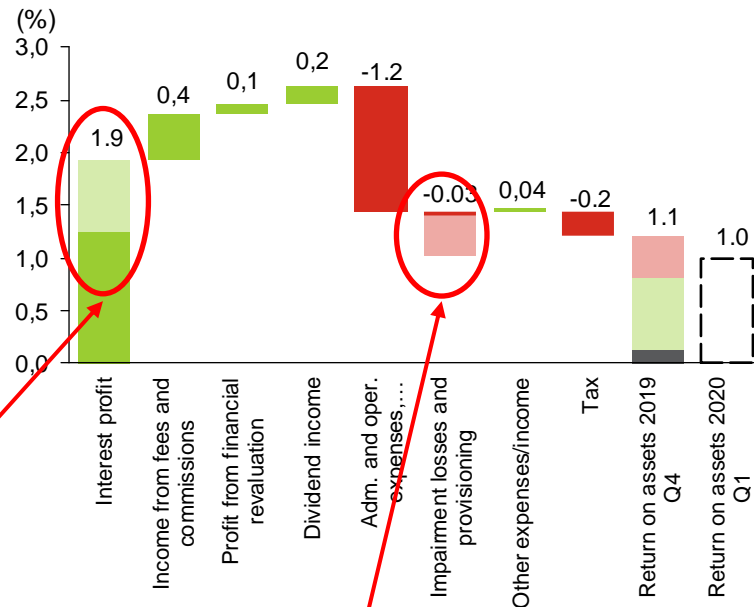
Banking sector performance

Chart III.12
Decomposition of interest profit
 (quarterly contributions in CZK billions)



Source: CNB

Chart III.10
Decomposition of return on assets
 (%)



Source: CNB

Note: The given value is the ratio of the given type of income/expense to the level of assets. The light red fill is the level of impairment as of 2009 Q4 (the highest impairment level in the period under review) and its potential impact on return on assets in 2019 Q4. The light green fill is the share of interest profit from exposures to the central bank.

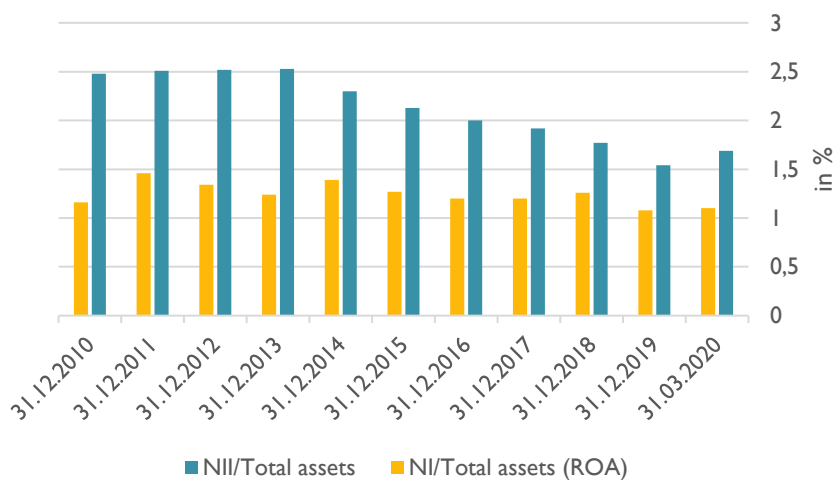
Data as of 31.12.2019, 31.3.2020 respectively

Source: Financial Stability Report, 2019/2020, www.cnb.cz



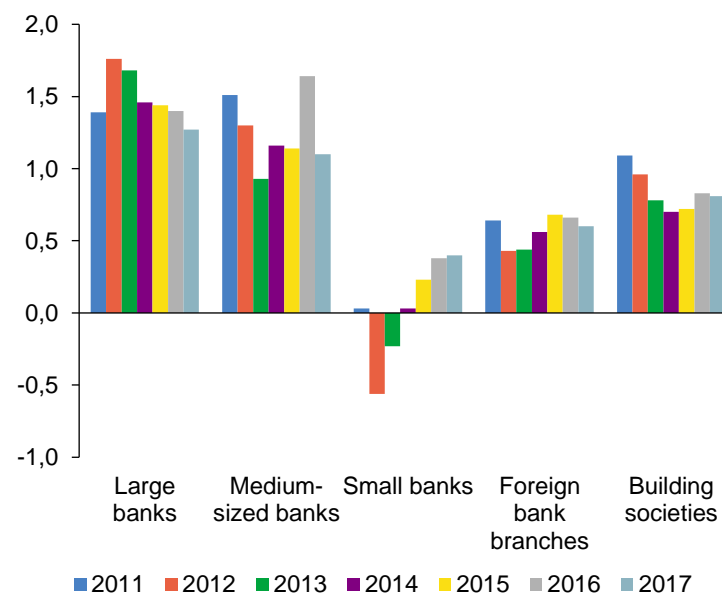
Rentability (RoA)

Profitability in terms of assets



NI – net income
NII – net interest income

RoA

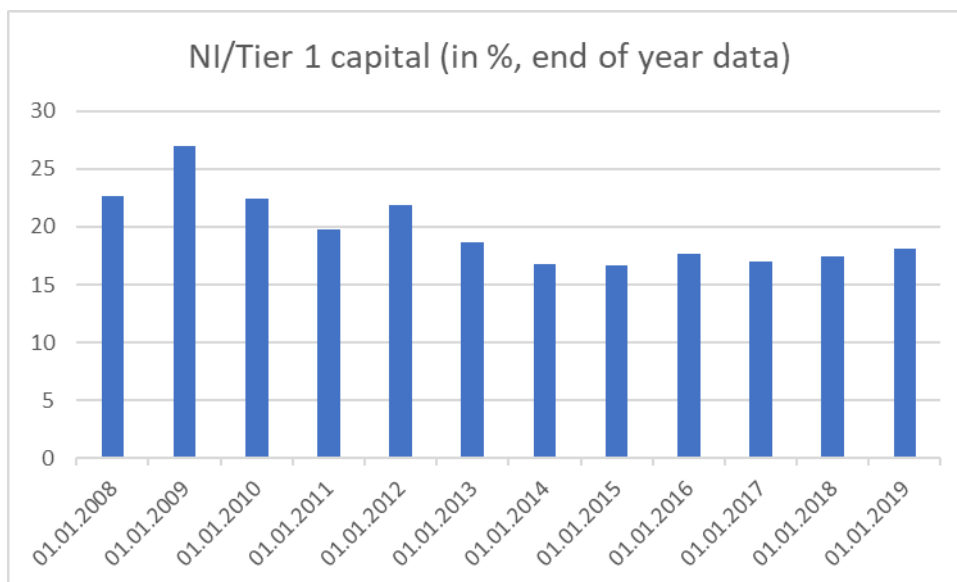


Economies of scale ?

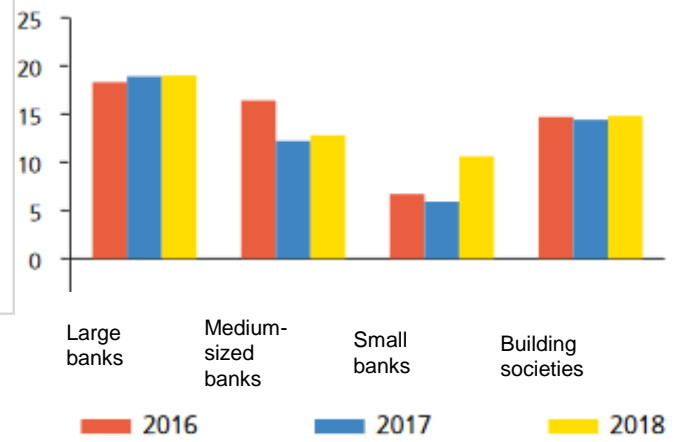
Source: Financial stability report 2017/2018, own calculations based on ARAD database



Rentability (RoE)



RoE (Tier I rentability)



.....and hasn't changed much in 2019

Source: Financial Market Supervision Report, 2018, ARAD database

Content



1. Bank definition
2. Banking sector
3. Traditional operations of banks
4. Banking risks, efficiency and profitability
5. Approaches to bank valuation
6. Bank heterogeneity, competing institutions



Approaches to (bank) valuation

- ✦ Discounted cash flow approaches
 - ◆ Dividend discount model
 - ◆ Free cash flow valuation models
- ✦ Methods of comparables (P/E, P/EBITDA ratios etc.)
- ✦ Risk index method
- ✦ Specific decomposition of ROE (DuPont decomposition)
- ✦ A simple model of a bank, Baltensperger (1980)
- ✦ One-stage model based on economic profit (residual income), EVA™

Economic profit (Economic value added (EVA™))

Economic profit is the net income of a firm (bank) less a charge that measures stockholders' opportunity costs in generating that income. This valuation approach explicitly deducts **all** capital costs.

Economic profit =

*(Return on Capital – Cost of Capital)*Capital invested*

Economic profit (Economic value added (EVA™)) cont.

$$EVA = (NOPAT - \$WACC),$$

NOPAT – net operating profit after tax (EBIT, adjusted for other items)

\$WACC – after tax dollar cost of capital

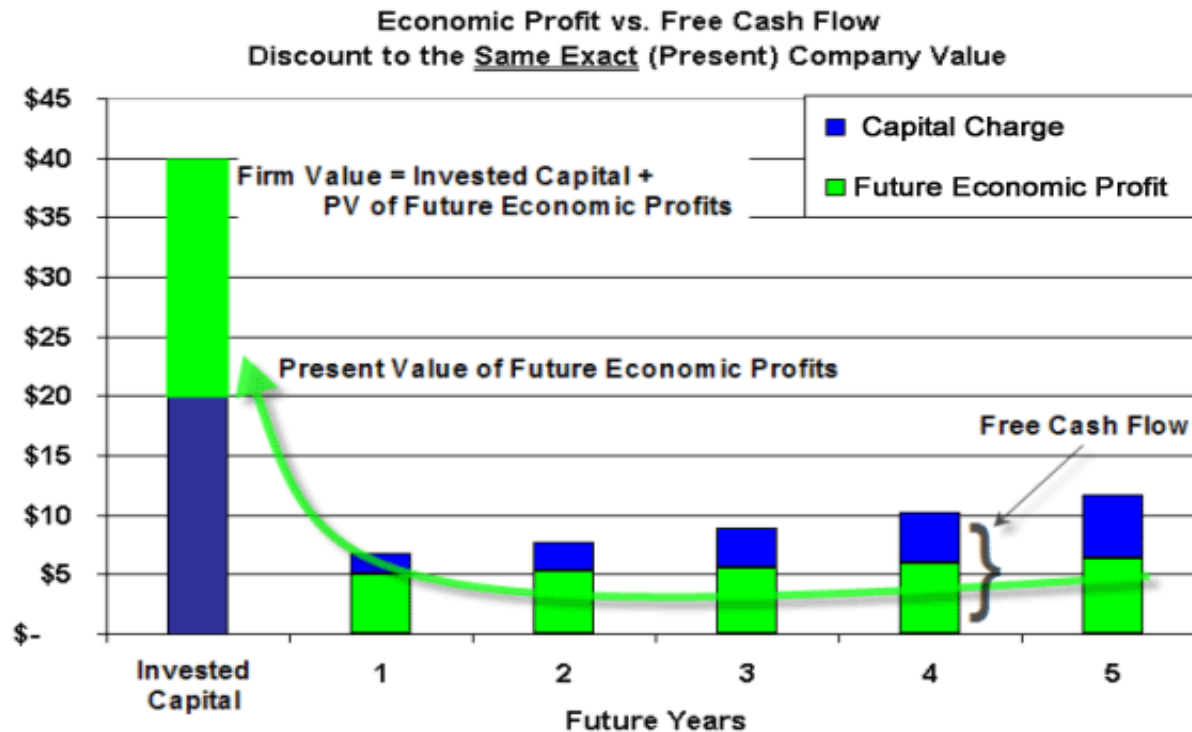
EVA > 0 – value is added (value is created), should be reflected in rising market value of the company

EVA = 0 – no value was added

EVA < 0 – value subtracted (value was destroyed)

The value of a company (or a bank) can be then estimated by the sum of discounted (projected) residual income (economic profit, EVA™) plus the current book value of invested capital.

Economic profit vs. Free Cash flow



In an ideal world, the results of using the dividend discount model, free cash flow valuation approach (discounting expected free cash flows instead of dividends) and the residual income model (discounting future EVA™ or any model based on economic profit) shall yield the same result.

Content



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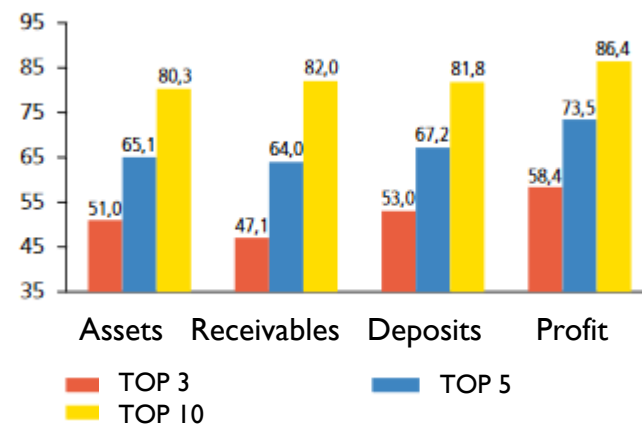


Market segmentation and bank heterogeneity



| as of Dec 31 | 1995 | ... | 1997 | ... | 1999 | ... | 2002 | ... | 2006 | ... | 2010 | ... | 2013 | ... | 2018 |
|----------------------------|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| Banking sector, total | | | | | | | | | | | | | | | |
| of which: | | ... | | ... | | ... | | ... | | ... | | ... | | ... | |
| large banks | 70 | ... | 66,6 | ... | 65 | ... | 62,2 | ... | 59,8 | ... | 58,0 | ... | 58,7 | ... | 60,1 |
| medium-sized banks | 14,7 | ... | 16,4 | ... | 17,4 | ... | 16,6 | ... | 16,2 | ... | 13,1 | ... | 19,9 | ... | 17,3 |
| small banks | 8,2 | ... | 3,1 | ... | 1,7 | ... | 3,4 | ... | 2,3 | ... | 6,3 | ... | 3,1 | ... | 7,7 |
| foreign bank branches | 6 | ... | 7,8 | ... | 11,4 | ... | 9,6 | ... | 9,3 | ... | 11,3 | ... | 9,2 | ... | 9,3 |
| building societies | 1,1 | ... | 3 | ... | 4,5 | ... | 8,2 | ... | 12,5 | ... | 11,2 | ... | 9,2 | ... | 5,6 |
| banks under administration | 0,0 | ... | 3,1 | ... | 0,0 | ... | 0,0 | ... | 0,0 | ... | 0,0 | ... | 0,0 | ... | 0,0 |
| | 100,0 | ... | 100,0 | ... | 100,0 | ... | 100,0 | ... | 100,0 | ... | 100,0 | ... | 100,0 | ... | 100,0 |

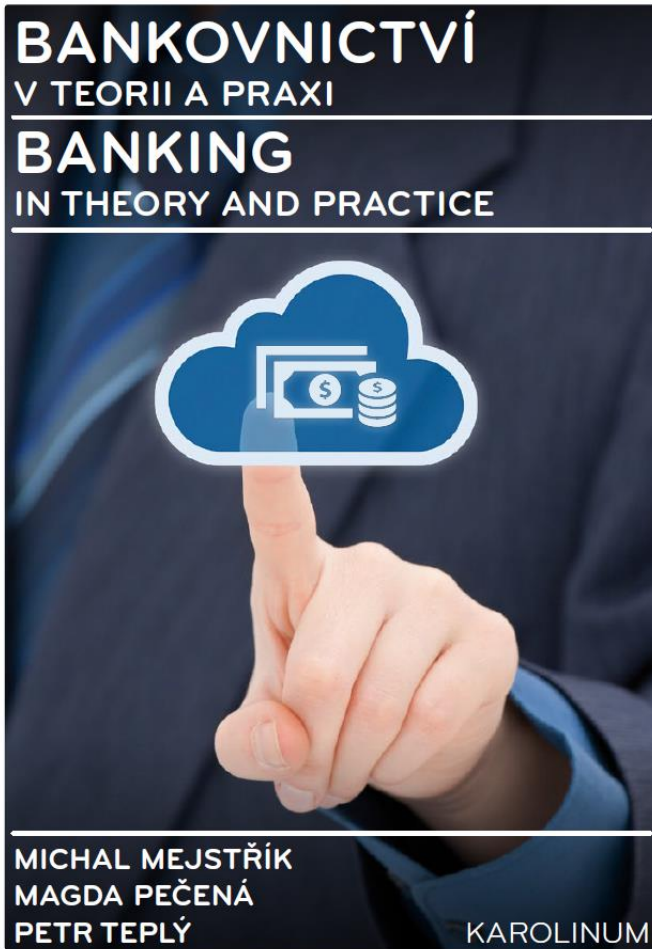
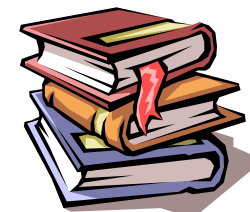
Concentration of the banking sector as of 31.12.2018



TOP 3, TOP 5 and TOP 10 banks, (2018)

Source: own calculations, Financial Market Supervision report, 2018

Reading for the this lecture



✓ Chapter II – Basic principles of Banking