BANKING

Lecture 4 A – Corporate Governance

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Key terms of Lecture 3

- Key risks in banking
- Risk categorization
- Risks in the balance sheet
- ALM
- Basic market risk measurement tools and management
- GAP analysis

What is corporate governance

The Basics of Corporate Governance (Investopedia)

Governance refers specifically to the set of rules, controls, policies, and resolutions put in place to dictate corporate behavior.

….

What is Corporate Governance?

Corporate governance is **the system of rules, practices, and processes by which a firm is directed and controlled.** Corporate governance essentially involves balancing the interests of a company's many stakeholders, such as shareholders, senior management executives, customers, suppliers, financiers, the government, and the community. Since corporate governance also provides the framework for attaining a company's objectives, it encompasses practically every sphere of management, from action plans and internal controls to performance measurement and corporate disclosure.

…… Specifically requirements for banks:

EBA Guidelines on Internal Governance EB/GL/2017/11:

Weaknesses in corporate governance in a number of institutions have contributed to excessive and imprudent risk-taking in the banking sector, which has led to the failure of individual institutions and systemic problems in Member States and globally. In order to address the potentially detrimental effects of poorly designed corporate governance arrangements on the sound management of risk, ….the EBA has updated its Guidelines on internal governance, originally published on 27 September 2011.

The Guidelines put more emphasis on the duties and responsibilities **of the management body in its supervisory function in risk oversight**, including the role of their committees. They aim at improving the status of the risk management function, enhancing the information flow between the risk management function and the management body and ensuring effective monitoring of risk governance by supervisors. The 'know-your –structure' and complex structures sections, especially following the 'Panama events', have been strengthened to ensure that the management body is aware of the risks that can be triggered by complex and opaque structures and to improve transparency. In addition, the framework for business conduct has been further developed and more emphasis is given to the establishment of a **risk culture, a code of conduct and the management of conflicts of interest**.

Corporate governance in banks

Role and responsibilities of the management body (from the EBA Guidelines on Internal Governance EB/GL/2017/11)

20. In accordance with Article 88(1) of Directive 2013/36/EU, the **management body must have ultimate and overall responsibility for the institution and defines, oversees and is accountable for the implementation of the governance arrangements** within the institution that ensure effective and prudent management of the institution.

21. The duties of the management body should be clearly defined, **distinguishing between the duties of the management (executive) function and of the supervisory (non-executive) function**. The responsibilities and duties of the management body should be described in a written document and duly approved by the management body.

Common approach to corporate governance in CZ, Central Europe („Continental approach“)

a) Supervisory Board

performs **oversight** of the efficiency and effectiveness of the bank's internal control system and carries out an evaluation thereof,

specifies the principles for the remuneration of members of the board of directors,

usually establishes committees concentrating on specific areas (e.g. renumeration/nominating, audit, financial committees).

b) Board of Directors

is responsible for **establishing**, maintaining and evaluating an efficient and effective internal control system, **bears responsibility for the functioning of the bank**,

approves the overall and risk management strategy of the bank,

approves a functional organizational structure that reflects the requirements for the segregation of conflicting duties,

specifies and approves principles of employee and salary policy.

Continental approach to corporate governance

c) Senior Management shall **implement** the strategy approved by the Board of Directors.

Members of the Board of Directors and Senior Management may or may not overlap in person (e.g. Chairman of the Board of Directors and General Manager, or CEO, may or may not be the same person).

General requirements of the Supervisory Board and Board of Directors are set by Commercial Code, and by the Act on Banks, No. 21/1992 Coll. for banks only. Specific requirement are set by Decree No. 163/2014 Coll. on the performance of the activity of banks, credit unions and investment firms (since revision No. 392/2017 Coll. investment firms removed)

Segregation of conflicting duties

The bank shall ensure that the units, employees and committees of the bank are assigned responsibilities and authorities in such a way that potential conflicts of interest are adequately prevented.

Units that are responsible for the following activities **risk management** and e.g. settlement and reconciliation of financial market transactions may not be organizationally subordinate to senior management members to whom **business units** are organizationally subordinate:

See the organizational chart of ČSOB

Other issues

- **Internal Audit department**
- **Compliance department/function**
- **F/O** – front office ~ where the transactions are negotiated with the client (business units)
- **B/O** – back office ~ where the transactions are settled and reconciled
- **M/O** – middle office ~ where the market conformity of prices is controlled if transactions on financial markets are closed for market prices
- **Risk management department** ~ where the risks are monitored, (loan) transactions are independently evaluated and finally approved.
- **Potential conflict of functional vs. organizational subordination** – a typical issue for foreign owned banks: for example, a risk management department of a bank is organizationally subordinate to the General Manager of the bank, but functionally subordinate to and managed by the risk management department of the parent bank.
- **Banks versus branches** – banks are managed as an independent shareholder's company, branches as organizational units of foreign banks.

BANKING

Lecture 4 B and Tutorial 4
Credit risk

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Content – Credit risk

1.	Credit risk and basic instruments
2.	Macro assessment of credit risk
3.	Credit registers
4.	Assessment of credit risk
5.	Micro assessment - loan granting process
6.	Loan pricing

Credit risk - definition

Credit risk

Risk to the bank of **losses resulting from the failure of a counterparty to meet its obligations** in accordance with the terms of a contract under which the bank has become a creditor of the counterparty (CNB),

Loans - Non-standard contracts difficult to transfer to third parties

Securities (Tradable securities) - Standard contract easy to transfer to third parties

Counterparty credit risk (CCR) – counterparty risk arising from derivative deals (OTC derivatives, repo style transactions, money market transactions)

Credit risk represents 50 – 80 % of all banking risks.

Assets	Liabilities and Equity
Assets sensitive to credit risk (loans provided, securities purchased)	Liabilities (generally not exposed to credit risk)
tangible investments, cash, deposits at the central bank, sovereign debt (?))	
	Equity
Off-balance sheet assets sensitive to credit risk (accepted guantantees)	**Off-balance sheet liabilities sensitive to credit risk (guantantees provided), loan commitments**

Credit risk measurement terminology

- Credit rating
- Credit scoring
- PD (probability of default)
- NPL (non-performing loans)
- LGD (loss given default)
- Models (combining all of this)
- RW (risk weight, regulatory vs. internal)
- LTV (loan-to-value), in %
- DTI (debt-to-income), in number of years
- DSTI (debt-service-to-total-income), in %

Credit risk – Basic debt instruments

- **A simple loan**
- **Fixed-payment loan contract**
- **Coupon bond**
- **Discount bond (or zero-coupon bond)**

- **Corporate** financing (corporate loans, securities), (operational vs. investment financing)
- **Retail** financing (retail loans, loans to households = individuals + trades)
    - Consumer credits
    - Mortgages
    - Etc.
- **Government** and **public** financing
- Loans to **financial institutions**
- **Project** financing and other structured financing (of corporate or public projects)
- Etc.

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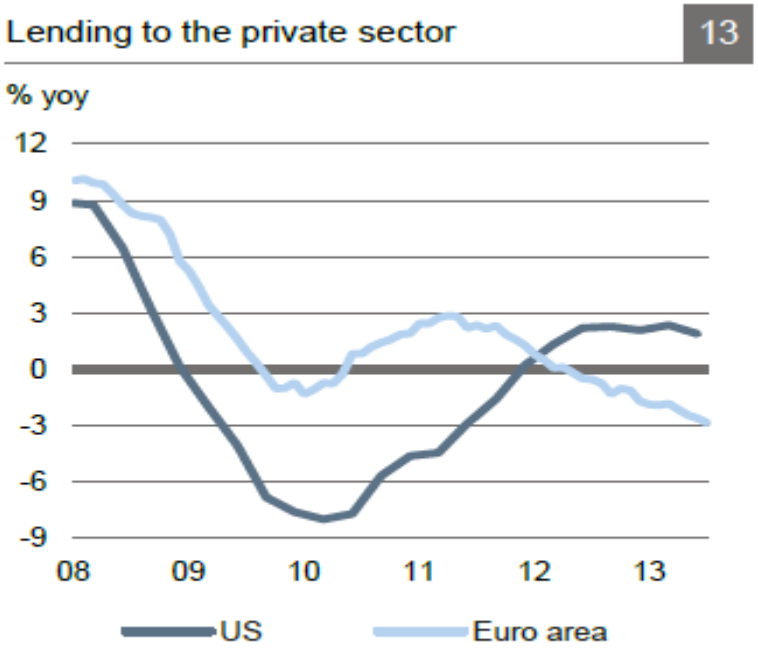
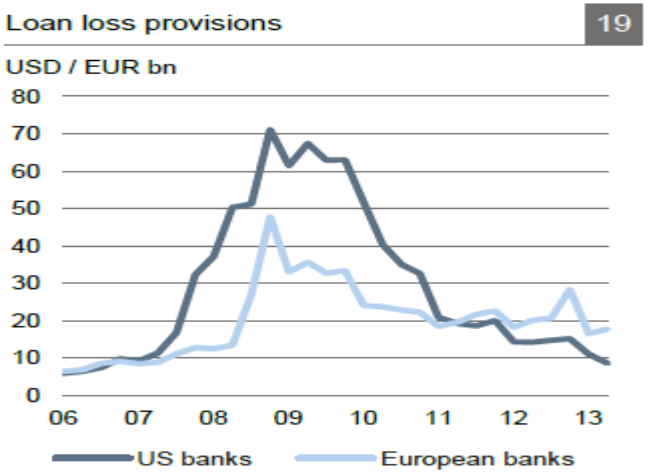
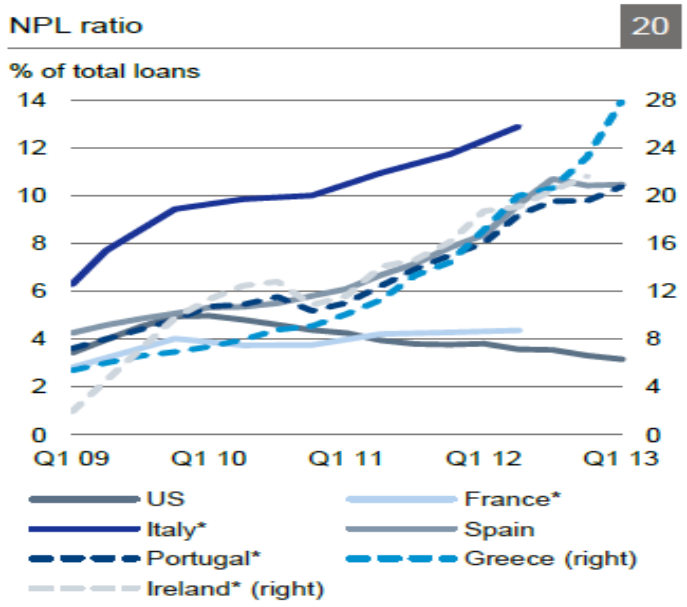
Lending to the private sector ….. during and after the financial crises…. and the respective LLP and NPL



Sources: ECB, FDIC, DB Research



Sources: FDIC, company reports, DB Research

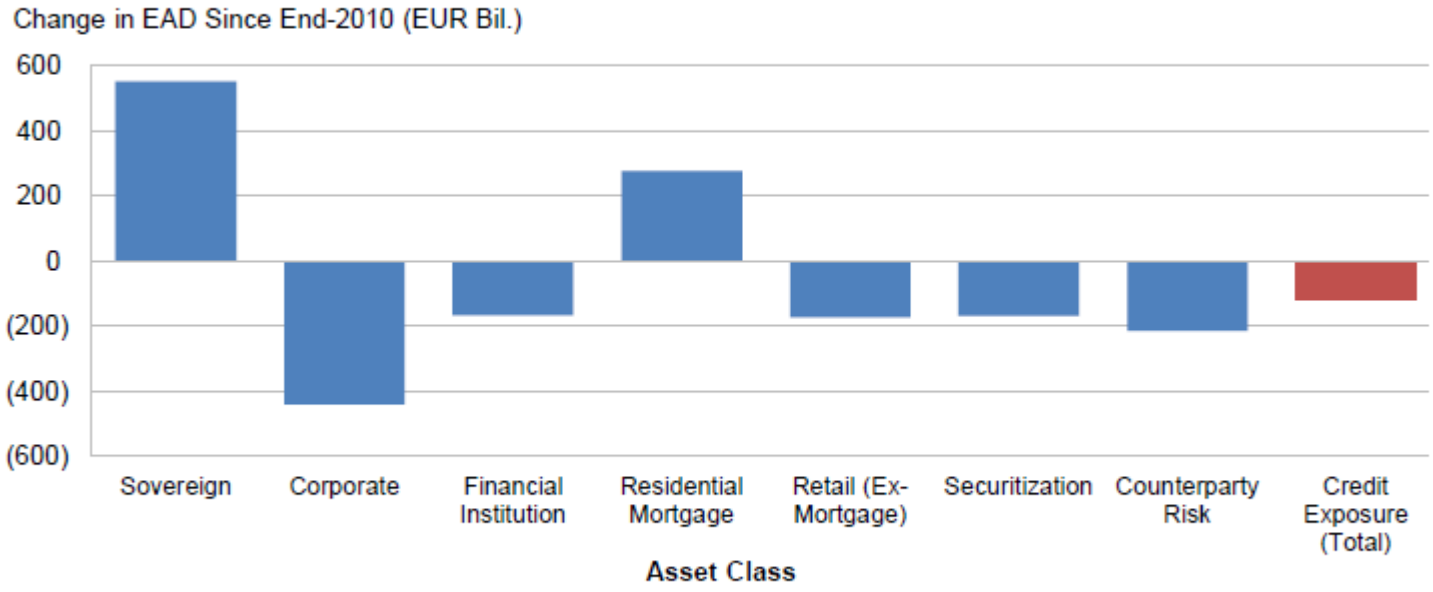


* First data point from Q4 2008.

Source: Deutsche Bank Research, Bank performance in the US and Europe, 2013

Credit risk – after the crisis – Reallocation rather than reduction

Risk Exposure (EAD): Modest Reduction, Major Reallocation

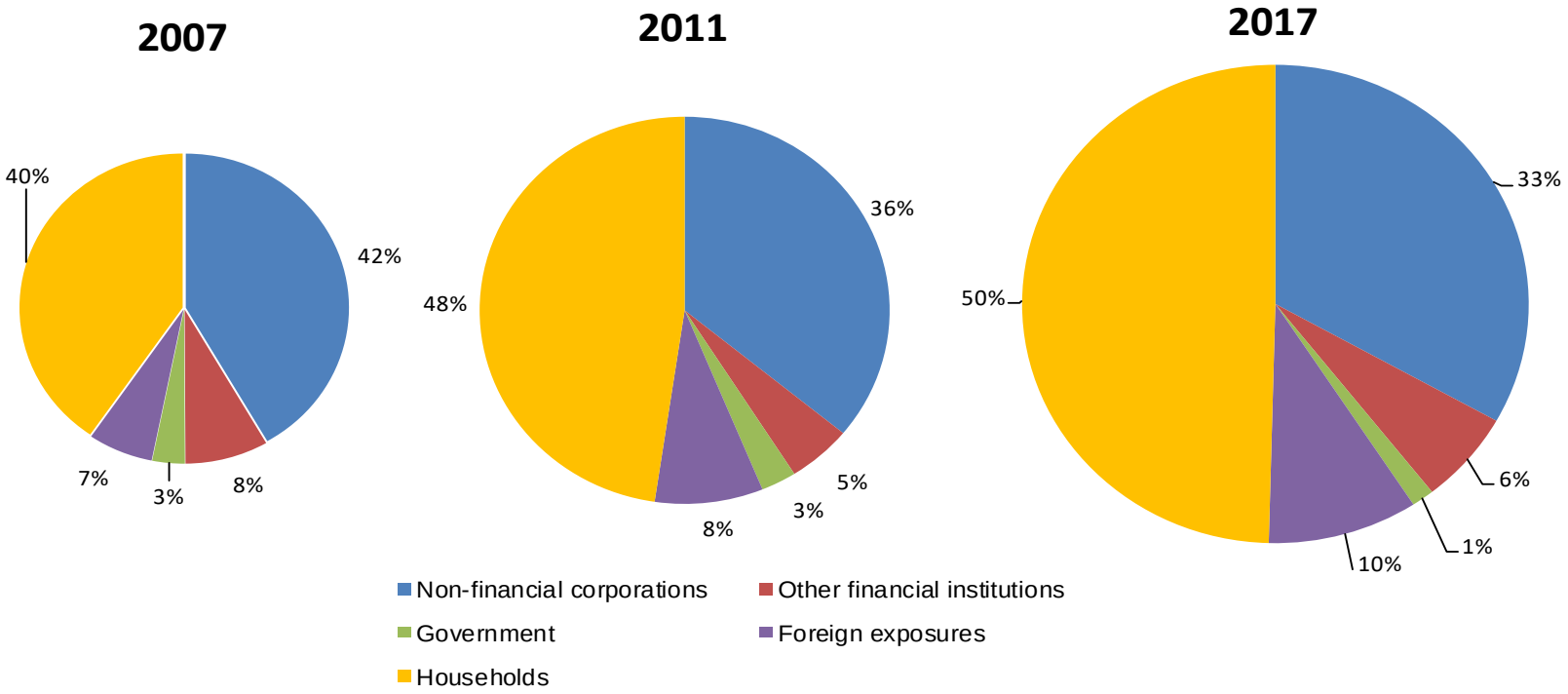


Source: Fitch Ratings; bank Pillar 3 disclosures (sample of 16 European G-SIBs).

G-SIBs – European Global Systemically Important Banks

Source: Fitch Ratings: Shifting the Credit Landscape, 11/2013

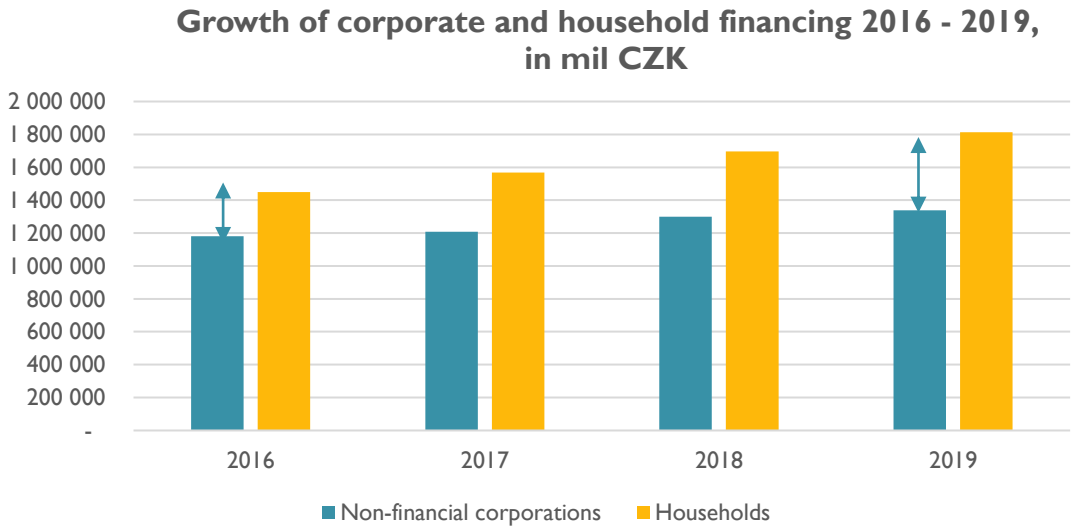
Credit risk – Loan portfolio structure, CZ



- Volume boom of loan market between 2007 and 2019
- **Increasing share of household financing (especially boom of residential mortgages)**
- Decreasing share of corporate financing, no significant change since 2017
- Slightly increasing share of foreign exposures

Source: own calculations, based on www.cnb.cz

Credit risk – Loan portfolio structure, CZ

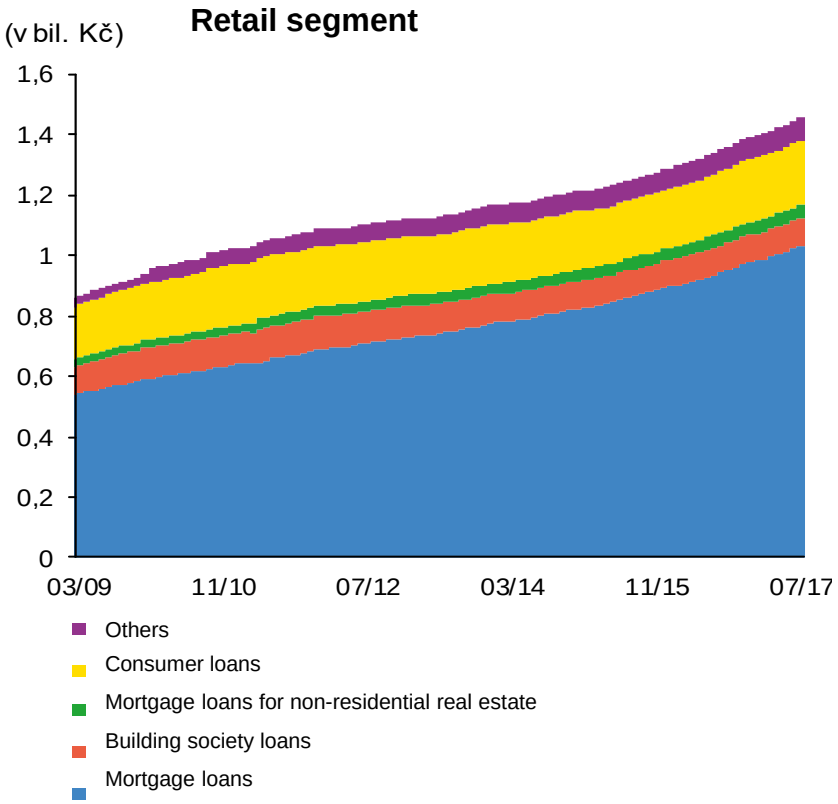


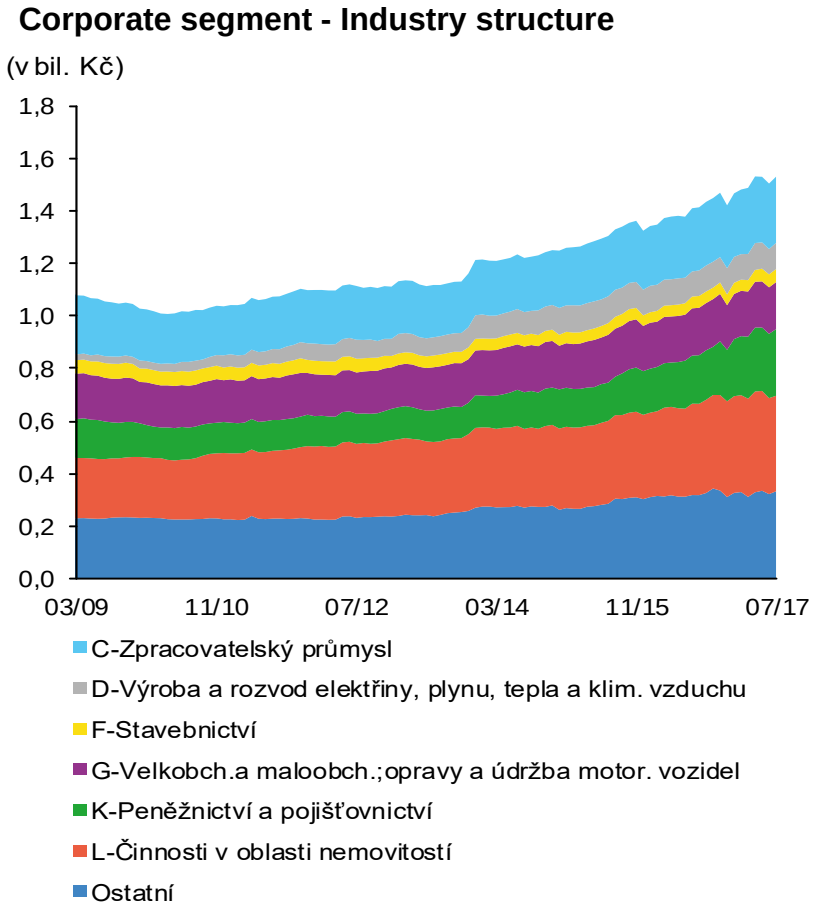
- Another volume boom of loan market between 2017 and 2019
- **Continuing increase of household financing (residential mortgages)**
- Total **housing loans** represent ca 3/4 of all loans provided to individuals/households

  Out of these **almost 90 % are mortgages,** the portion of morgages is slightly increasing.

Source: own calculations, based on www.cnb.cz

Credit risk – Loan portfolio structure, CZ





Source: own calculations, based on www.cnb.cz

Spring COVID 19 credit related measures (CZE)

- CNB has an open way to quantitative easing, QE (purchasing securities of long-term maturities on the secondary market (from other institutions than banks, and also other instruments (covered bonds))
- Postponement of regular monthly instalments for max 6 months
  - For retail lending - principal and interest payments postponed (but interest for postponed payments is charged (and will be payed later))
  - For entepreneurs – only principal repayments postponed
- Retail lending
  - Relaxation of LTV ratio (from max 80 % to max 90 %), *loan-to-value*
  - Firstly, relaxation of DSTI ratio (from max 45 % to max 50 %), *debt-service-to-total income*, since July 2020 – no limit on DSTI
  - No limit on DTI (9 years previously), *debt-to-total income*

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Credit registers

Banking sector – significant exposure to risk due to high information assymetry (moral hazard and adverse selection)

One of the way to reduce credit risk is to improve the information background of banks – to **share information among institutions (not only banks)** - with the help of registers of credits

Credit registers

- **Central Register of Credits (CRC)** - pools information on the credit commitments of individual entrepreneurs and legal entities, in operations since 2002 (created, operated and guaranteed by CNB)
- **AnaCredit** (Analytical Credit Datasets) project was set up at the initiative of the European Central Bank to establish a cross-border database of detailed (individual) credit and credit risk data. The Czech part will be operated by the CNB and will replace CRC. Not operating yet.

CRIF – Czech Credit Bureau

- **REPI – Payment information register, 29 members sofar (as of 09/2020)**
- **Banking Register of Client information (BRCI, operated by CBCB) –** mutual information exchange between banks regarding the payment prospects and credibility of their clients, founded and used by commercial banks (09/2020 – 26 banks (incl. branches), (banks and branches with retail exposures))
- **Non-Banking Register of Client Information (NBRCI, operated by CNCB) –** for non-banking creditor entities (leasing companies and companies providing consumer loans), (09/2020 – 41 users)
  - the databases of CIBR and NBCIR are independent)
- **SOLUS** (Association for the Protection of Leasing and Loans to Consumers), founded in 1999 (banks and other non-banks creditors (leasing, energy distributors, telecommunication operators, insurance companies), (09/2020 - 53 members)

Source: www.cnb.cz, www.crif.cz, www.solus.cz

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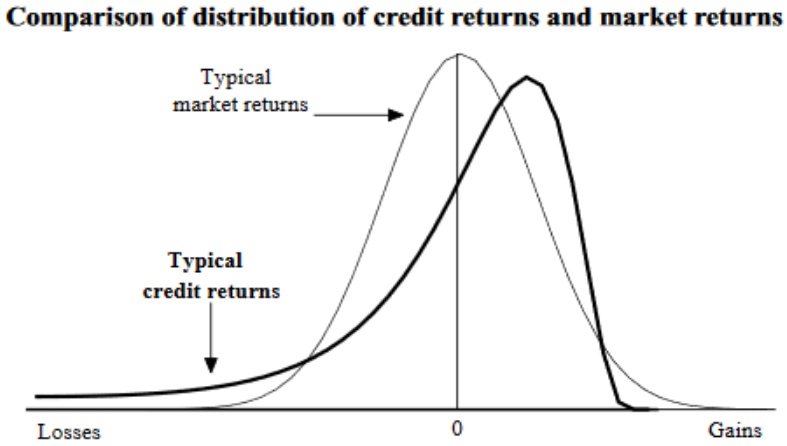
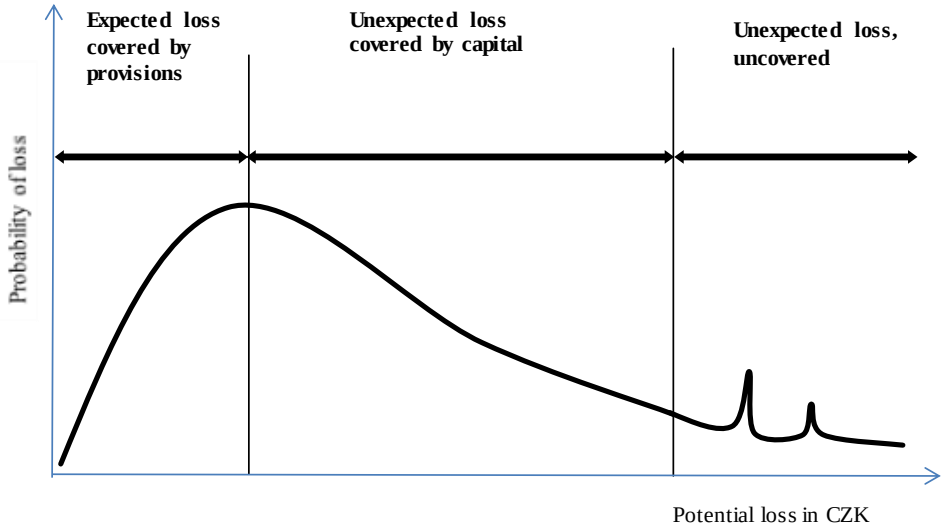
Loss distribution of credit risk



This long downside tail of the distribution of credit returns is caused by defaults. Credit returns are characterized by a **fairly large likelihood of earning a (relatively) small profit** through net interest earnings (NIE), coupled with a (relatively) **small chance of losing large amount of investment**. Across a large portfolio, there is likely to be a blend of these two forces creating the smooth but skewed distribution shape above. The second problem is the difficulty of modeling correlations. For equities, the

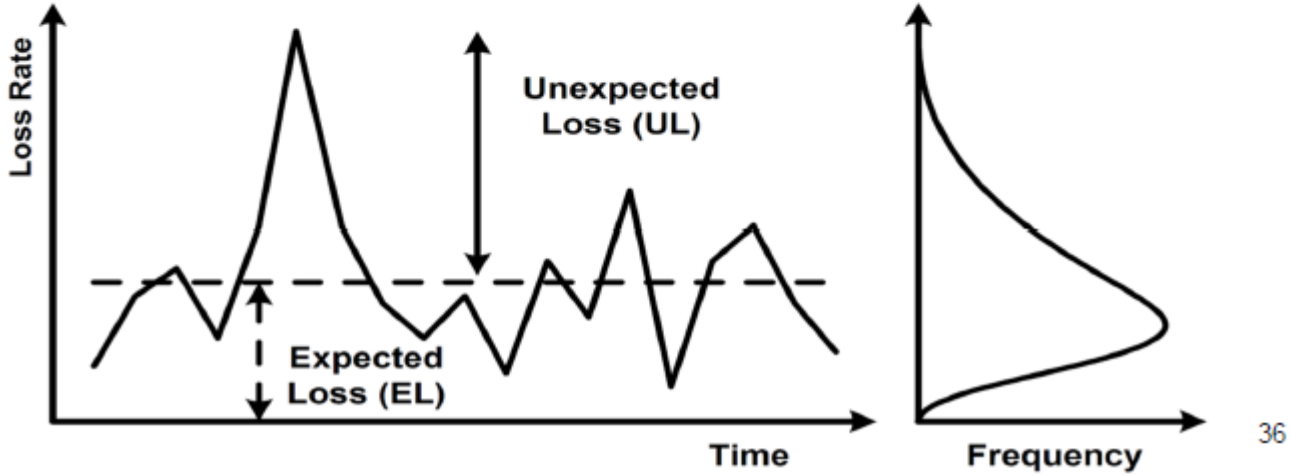
Source: CreditMetrics Technical Document, 2007

Expected loss is a function of PD (probability of default)



Definitions

- **Expected Loss:**
  - A mean value
  - Not considered a „risk“
  - EL = PD x LGD x EAD
  - Additive in a portfolios
- **Unexpected Loss:**
  - A deviation from the mean
  - Considered a „risk“
  - Sub-additive, skewed, fat tails
  - systematic component and tails hinder diversification, thus priced by market (main component of credit spread)



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Notes: EL = Expected Loss, PD = Probability of Default, LGD = Loss Given Default, EAD = Exposure at Default

Credit risk – expected vs. unexpected loss
provisions vs. capital requirement

Provisioning – „**expected**“ **loss** of the receivables (performing and non-performing)

Since 2005, banks have been able to use the portfolio-based approach (*statistically based*) to calculate provisions (allowances) for certain loan types (particularly in the small business and retail banking segment (e.g. mortgage loans segment)).

IFRS 9 requires the bank to create provisions for performing loans **as performing loans have non-zero PD as well**

Capital adequacy – capital buffer for covering **„unexpected“ losses** of receivables (incl. defaulted receivables net of provisions)

The assets (loans) are weighted according to their riskiness

→ **RWE (risk weighted exposures) are calculated**

→ **Capital requirement is determined as RWE * 8 %**

Credit risk – default

Default

A debtor is in default at the moment when it is probable that he will not repay his obligations in a proper and timely manner, or when at least one repayment of principal is more than 90 days past due

Categorization of receivables according to CNB until end 2017 (Decree No. 163/2014 Coll.)

- Standard, watch – „loan without obligor default", **since 1.1.2018 ≈ „performing loan" (Decree No 392/2017 Coll.)**
- Substandard, doubtful and loss loans – „loan with obligor default", **since 1.1.2018 ≈ non-performing loan (Decree No 392/2017)**

Non-performing assest = Regulatory approach

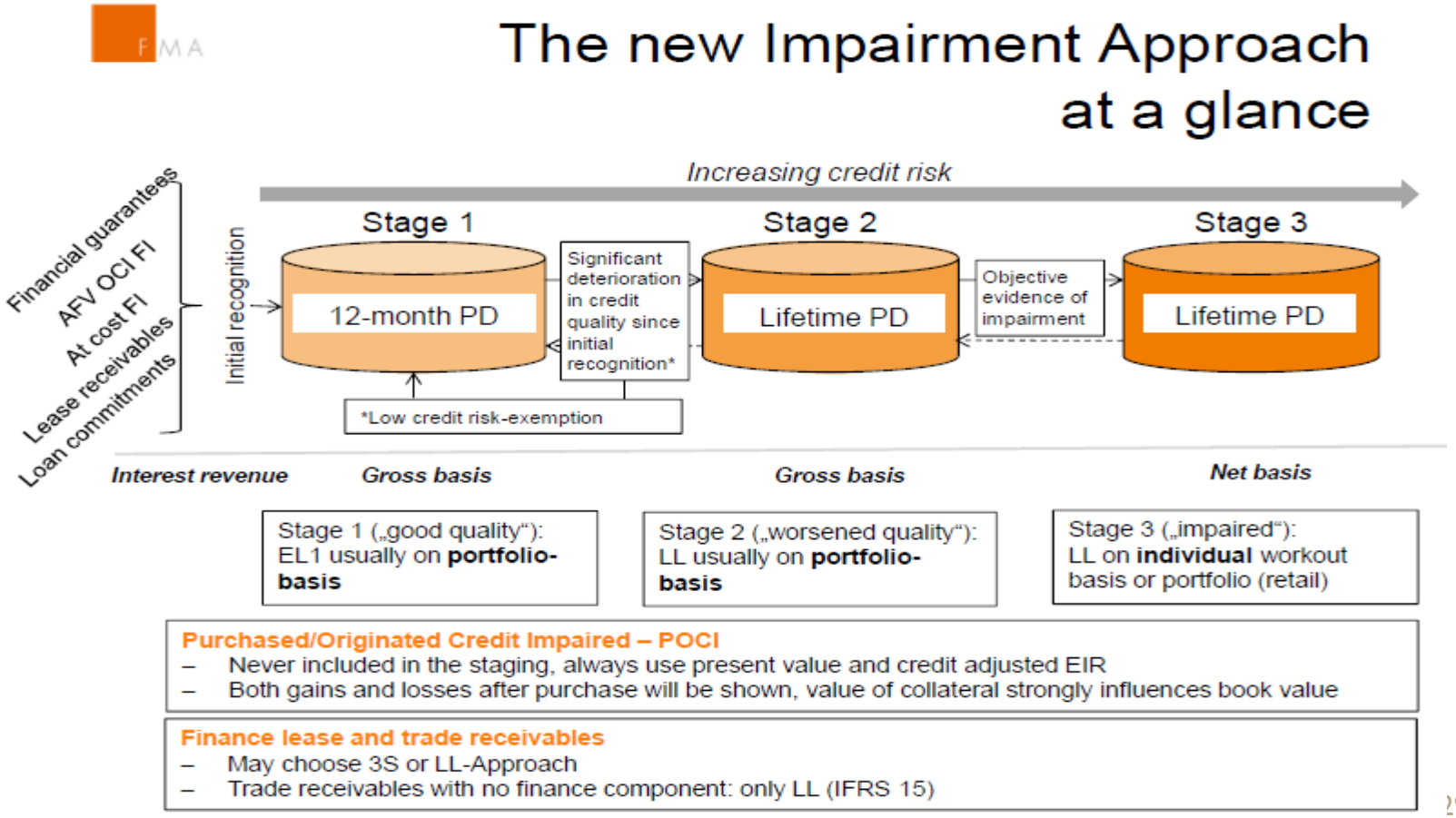
≈

Impaired assets = Accounting approach

Starting 1.1.2018 – IFRS 9 standard is effective, replaced IAS 39

Credit risk - Staging

- **Staging since 1.1.2018**
- **No major recategorization of assets**
- Stage 1 and Stage 2 ≈ performing loans (loans without default)
- Stage 3 (impaired assets) ≈ non-performing loans (loans with default)



Credit risk – expected loss calculation

Expected loss is the sum of the values of all possible losses, each multiplied by the probability of that loss occurring.

Expected loss = PD * LGD * EAD = PD * (1-RR) * EAD

PD – probability of default od the homogenous group of the clients with the same rating

LGD – size of the loss, amount of money that is not recovered (RR)

EAD – exposure at default, may differ from the current exposure (example ?)

Table 1.8

One-year transition matrix (%)

Initial rating	Rating at year-end (%)							
	AAA	AA	A	BBB	BB	B	CCC	Default
AAA	90.81	8.33	0.68	0.06	0.12	0	0	0
AA	0.70	90.65	7.79	0.64	0.06	0.14	0.02	0
A	0.09	2.27	91.05	5.52	0.74	0.26	0.01	0.06
BBB	0.02	0.33	5.95	86.93	5.30	1.17	0.12	0.18
BB	0.03	0.14	0.67	7.73	80.53	8.84	1.00	1.06
B	0	0.11	0.24	0.43	6.48	83.46	4.07	5.20
CCC	0.22	0	0.22	1.30	2.38	11.24	64.86	19.79

Source: Standard & Poor's CreditWeek (15 April 96)

Credit risk – Provisioning

Generally

- **Retail segment, micro SMEs, standard corporates – model based provisioning –** (in CZE since 2005), banks have been able to use the portfolio-based approach (*statistically based*) to calculate provisions (allowances) for certain loan types (particularly in the small business and retail banking segment).

  Stage 1 and Stage 2

- Large corporates – **individual provisioning**

  Stage 3

Credit risk – individual provisioning – HISTORY !

Provisions for client loans assessed individually - reference rates used, according to the CNB regulation). **BUT**

big commercial banks use their own assessment of individual loan loss provisions

Category	Arrears (overdue)	Probability of Payment	Underlying Financial Position	CNB Required Provision (%)	Provision permitted by Tax Authority (%)
Standard	< 31 days	No Doubts	No debts restructured in the last 2 years	0	0
Watch	30-90 days	Expected	No Debt rescheduled in the last 6 months	1	0
Sub-standard	90-180 days	Partial Payment Expected		20	1
Doubtful	180-360 days	Full repayment very unlikely, partial possible		50	10
Loss	>360 days	Highly unlikely	A receivable from a debtor in composition proceedings, debtor has declared bankruptcy	100	20

Receivables without default („bez selhání“)

Receivables with/in default („se selháním“

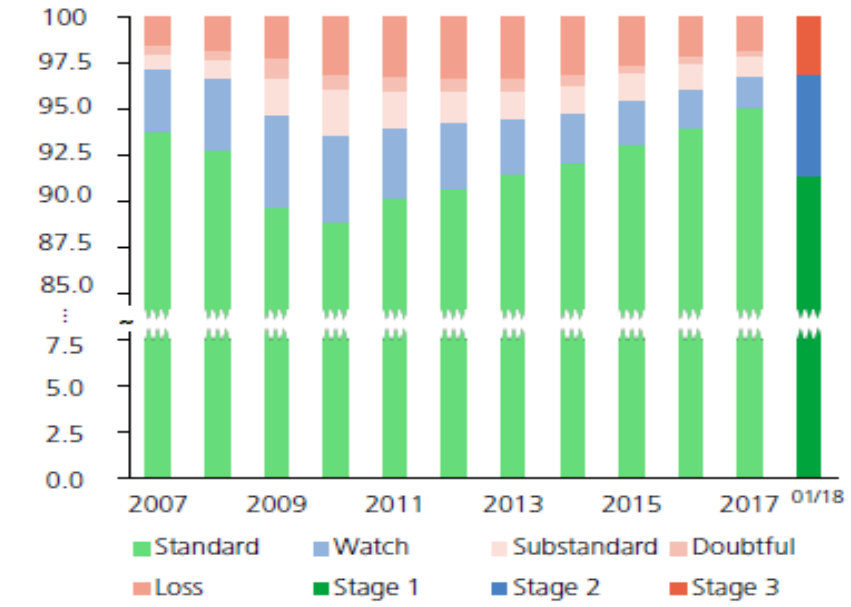
Watch loans – until December 2004 the loan loss provision for watch loans amounted 5 %.

Source: www.cnb.cz, Decree of CNB No. 163/2014 Coll.

Credit risk – Loan structure by categorization

Under IFRS 9, which has been in force internationally since 1 January 2018, banks should, when provisioning, take into account all available information about current and future macroeconomic developments and their effects on the credit risks of relevant exposures. Under this assumption, banks should thus create sufficient provisions to cover their expected credit losses before the business and financial cycle changes, i.e. in the period of still favourable economic conditions, when they are usually profitable. In contrast to the previous IAS 39 standard, which was based on an inherently procyclical concept of incurred losses,[44] IFRS 9 should thus have a positive impact on the stability of banks during crises.

Loan structure by categorisation
(%)



Source: CNB
Note: Standard loans are bank receivables in respect of which there is no doubt that they will be repaid (loans usually no more than 30 days past due). Watch loans are bank receivables in respect of which repayment is highly probable (loans usually 30–90 days past due). Substandard loans are receivables in respect of which repayment in full is uncertain (loans usually 91–180 days past due). Doubtful loans are receivables in respect of which repayment is very improbable (loans usually 181–360 days past due). Loss loans are receivables with the highest risk rate, in respect of which repayment is practically impossible (loans usually more than 360 days past due). The Stage 1, Stage 2 and Stage 3 categories correspond to the IFRS 9 exposure classification.

Source: Financial stability report 2018/2019, page 43

IFRS 9 vs IAS 39

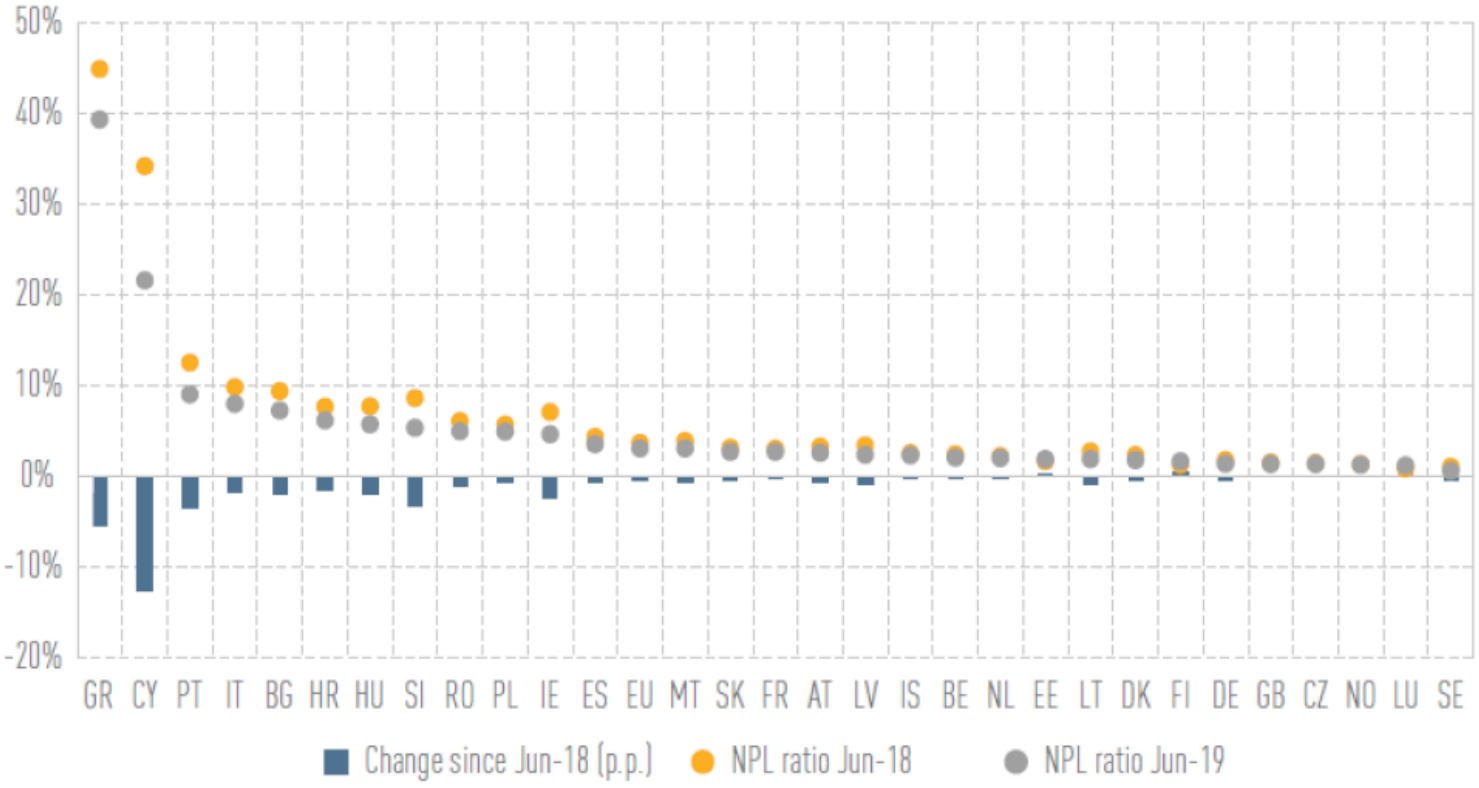
The biggest uncertainty with Stage 2 classification

Source: Financial stability report 2017/2018

Non-performing loans (NPLs) in the EU

Figure 17: NPL ratios by country in June 2018 and June 2019 (%) and pp change between June 2018 and June 2019

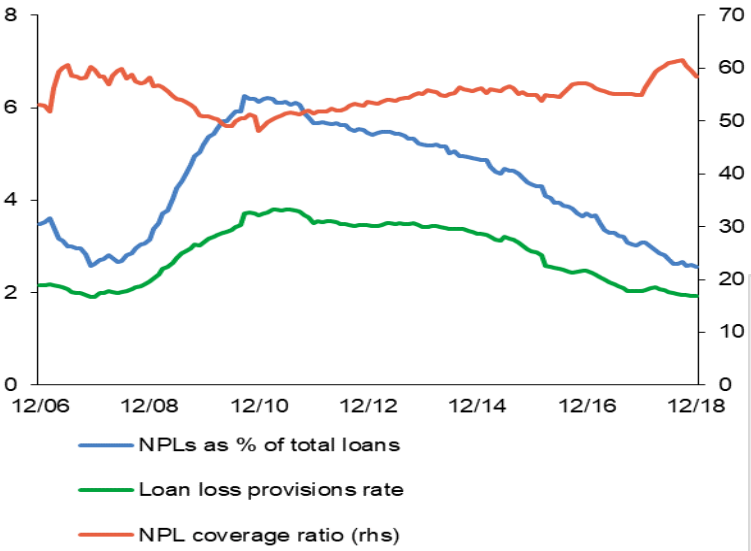
Source: EBA supervisory reporting data



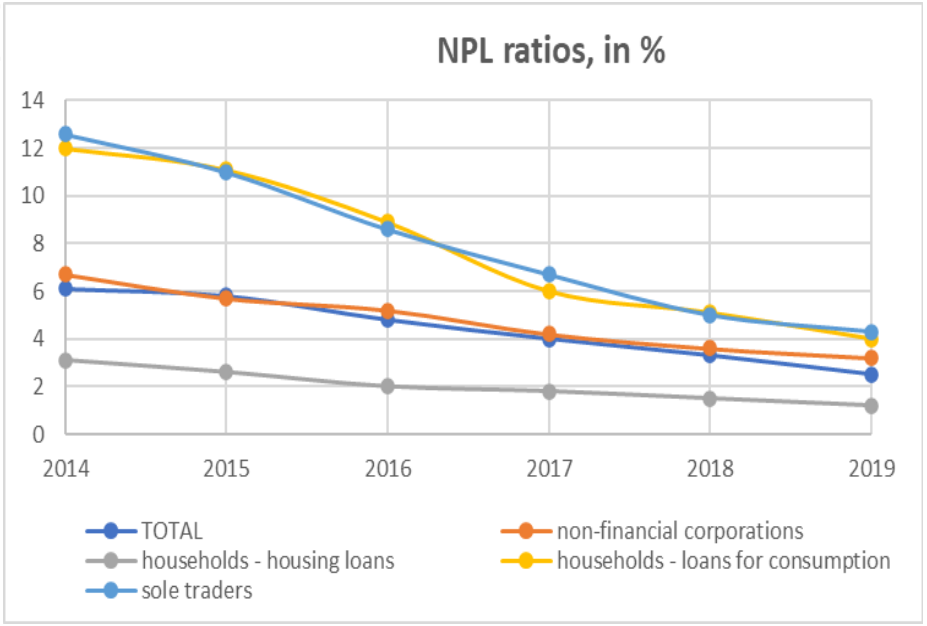
Source: EBA (2019). Risk Assessment Report.European Banking Authority

Credit risk – Loan portfolio quality

Non-performing loans and provisions in the domestic banking sector, %



- 2019 – all time low NPL ratio (2,5 %)
- NPL coverage ratio around 60 % (e.g. an average non-performing loan is covered by provisions from 60 %, ….does it mean, that 40 % is uncovered ?
- NPL coverage ratio (2019 – 57,4 %)



Source: Financial stability report, 2018/2019, 2019/2020, own calculation

Example 1 – Credit risk quantification

A bank granted a loan to a client in the amount of 100 mil CZK, with a collateral of 30 mil CZK (commercial property), performing loan in Stage 1.

After 1 year the client defaulted on his obligations and made the bank clear, he will not be able to repay the loan from the operating cash flow, so the bank expects to recover the loan out of the sale of the commercial property.

Show the effect of this situation on the balance sheet of the bank, its P/L and capital ratio.

Important issues

- Provisions are cost items, reduce profit and hence the capital.
- Non-performing loan changes its risk weight when transferred from performing to non-performing loan (non-performing loans are generally assigned a risk weight of 150 %)

Example - Credit risk quantification

31.12.2018

Asset				**Liability**	
	Brutto	Provisions	Netto		
Loan (@ RW of 100 %)	100	0,01	99,99	Deposits	1929,99
Other loans (@ RW of 50 %)	2000	20	1980	Capital	150
			2079,99		**2079,99**

Risk weighted exposure calculation

Loan	*99,99 * 100 %*	99,99
Other loans	*198 * 50 %*	990
RWA total		**1089,99**

Minimum capital requirement @ 8 %	***87,20***

Capital ratio	**13,762%**

31.12.2019

Asset				**Liability**	
	Brutto	Provisions	Netto		
Loan (@RW of 150 %)	100	***70***	30	Deposit	1929,99
Other loans (@ RW of 50 %)	2000	20	1980	Capital	***80,01***
			2010		**2010**

Risk weighted exposure calculation

Loan	45
Other loans	990
RWA total	**1035**

Capital ratio	**7,730%**

Capital = 150 – loss of 70

Example - Credit risk quantification

What if the collateral can not be sold immediately ?

- The bank should prove prudential behaviour by discounting the expected cash flows, add all addition legal and work-out costs and adjust the provisions accordingly
- this adjustment further influences the P/L and capital ratio

Collateral		
expected value		30
will be sold in 2 years time	**discount rate 3 %**	
		28,28
work out costs		**0,50**
current value		**27,78**

provisions	**72,22**

31.12.2019

Asset				**Liability**	
	Brutto	Provisions	Netto		
Loan (@RW of 150 %)	100	***72,22***	27,78	Deposit	1929,99
Other loans (@ RW of 50 %)	2000	20	1980	Capital	***77,8***
			2007,8		**2007,8**

Risk weighted asset calculation

Loan	41,667
Other loans	990,000
RWA total	**1031,667**

Capital ratio	**7,540%**

NPL coverage ratio ?

Credit risk management models

- Credit risk assessment
  - Scoring
    - Altman Z-score
  - Rating
- Credit risk models
  - Credit Monitor Model (KMV Moody´s)
  - Credit Margin Models
  - CreditMetrics (based on VaR methodology)
  - RAROC

Credit risk assessment - Scoring

- **Scoring (scoring models, scoring functions)**
  - used for the credit assessment of small companies or individuals
  - credit risk of individuals is assessed using more or less simple scoring function with independent variables such as income, age, number of children etc. Scoring functions are used for products like consumer credit or mortgage.
  - Credit risk of small companies is (usually) based on scoring function with financial ratios as independent variables
  - scoring does not look at qualitative issues, as it would be inefficient (large number of credits with relatively low nominal value).

Credit risk management models

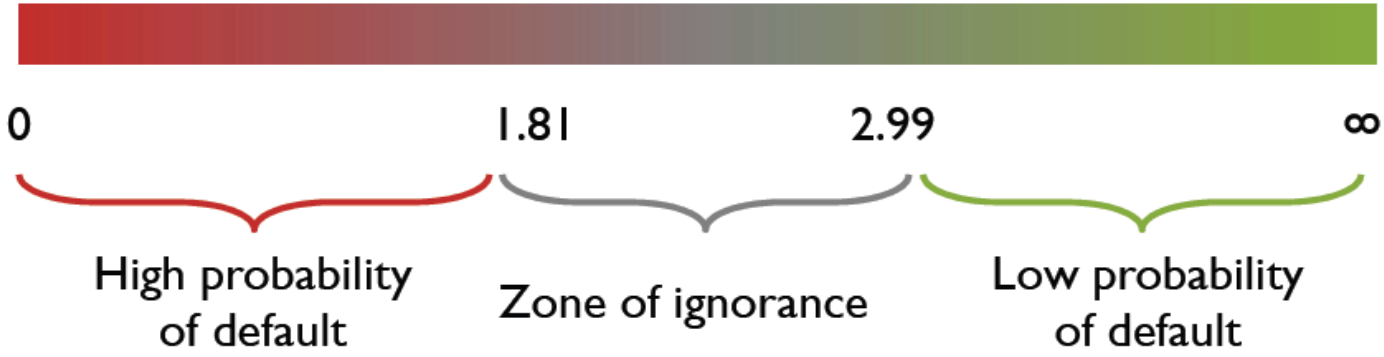
Original Altman Z-score:

$$Z = 0{,}012X_1 + 0{,}014X_2 + 0{,}033X_3 + 0{,}006X_4 + 0{,}999X_5$$

where

X_1	Working capital/Total assets
X_2	Retained earnings/Total assets
X_3	EBIT/Total assets
X_4	Market value of equity/Book value of total liabilities
X_5	Sales/Total assets

The model was revised several times and plenty versions based on original model exist, but the ratios used are more or less similar



Credit risk assessment - Rating

Rating (more qualitative issues included)

Rating agencies – Moody´s, Standard & Poor´s, FITCH

Short-term rating (for debt instruments with a maturity less than one year)

Moody's	Standard & Poor's	
Prime-1 Prime-2 Prime-3	A-1 A-2 A-3	**Investment grade**
Not Prime	B C D	**Speculative grade**

Long-term rating (maturity of more than 1 year)

Standard & Poor´s (AAA, AA, A, BBB, BB…..D), or with + - refinements

Moody´s (Aaa, Aa, ….Baa, Ba, ….)

Note: It is worthwhile to recall that there is a big jump between a rating of BB– and BBB+. It is a small difference in rating, but as it divides the rating scale between **investment** and **speculative** grade, it receives special attention from the investor community.

Credit margin models

- model assumes that the credit margin reflects the probability of default

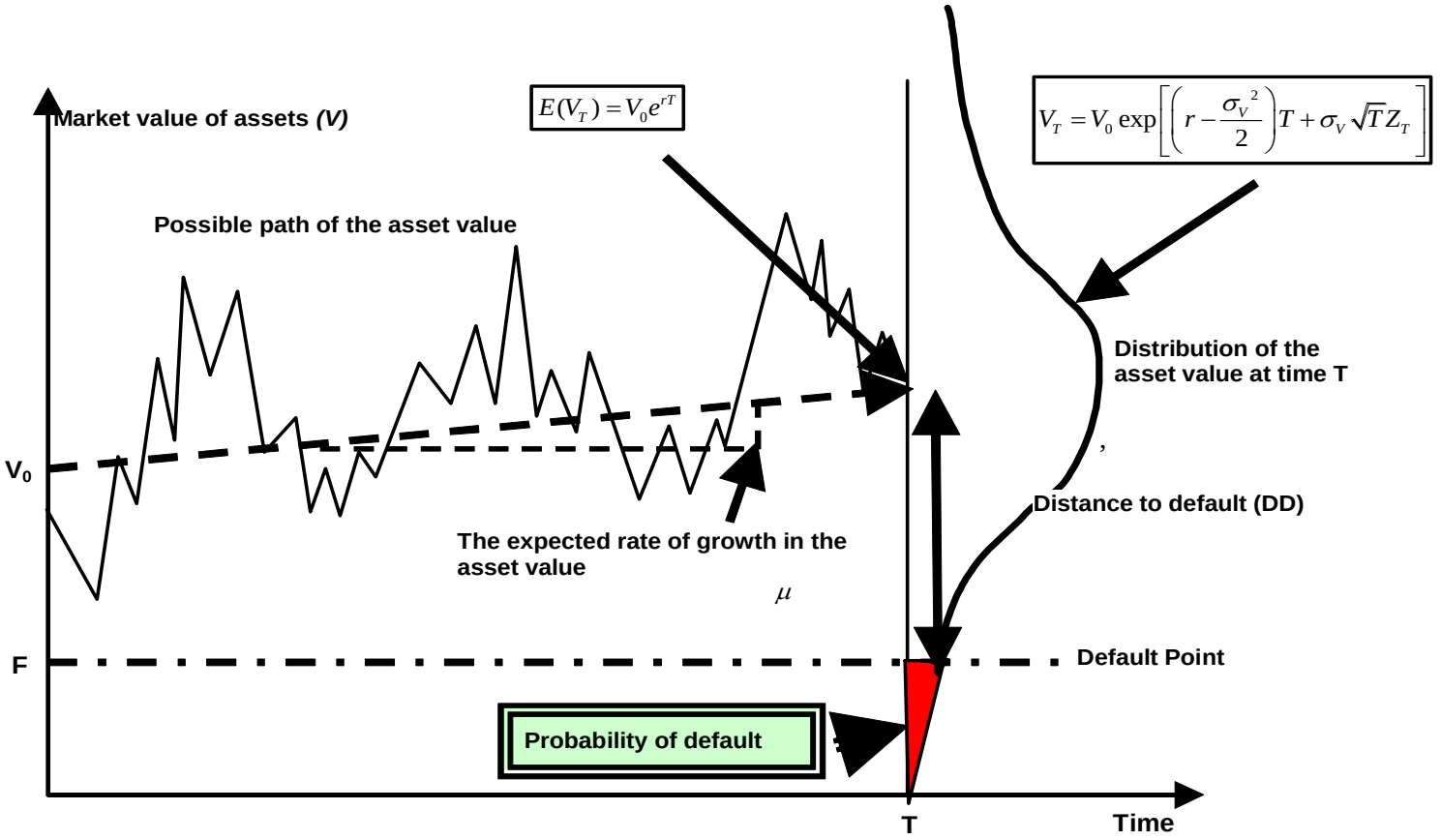
$$(1-p)(1+k)=1+r_f,$$

where

p - implied risk neutral probability of default
k - yield on one year risky asset
r_f - risk free interest rate

Credit risk management models

Credit risk – KMV model



Credit risk management models – Credit Metrics

For illustration only

Loan information

Rating/ Issuer rating	**A**
Maturity	3 years
Coupon	10.2072%
Principal value	100
AAA-yield	10%

Spreads

AAA	0%
AA	0.00%
A	0.20721%
BBB	0.46081%
BB	0.96801%
B	1.98241%
CCC	4.01121%
Recovery rate	50.00%

Year-end rating	Probability of state	Yield	Bond price + coupon	Probability weighted value	Difference from the mean	Difference from the mean (absolute)	Probability weighted difference squared
AAA	**0.09%**	10%	110.567	0.09951	0.429	0.42948	0.0002
AA	**2.27%**	10.00%	110.567	2.50987	0.429	0.42948	0.0042
A	**91.05%**	10.21%	110.207	100.34367	0.070	0.06986	0.0044
BBB	**5.52%**	10.46%	109.770	6.05929	-0.368	0.36757	0.0075
BB	**0.74%**	10.97%	108.904	0.80589	-1.234	1.23358	0.0113
B	**0.26%**	11.98%	107.206	0.27874	-2.931	2.93101	0.0223
CCC	**0.01%**	14.01%	103.944	0.01039	-6.193	6.19314	0.0038
D	**0.06%**	recovery rate	50.000	0.03000	-60.137	60.13735	2.1699
		Mean =		**110.13735**		Variance =	**2.2236**
						St. dev. =	**1.4912**

Confidence level		Normal distribution assumed	
99.00%	2.326	**Var**	**3.4690**
99.50%	2.576	**Var**	**3.8413**
99.90%	3.090	**Var**	**4.6081**

Concentration of credit portfolio

Concentration in terms of:

- large exposures (large exposure (LE) is an exposure that represents more than 10 % of capital)
  - limit for LE set in regulation is 25 % of capital
- economicaly connected group and so becoming a LE
- industry exposure (e.g. automotive, construction, commercial real estate)
- country exposure
- repayment structure exposure (e.g. high concentration in bullet payments)

Client and industry concentration can be measured by e.g. HH (Herfindahl-Hirschman) Index (defined as the sum of the squares of the client/industry share of the portfolio)

No regulatory capital requirement for concentration risk, regulation rather assummes diversified porfolio

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1.	Credit risk and basic instruments
2.	Macro assessment of credit risk
3.	Credit registers
4.	Assessment of credit risk
5.	Micro assessment - loan granting process
6.	Loan pricing

Loan granting process

- General level –
  - Credit strategy (approved by Board of Directors)
  - Organizational issues (departments involved in credit process)
  - Internal norms
  - Credit limits
  - Credit risk management
  - Controlling and audit

Loan granting process

- Individual loan level –
  - Loan/client acquisition
  - Loan/client valuation
  - Collateral valuation
  - Credit approval

  - Loan/client monitoring
  - Loan/client classification and provisioning
  - (Work-out)

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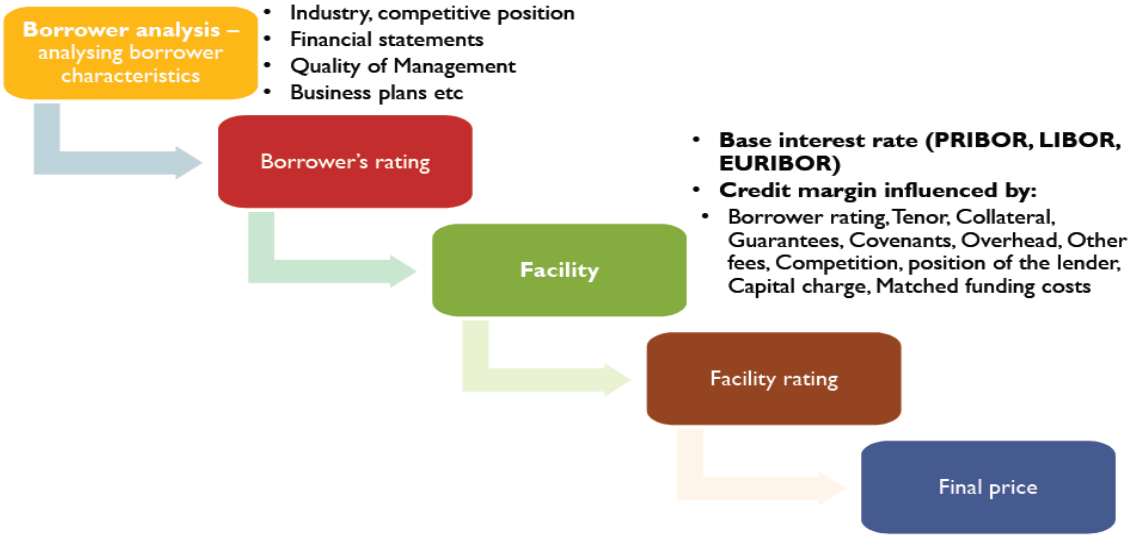
Loan princing

- Traditional approach (Cost-plus-profit approach)
  - Based on cost-plus-profit approach



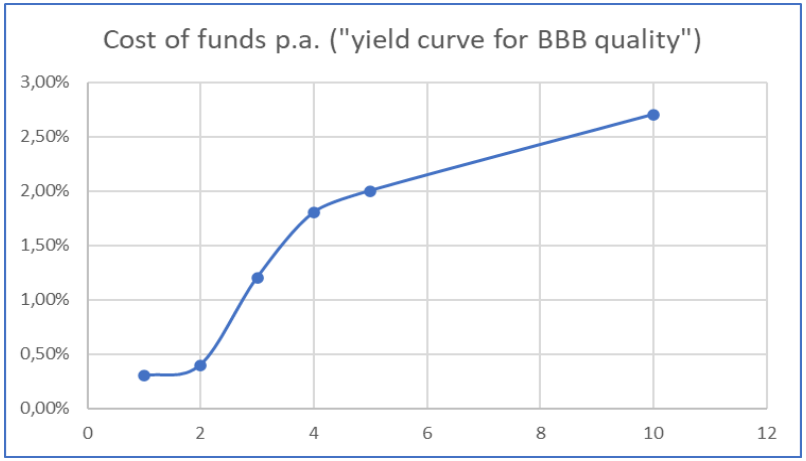
- RAROC (Risk-adjusted return on capital (risk adjusted profitability measure where the volatility of losses is taken into account))

Example 2 - Loan princing

What is is the minimum margin the bank shall charge a BBB client to meet its minimal costs.
The overhead costs (administrative, personal, IT…) are on average 0,3 % of the outstanding amount

Assumptions	
Borrower risk rating	BBB
Loan maturity	5
Capital ratio (min. capital requirement)	8%
Hurdle rate (min ROE)	10%
Loan amount	2 000 000

Rating	Historical 5-Year default rate (%)
AAA	0,01
AA	0,6
A	1,22
BBB	2,5
BB	8,69
B	18,63
…	



Maturity (years)	Cost of funds p.a. ("yield curve for BBB quality")
1	0,30%
2	0,40%
3	1,20%
4	1,80%
5	2%
10	2,70%
…	

Loan princing - example

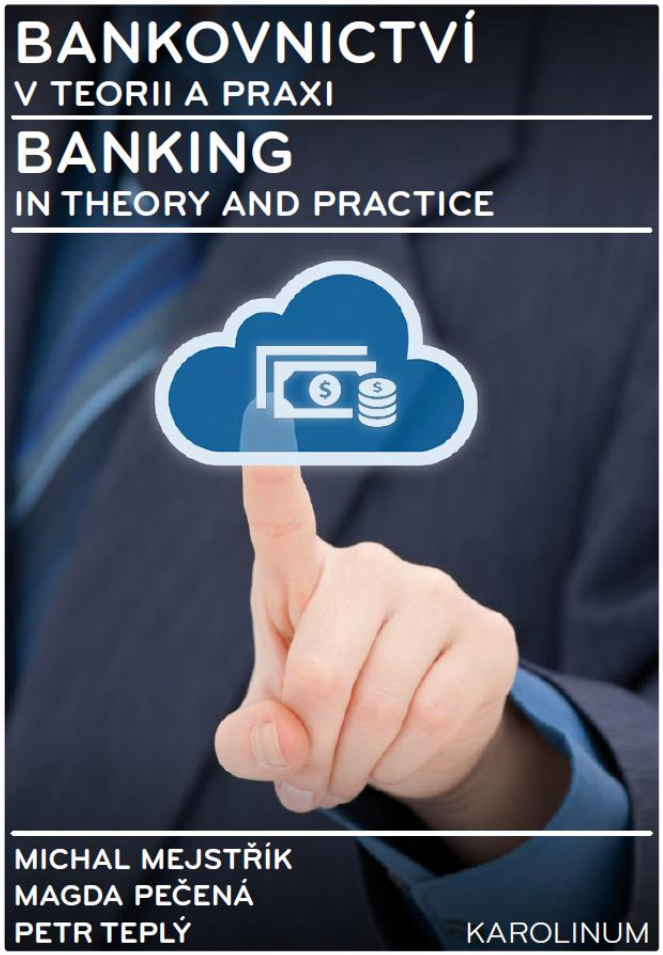
Item	Calculation	Amount
Assumptions		
Borrower risk rating		BBB
Loan maturity		5
Default rate		2,50%
Min. Capital ratio (capital adequacy)		8%
Hurdle rate (min. ROE)		10%
Loan amount		2 000 000
Overhead costs (as % of outstanding amount)		0,30%
Calculation		
Capital required	2 000 000 * 0,08	160 000
Annual capital charge	160 000 * 0,1	16 000
Annual funds costs	1 840 000 * 0,02	40 000
Annual loan loss allowance	2 000 000*0,025/5	10 000
Overhead costs	2 000 000*0,003	6 000
Break-even annual interest income		72 000
Loan Interest Rate (with no funding risk)		3,60%
Minimum spread (over funding)		**1,6%**
We also assume that capital (capital adequacy requirement) is equal to equity		

Loan princing - RAROC

- Risk adjusted return on capital (RAROC) is the **risk-adjusted** profitability measure where the volatility of losses is taken into account.
- RAROC provides a consistent view of profitability across businesses (business units, divisions).
- **It allows the comparison of two businesses with different risk profiles, and with different volatility of returns.**

- **The pricing of a loan/product** is derived from the fact that the manager must meet certain RAROC requirements (benchmark RAROC).
- RAROC is based on Value at risk methodology

Reading for the this lecture



- ✓**Chapter VIII – Credit risk**