RISK BASED PRICING - Possibilities of Advanced Approach to Mass Retail Management

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Komerční banka,a.s.

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Approach to mass retail portfolio management

1. Model with a good discriminating power (Complex set of data: demographic, behavioral, external registers)
   ↓
2. Granular rating scale
   ↓
3. Better client separation (Risk Margin assignment) and pricing
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4. Cut-off criteria based on profitability, business and Cost of Risk plans, recovery capacities
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5. **HIGHER NET INCOME OF THE BANK**

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Application scoring process

DATA COLLECTION (APPLICATION)

- Application form (demographic data)
- Internal KB Group databases (behavioral data in KB)
- Credit history in external registers

SCORE CALCULATION
(SCORECARD)

RISK PROFILE-RATING BAND
(Approval / Rejection)

LIMIT CALCULATION

RISK MARGIN CALCULATION

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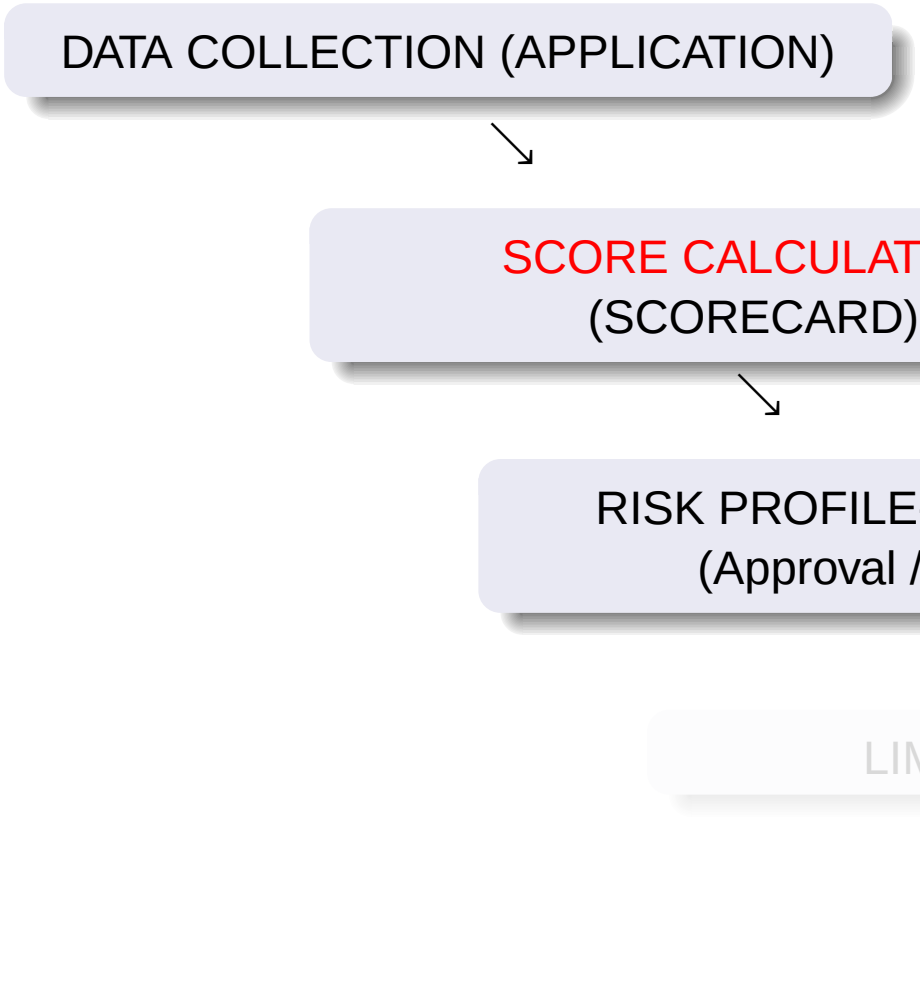

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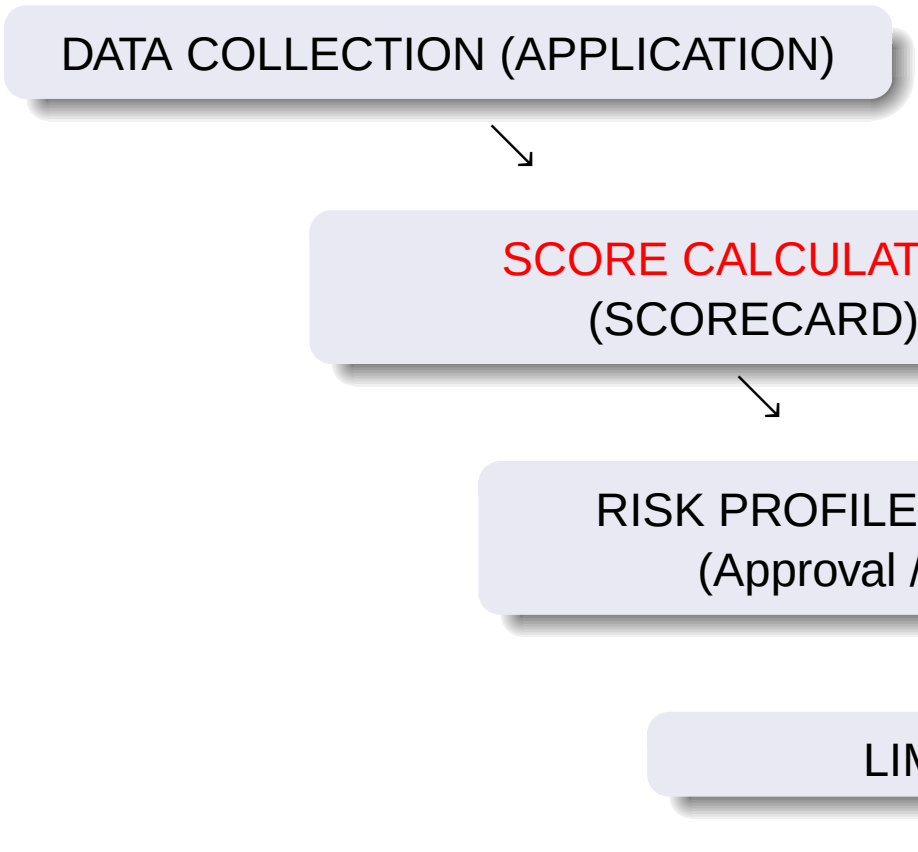

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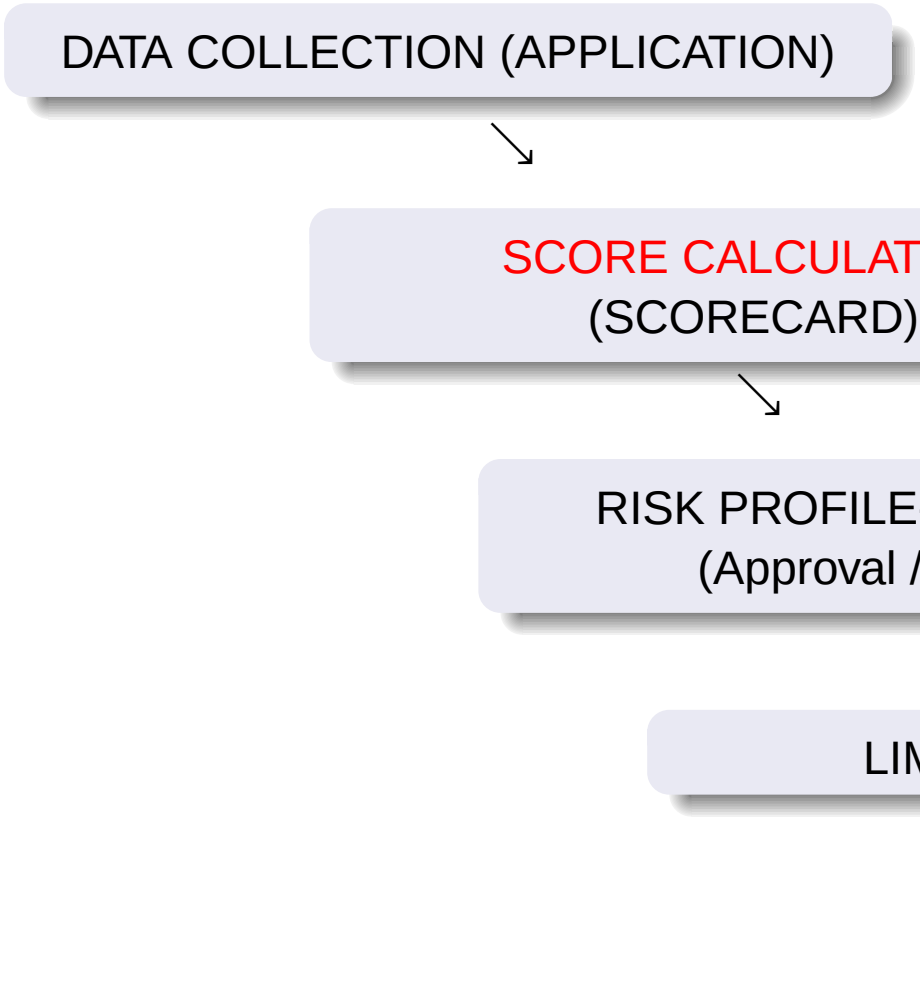

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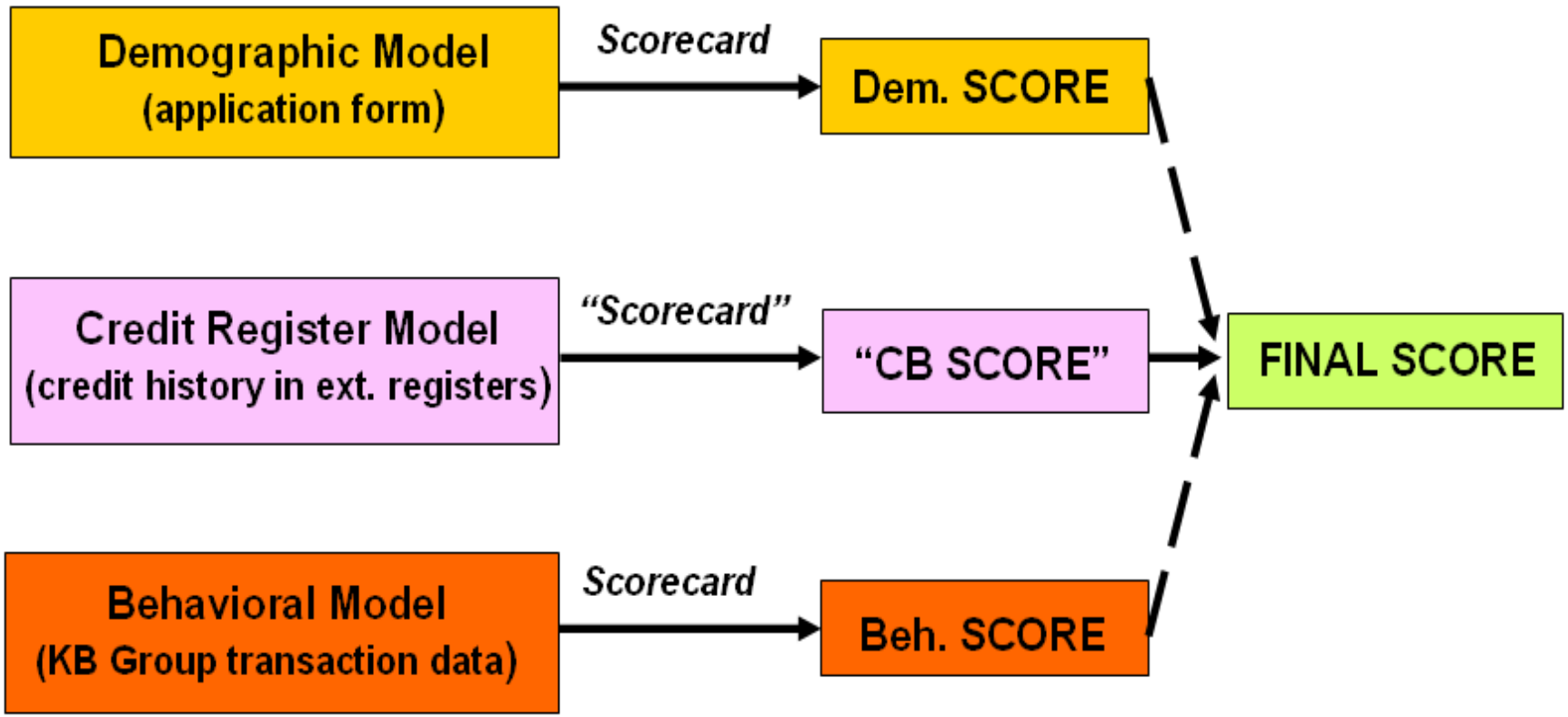
ARCHITECTURE OF THE APPLICATION SCORING MODEL



BASIC INFORMATION ON SCORECARD DEVELOPMENT

Scoring model predicts default of a client in 12 months using different type of data (demographic, behavioral, external credit register).

- SCORE (number of points) is calculated from the data using SCORECARD
- The score is mapped to 12-months probability of default (12M PD)
- High score corresponds with low risk (low 12M PD)

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Example of fictitious scorecard and mapping to PD:

Education	a: primary school	0
	b: high school	28
	c: university	65
	d: Ph.D.	80

+ 28

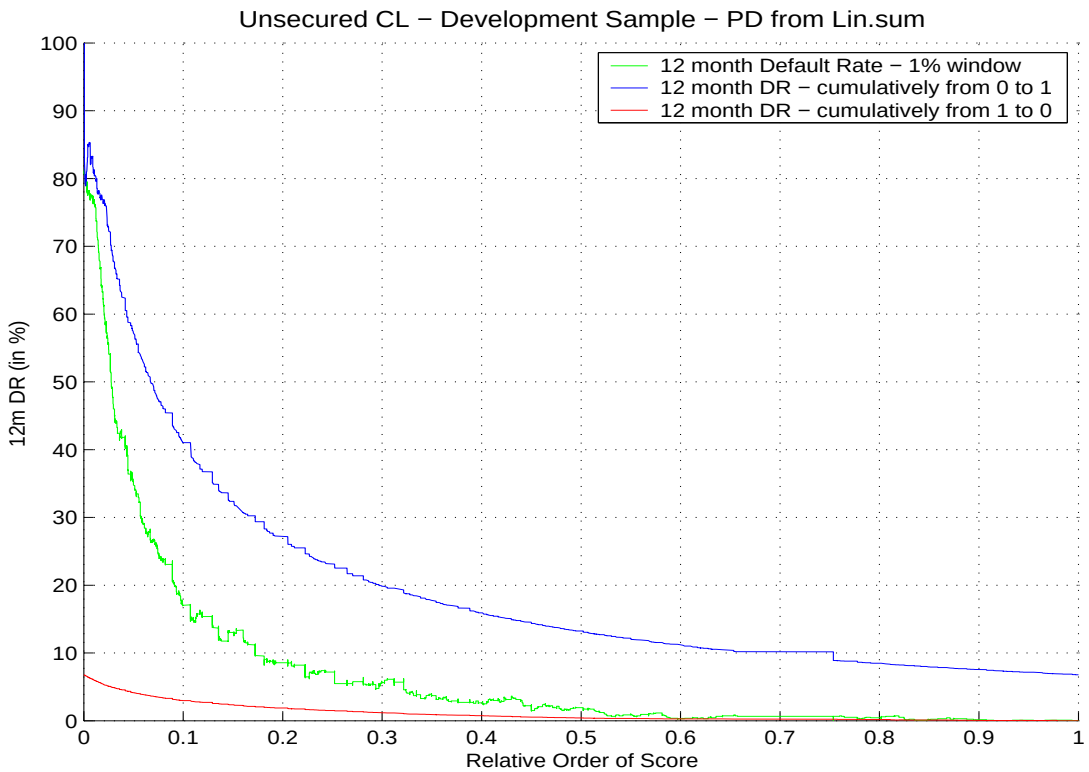
Family Status	a: divorced	0
	b: single / widow(er)	25
	c: married	40

+ 40

SCORE = 68 ⟶ 12M PD = 1%

SCORING MODEL OUTPUT (1/2)

Once you have sufficiently strong data bases and scoring models have very good discrimination power,



what should be the next steps?

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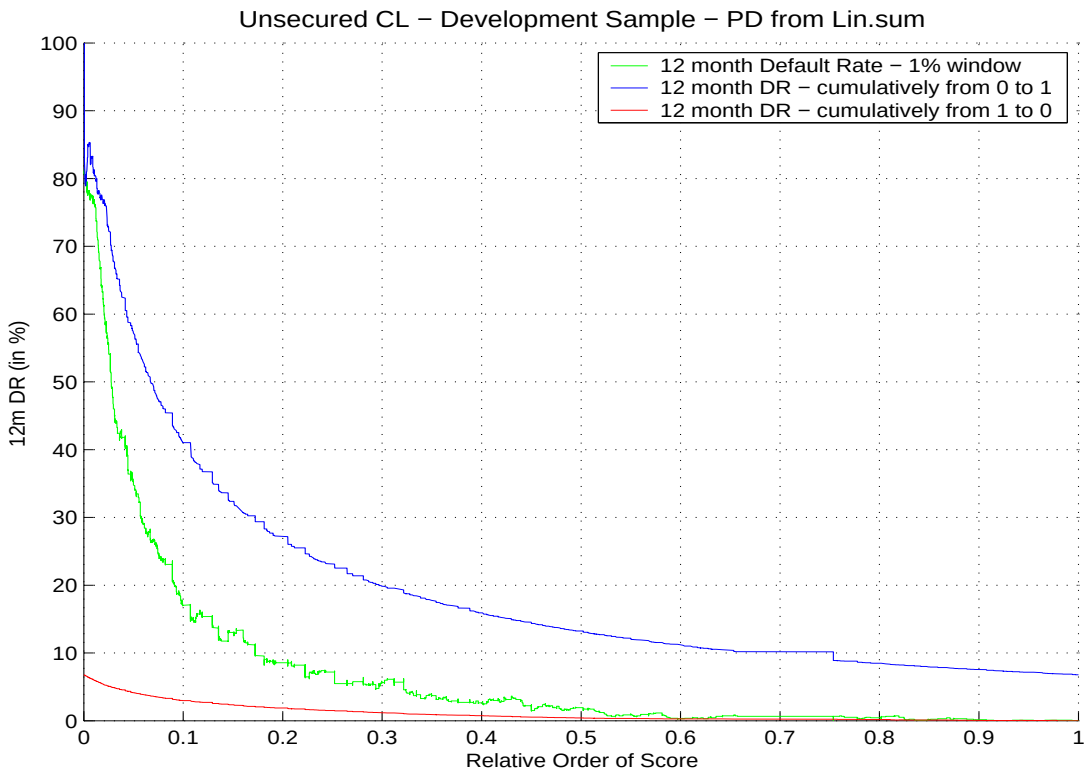

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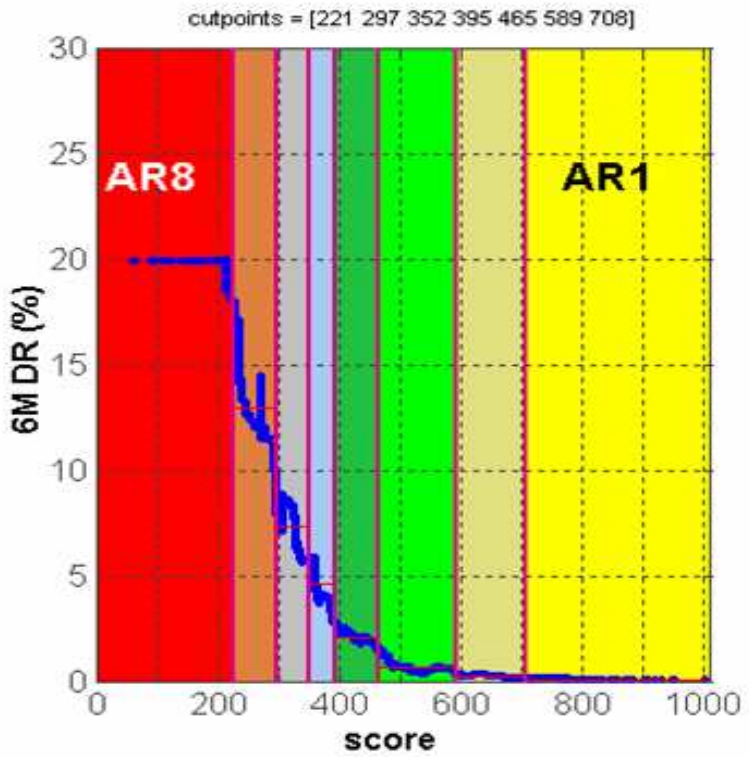
SCORING MODEL OUTPUT (2/2): SCORE CATEGORIZATION

- 8 BANDS (AR1, AR2, . . . , AR8)
- AR1 the best (low risk)
- AR8 the worst (high risk)

JUSTIFICATION OF 8 BANDS

The number is statistically optimal number of homogenous pools with similar risk behavior of clients.



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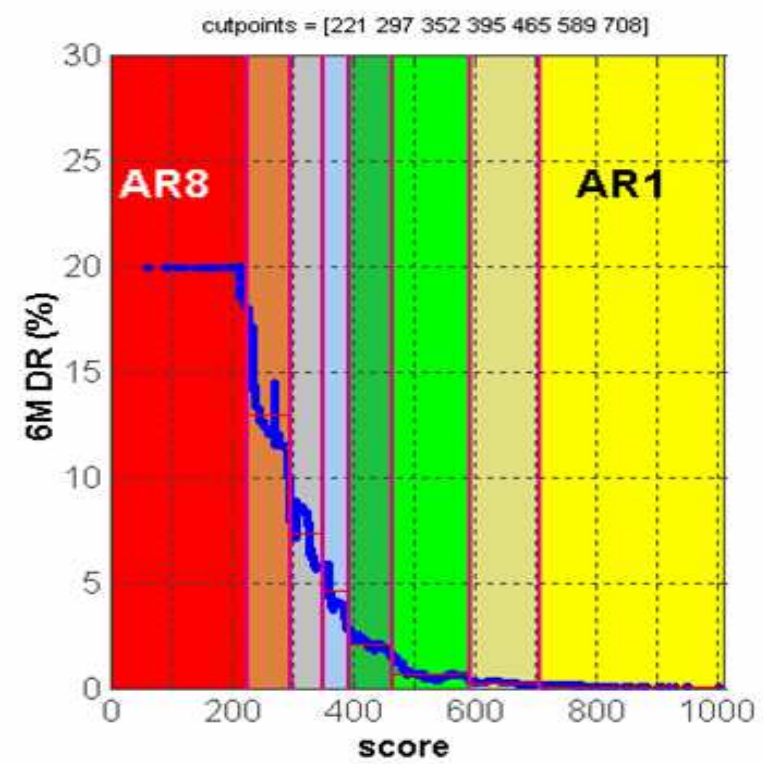

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RISK MARGIN definition

Insurance concept

The (expected) Risk Margin (RM) is defined as a **part of the client rate that** is charged to clients and **should cover the expected loss** over the lifetime of given production.

Main principles

- RM are calculated separately for each rating band x product x (maturity)
- RM are fixed at the time of granting for the whole lifetime of a contract (in case of Consumer Loans)
- RM is paid (collected) only from non-defaulted contracts

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RISK MARGIN Calculation

RM calculation

RM calculation combines costs and revenues based on the following parameters:

- Probability of Default (reflecting time to default)
- Loss Given Default (reflecting age of a contract)
- Exposure At Default (reflecting the **Outstanding Balance** of performing and non-performing contracts in time)

$$RM = \frac{12 \cdot \sum_t LGD_t \cdot PD_t \cdot OB_t}{\sum_t (1 - \sum_k PD_k) \cdot OB_t}$$

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CUT-OFF SETTING UNDER PRICING BY CONSTANT CLIENT RATE

Gross Margin vs. **Risk Margin** has to be examined:

Product	Client Rate	Funding Rate	Gross Margin	RISK MARGIN							
				AR1	AR2	AR3	AR4	AR5	AR6	AR7	AR8
Consumer Loans	15.0%	5.0%	10.0%	1.0%	2.0%	3.5%	5.0%	7.0%	9.0%	14.0%	30.0%

Comment: White – the business is surely profitable, Orange – small profitability, Red – the business is surely loss making under the given level of client rate

CUT-OFF SETTING UNDER PRICING BY FLAT CLIENT RATE

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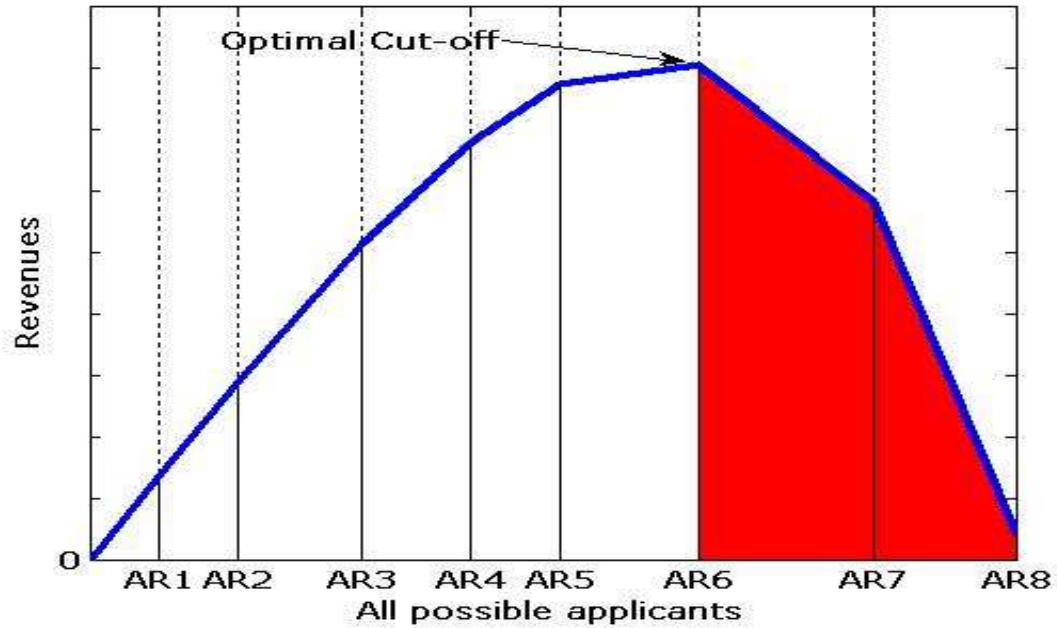
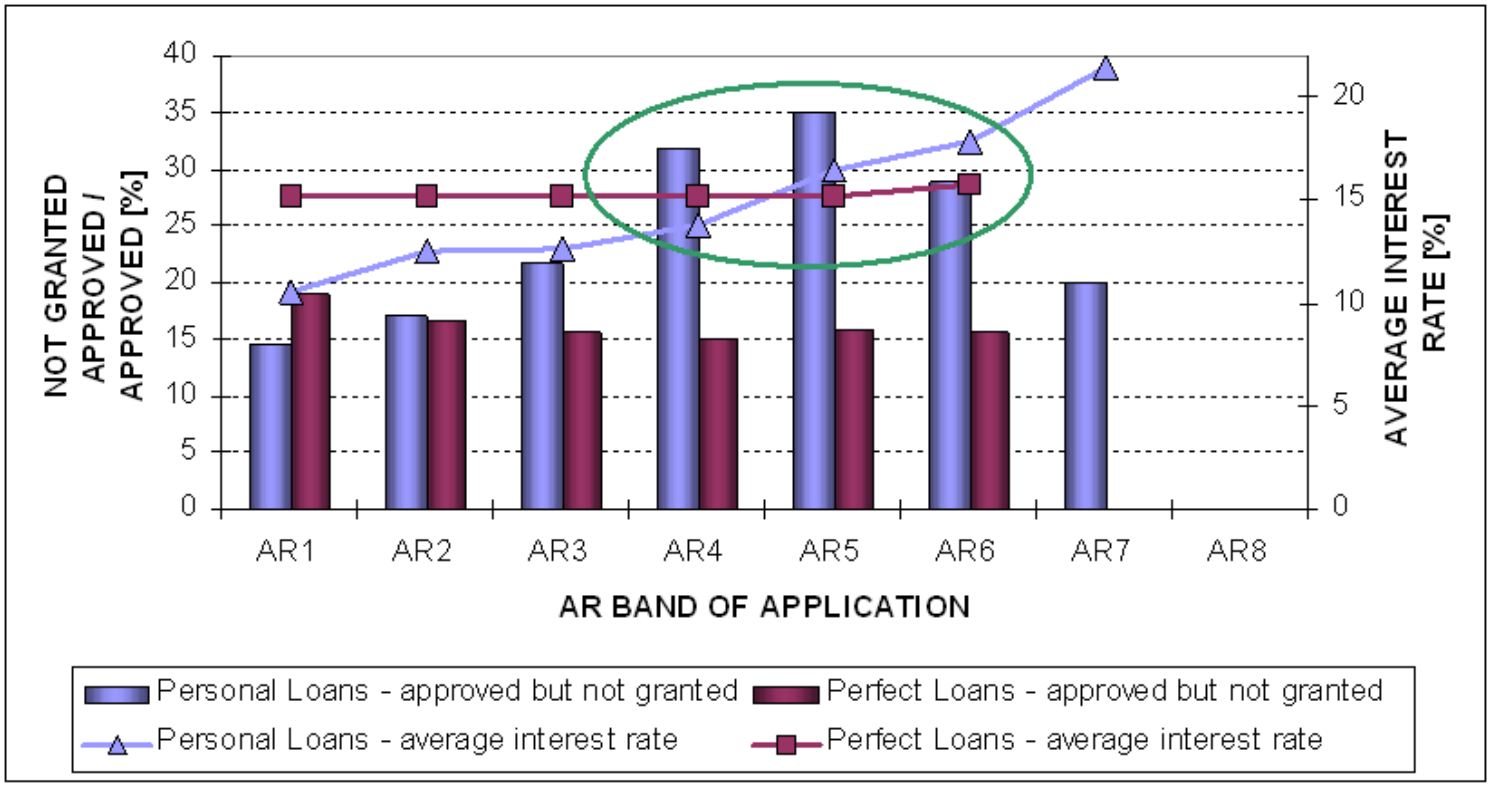


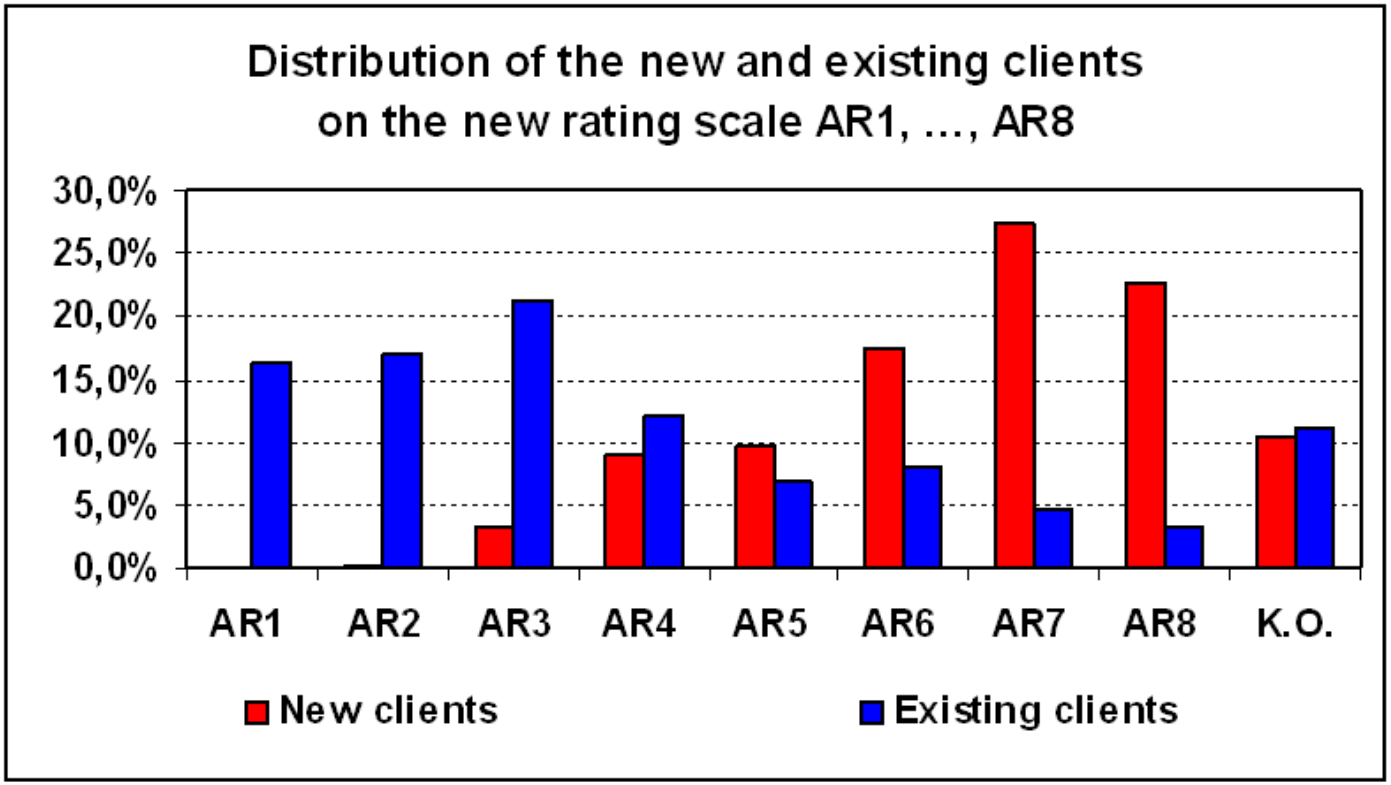
HOW TO SET UP ”CORRECT” CLIENT RATE?

- Besides rejected population, % of clients who were approved but did NOT take the loan is closely monitored
- The comparison of clients’ reaction on offered client rate can be measured for products
  - with flat client rate (Perfect Loans)
  - with ”risk adjusted” client rate (Personal Loans)



MONITORING OF ATTRACTED POPULATION

Structure of population of applicants for unsecured consumer loans



K. O. = Client is actually past due or last year was in default

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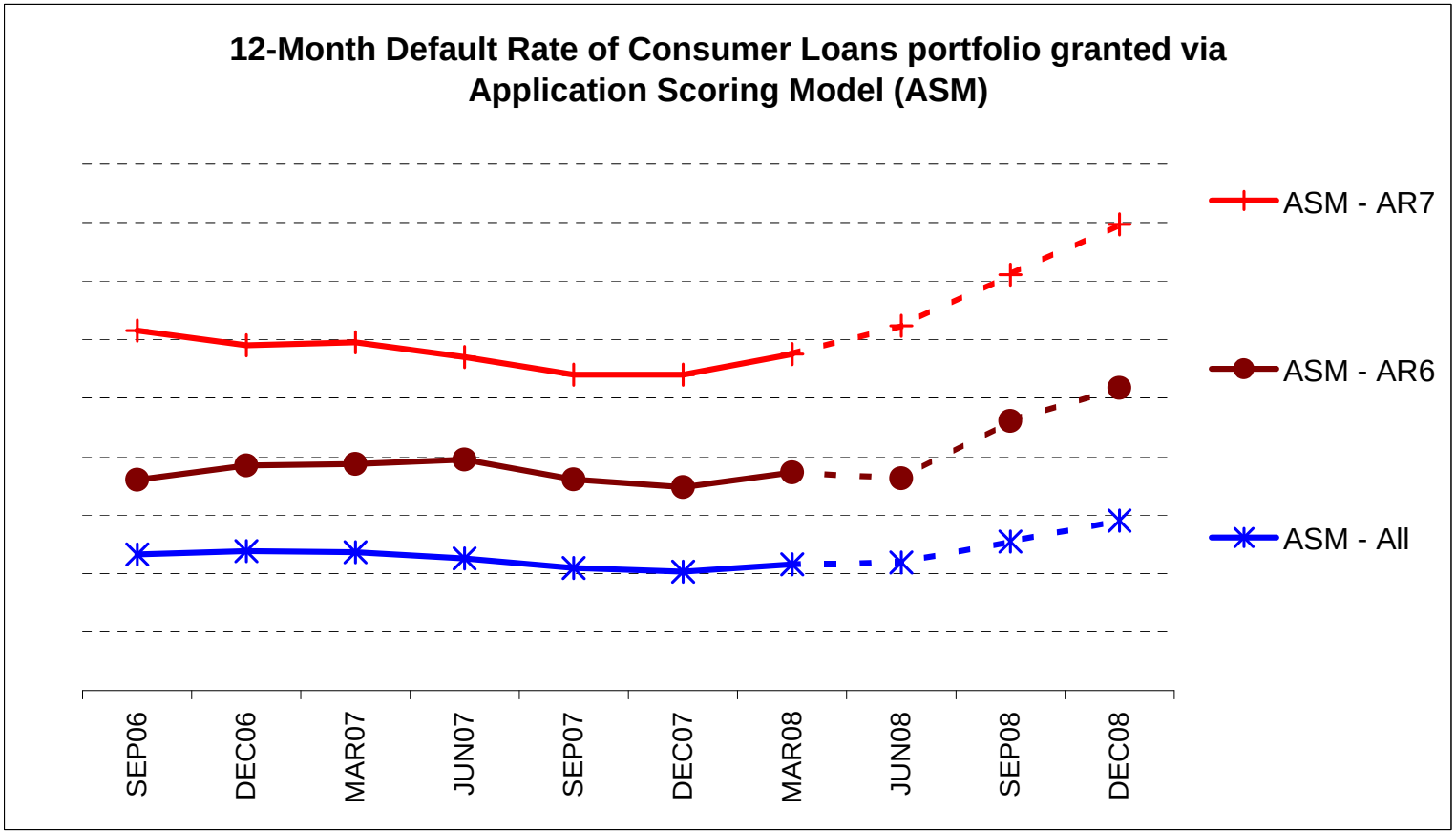
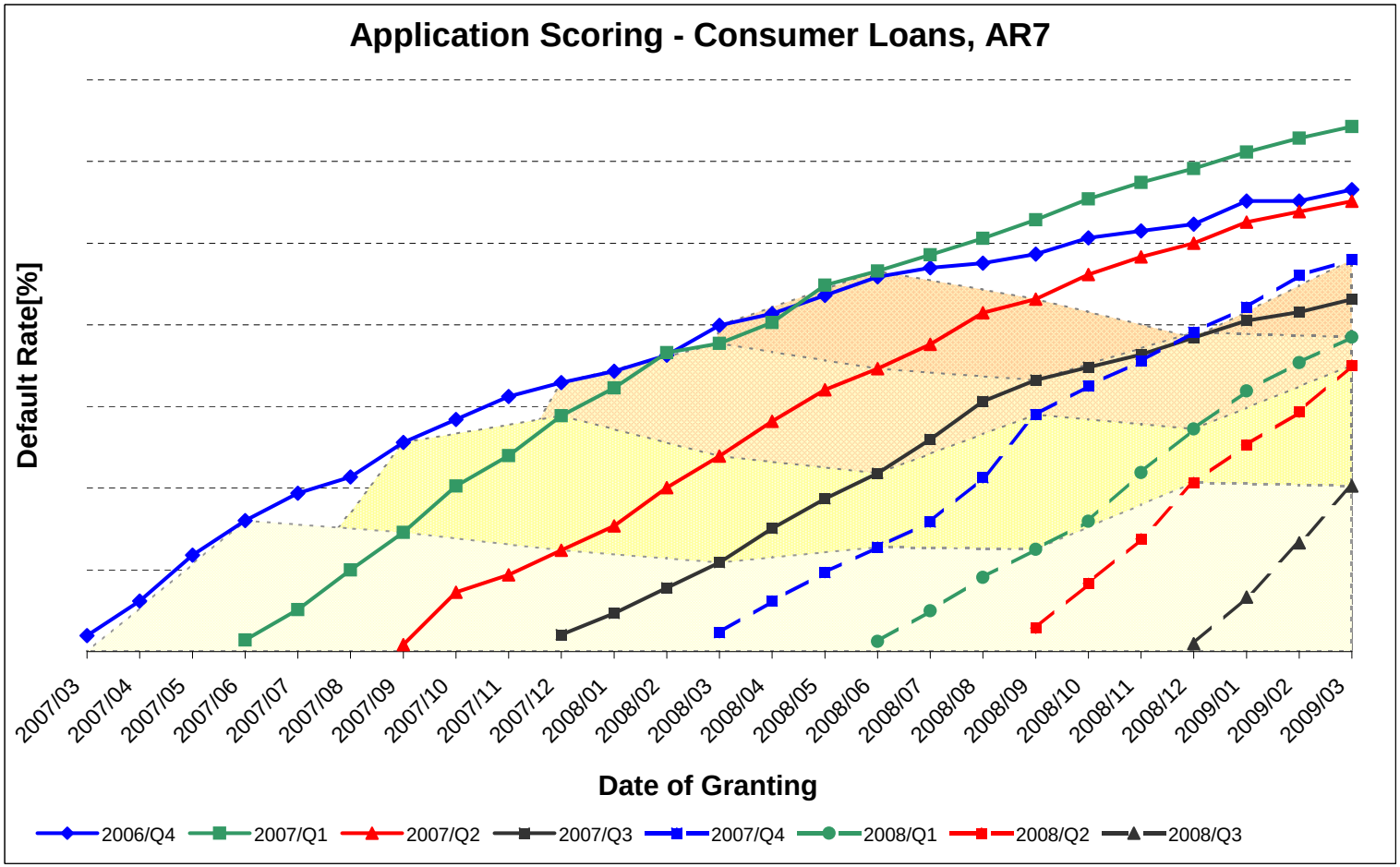
DEFAULT RATE MONITORING

For **granted loans**, each rating band and its population can be monitored separately



VINTAGE ANALYSIS OF DETERIORATING POPULATION

Each **vintage** in particular rating band is tracked and can be further analyzed in detail.



OTHER POSSIBILITIES CONNECTED TO GRANULAR RATING SCALE

Collection capacities

When thinking about cut-off / pricing policy (with granular rating scale)

impacts on inflow into recovery processes (on 12M or even longer horizons) can be considered

$\Rightarrow$ necessary capacities can be estimated much more precisely

Cost of Risk

- Components of provisions creation can be tracked and analyzed with respect to possibility of immediate adjustment of granting process
- Cost of Risk and its outlook can be budgeted and re-estimated much more precisely

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ANNEX – EXAMPLE OF SCORECARD STABILITY TEST