Scoring and Rating Systems
Basel III Requirements

Dr. Anatoliy Antonov
Eurorisk Systems Ltd.
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Regulatory Requirements for Rating Systems


Definition

Article 142

**Rating Systems** refer to a number of:

- Methods, processes, control mechanisms
- Data collections and information systems that support
  - Credit risk evaluation,
  - Assignment of exposures according to rating categories or groups, and
  - Quantification of exposure defaults and losses
Regulatory Requirements for Rating Systems

Debt Category represents:
- A risk category (Rating) within a Rating Scala
- In a given rating system

that categorizes
- The debtor, based on a specific and unambiguous set of rating criteria, which serve as a source of Probability of Default (PD) estimates

Long and Short-term Rating represents: long-term (over 1 year) and short-term (up to 1 year) credit ratings

Rating Scales represent:
- For IRB: at least 7 Ratings and 1 Rating for non-performance
- For Standardized Approach: Risk Weights, credit rating: 1 2 3 4 5 6
  Risk weight, ex.: 20% 50% 50% 100% 100% 150%

Counterparty Risk or "CCR" represents:
- The risk of the counterparty defaulting on a particular transaction, prior to the final settlement of the transaction
- Calculation of expected losses from derivatives: CVA and DVA
Regulatory Requirements for Rating Systems

Article 170

The **Structure of Rating Systems** must meet the following requirements:

- The rating system is consistent with the risk characteristics of the **debtor** and the **transaction**.
- The rating system includes a **rating scale for debtors** that allows a quantitative estimate of the debtor’s default risk.
- The rating scale of the debtor has at least seven categories for regular borrowers and one category for defaulting debtors.

Article 171

**Assignment to Categories or Groups**:

- The institution has specific **definitions, procedures** and **criteria** for allocating exposures by risk category within the rating system.
- Category definitions and criteria are sufficiently **detailed** and contain **instructions for the assignment** of ratings.
- The **documentation** of the rating process allows third parties to understand, reproduce and evaluate the assignment of exposures to categories.
Article 174

**Application and Validation of Models**

- The institution must have a periodical validation process (**validation**)
- **Observation** of model results, model stability, model specifications and results
- Comprehensive **statistical process**, including tests, that uses data outside the recorded period and outside the sample, in order to validate the model;

Article 175

**Rating Systeme Documentation**

- Institutions document the structure, functions and justifications of the rating system
- The documentation confirms:
  - Compliance with requirements, differentiation of portfolios, allocation criteria of ratings
  - Responsibilities of persons who determine the rating of debtors and exposures
  - Independent monitoring of credit risk: control, design and definition of internal rating models
  - Frequency of the verification of given ratings and control of the rating process
  - Organization and rating allocation process, as well as the structure of internal control.
Article 176

Database Maintenance

The institutions **collect and store data** on rating elements, such as:

- Comprehensive **historical data** on the ratings of debtors and established guarantors
- Data on which ratings are allocated
- **Output data and methodology** for rating allocations
- **Persons** responsible for the assigned ratings
- Identification of debtors and exposures that are **in default**
- Date of occurrence and circumstances that caused the default
- Data for the **PD parameter**, actual **default rates** for the rating categories and the migration between them, **Migration Matrix formation**.

Article 177

- Useage of **Stress Tests** for **Capital Adequacy** assessments
Article 178

**Probability of Default**

- The *Probability of Default* is predicted on the basis of historical records of defaults, i.e.:
  - When the likelihood of the debtor fully repaying his loan obligations is low, and/or
  - When the debtor is in arrears for more than 90 days (180 days for real estate collaterals)

Article 185

**Validation of Internal Ratings**

- The institutions have *reliable systems for the validation* of the accuracy and consistency of rating systems, procedures and the evaluation of all relevant risk parameters
- The institutions also use *other quantitative validation tools* and comparisons to appropriate external data sources
- The analysis is based on data that is relevant to the portfolio, that is regularly updated and covers the longest observation period.
Regulatory Requirements for Rating Systems

Requirements for the IT Application

- System and administration models for users, rights, roles, validations
- Scoring and rating of Retail and Corporate clients, loan offers
- Maintenance and evaluation of collaterals
- Models for the evaluation and analysis of rating models
  - Discriminant-Function (Gini-Indicator), statistical significance of variables and results
  - Exception rules and criteria, Proof of Default
- Models for the adjustment of rating models
- Models for the maintenance of standard data and credit data of customers and balancing
- Connection and integration to existing banking systems
- Remote access via the Internet, ex. access from branches
The Rating System within the Risik Evaluation System

Rating Model

Balances

Soft Factors

Portfolio Management

Market Data, Curves, Prices

Key Factors, Distribution

Operational Risk Models

Rating Tool Box

Rating

PDs

EAD

LGD

Operational Risk

Key Factors, Distribution

Operational Risk Models

Credit Risk

OR VaR

Market Risk

Market VaR

Report-basis

RWA & Risk Reports

Basel III Bewertung

PD Calculator

Historical Series

Loss Data, Collaterals

LGD Simulator

Historical Series
Rating System Structure

Questions

Aggregation

CF1

weighting

CF2

CF3

Input

Rating criteria acc. to Basel II

1. Earnings
2. capital structure
3. quality of earnings

4. Information quality
5. Debt
6. Liquidity
7. Management
8. Industry risk
9. Country risk

Partial assessment

Probability of Default

Diskriminanz-funktion

< 0,3 %
< 1,4 %
< 3,2 %
< 9,2 %
< 12,6 %
< 18,3 %

Master-Scale

weighting

Internal / External Rating

AAA
AA
A
BBB
BB
B
CCC
D

Partial assessment

Internal / External Rating
Steps of the Rating Process

1. **Balance sheet**
   - 1996 Balance data
   - 2000 balance data

2. **Step 1**
   - Partial assessment
   - Transformation
   - Input

3. **Step 2**
   - Balance data
   - Financial ratios
   - Input

4. **Step 3**
   - Event risk
   - Management quality
   - Business risk

5. **Step 4**
   - Master-Scale
   - Attribution
   - Overall result

6. **Step 5**
   - Risk Rating Criteria-Hierarchy
   - Diskriminanz
   - Country Risk
   - Industry risk
**Balance Sheet data and OPR-Indicators**

<table>
<thead>
<tr>
<th>Balance Sheet data</th>
<th>(TDM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assets</td>
<td>4,522,10</td>
</tr>
<tr>
<td>2. Financial Assets</td>
<td>161,30</td>
</tr>
<tr>
<td>3. Intangible Assets</td>
<td>2,954,70</td>
</tr>
<tr>
<td>4. Balance Sheet Total</td>
<td>12,828,00</td>
</tr>
<tr>
<td>5. Equity</td>
<td>2,973,60</td>
</tr>
<tr>
<td>6. Long-Term Payables</td>
<td>3,805,10</td>
</tr>
<tr>
<td>7. Short-Term Payables</td>
<td>584,50</td>
</tr>
<tr>
<td>8. Revenues</td>
<td>13,188,60</td>
</tr>
<tr>
<td>9. Cash-Flow</td>
<td>1,171,40</td>
</tr>
<tr>
<td>10. EBIT</td>
<td>796,90</td>
</tr>
<tr>
<td>11. Interest Expense</td>
<td>228,00</td>
</tr>
<tr>
<td>12. Annual Result</td>
<td>413,90</td>
</tr>
</tbody>
</table>

**Financial Ratios**

<table>
<thead>
<tr>
<th>Calculated Data</th>
<th>Partial Assessment (0..10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.ROI</td>
<td>6,0 %</td>
</tr>
<tr>
<td>2.Return on Equity</td>
<td>13,9 %</td>
</tr>
<tr>
<td>3.Return on Sales</td>
<td>3,1 %</td>
</tr>
<tr>
<td>4.Equity Ratio</td>
<td>23,1 %</td>
</tr>
<tr>
<td>5.Working Capital Ratio II</td>
<td>88,7 %</td>
</tr>
<tr>
<td>6.EBIT/Interest</td>
<td>3,4</td>
</tr>
<tr>
<td>7.Cashflow/Payables</td>
<td>26,6</td>
</tr>
</tbody>
</table>

**Overall result (0..10)**

6,6

**Quantitative Factors**

- Quantitative rating factors are calculated as indicators of the debtor’s balance, ex...:
  - Equity Ratio
  - Percentage of Cashflows
  - Profitability of Sales
  - Liquidation of Obligations
  - Interest Rate Capital

- The balance sheet results for the past 3 years allow the tracking and inclusion of trends in final evaluations.
## Subjective Evaluations and Criteria

### Business Risk
- Industrial Risk
- Dependence on Products
- Dependence on Exports
- Dependence on Customers
- Dependence on Suppliers
- Dependence on Investments
- Production Process
- Return from Core Business

### Management Quality
- Management
- Decision making Ability
- Elaborateness
- Knowhow
- Reliability
- Objectiveness

### Event Risk
- Order Situation
- Utilization
- Account Processing
- Dependence on Experts
- Dependence on HR
- Accounting

### Qualitative Factors

Qualitative factors can be assessed via subjective evaluations, ex. between 0 und 5:
- 0 Unknown factor value
- 1…5 factor estimate (1 - best, 5 - worst)

Qualitative factors are divided into groups, for which intermediate estimates according to groups are defined, ex.:
- Personal profile of the management
- Company valuation
- Business risk factors
- Global indicators
- Industry evaluation etc.
Changes in Economic Environment

Hence:
Rating models and criteria have to change according to the changing economic environment.
# Standardized Solutions for Different Customer Segments

<table>
<thead>
<tr>
<th>Customer Segment</th>
<th>Available Quantitative Information</th>
<th>Available Qualitative Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional customer (ex. banks, insurance companies)</td>
<td>Financial reports (International accounting standards - Standard IFRS)</td>
<td>Business reports, Press releases, Customer connectivity, Immediate reports</td>
</tr>
<tr>
<td>Large corporations</td>
<td>Financial reports (International accounting standards - Standard IFRS)</td>
<td>Press releases, Customer connectivity, Immediate reports, Reports by industry</td>
</tr>
<tr>
<td>Medium-sized companies with large volumes</td>
<td>Financial reports (International accounting standards - Standard IFRS), planning</td>
<td>Press releases, Customer connectivity, Reports by industry</td>
</tr>
<tr>
<td>Medium-sized companies</td>
<td>Financial reports (Standard IFRS)</td>
<td>Customer connectivity, Reports by industry</td>
</tr>
<tr>
<td>Small businesses</td>
<td>Tax reports / OPR</td>
<td>Customer connectivity, Reports by industry</td>
</tr>
<tr>
<td>Natural people</td>
<td>Asset reports, Credits</td>
<td>Reports by industry</td>
</tr>
</tbody>
</table>
## Step 1. Calculation Balance Sheet Indicators

<table>
<thead>
<tr>
<th>Financial Quotas</th>
<th>Example-Computation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Equity</td>
<td>Annual profit*100/Equity</td>
</tr>
<tr>
<td>Return on Investment (ROI)</td>
<td>(Profit + Interest)*100/Capital</td>
</tr>
<tr>
<td>Return on Sales</td>
<td>Profit*100/Sales</td>
</tr>
<tr>
<td>Cashflow-Revenue Earning Rate</td>
<td>Cashflow*100/Sales</td>
</tr>
<tr>
<td>Equity Quota</td>
<td>Equity/Overall Result</td>
</tr>
<tr>
<td>Debt Quota</td>
<td>Debt*100/Equity</td>
</tr>
<tr>
<td>Dynamic Debt Ratio</td>
<td>Cashflow/Financial Debts</td>
</tr>
<tr>
<td>Interest Coverage Ratio</td>
<td>EBIT/Interset Expences</td>
</tr>
<tr>
<td>Return on Investment (ROI)</td>
<td>(Profit/Sales)(Sales/Capital)</td>
</tr>
<tr>
<td>.....................................................................................</td>
<td>.....................................................................................</td>
</tr>
</tbody>
</table>
Step 2. Standardization of Indicators

Transformation

ratio \( X \) to p.assessment \( Y \)

\( a, b \) – depending on industry

S-Function: \( Y = S(X,a,b) \)

\[
S(X,a,b) = \begin{cases} 
0 & \text{if } X \leq a \\
1 & \text{if } X > b \\
\frac{2(X-a)}{b-a} & \text{if } a < X \leq \frac{a+b}{2} \\
1 - \frac{2(b-X)}{b-a} & \text{if } \frac{a+b}{2} < X \leq b 
\end{cases}
\]
Step 3. Aggregation of Variables by Weighing

**Weighing:**
Assessment = \( (a \times \text{Factor 1} + b \times \text{Factor 2} + ... + N \times \text{Factor N}) / (a + b + ... + N) \)

**Example:**
Assessment = \( (3.5 \times 63\% + 4.5 \times 36\% + 7.2 \times 48\%) / (3.5 + 4.5 + 7.2) = 47.9\% \)

**Aggregation:**
Assessment = \( 1 - (1 - \text{Factor 1}) \times (1 - \text{Factor 2}) \times ... \times (1 - \text{Factor N}) \)

**Example:**
Assessment = \( 1 - (1 - 63\%) \times (1 - 36\%) \times (1 - 48\%) = 87.7\% \)

---

**Aggregation by Saturation Function, used in expert systems:**

For factor = 50.00%, the following aggregation applies:

- 1 Variables = 50.00%
- 2 Variables = 75.00%
- 3 Variables = 87.50%
- 4 Variables = 93.75%
Step 4. Comparison with the Master Scale of Probability of Default

Total Result = 4,34

Probability of Default
2,15 %
Step 5. Transition to other Rating Scales

### Internal Rating

<table>
<thead>
<tr>
<th>Internal</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0,02%</td>
<td>A1</td>
</tr>
<tr>
<td>&lt; 0,05%</td>
<td>A2</td>
</tr>
<tr>
<td>&lt; 0,11%</td>
<td>A3</td>
</tr>
<tr>
<td>&lt; 0,40%</td>
<td>A4</td>
</tr>
<tr>
<td>&lt; 1,33%</td>
<td>B1</td>
</tr>
<tr>
<td>&lt; 2,73%</td>
<td>B2</td>
</tr>
<tr>
<td>&lt; 7,70%</td>
<td>B3</td>
</tr>
<tr>
<td>&lt; 11,48%</td>
<td>B4</td>
</tr>
<tr>
<td>&lt; 16,99%</td>
<td>C1</td>
</tr>
<tr>
<td>&lt; 20,00%</td>
<td>C2</td>
</tr>
</tbody>
</table>

### Attributes of external rating systems

#### S&P 8

<table>
<thead>
<tr>
<th>Rating</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>0,00%</td>
</tr>
<tr>
<td>AA</td>
<td>0,03%</td>
</tr>
<tr>
<td>A</td>
<td>0,07%</td>
</tr>
<tr>
<td>BBB</td>
<td>0,10%</td>
</tr>
<tr>
<td>BB</td>
<td>0,24%</td>
</tr>
<tr>
<td>B</td>
<td>5,45%</td>
</tr>
<tr>
<td>CCC</td>
<td>23,69%</td>
</tr>
</tbody>
</table>

#### S&P 18

<table>
<thead>
<tr>
<th>Rating</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>0,00%</td>
</tr>
<tr>
<td>AA+</td>
<td>0,00%</td>
</tr>
<tr>
<td>AA</td>
<td>0,00%</td>
</tr>
<tr>
<td>A</td>
<td>0,04%</td>
</tr>
<tr>
<td>A+</td>
<td>0,07%</td>
</tr>
<tr>
<td>A-</td>
<td>0,21%</td>
</tr>
<tr>
<td>BBB+</td>
<td>0,24%</td>
</tr>
<tr>
<td>BBB</td>
<td>0,32%</td>
</tr>
<tr>
<td>BB+</td>
<td>0,67%</td>
</tr>
<tr>
<td>BB</td>
<td>0,86%</td>
</tr>
<tr>
<td>BB-</td>
<td>1,32%</td>
</tr>
<tr>
<td>B+</td>
<td>2,73%</td>
</tr>
<tr>
<td>B</td>
<td>8,94%</td>
</tr>
<tr>
<td>B-</td>
<td>11,48%</td>
</tr>
<tr>
<td>CCC</td>
<td>23,69%</td>
</tr>
</tbody>
</table>

#### Moody 18

<table>
<thead>
<tr>
<th>Rating</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaa</td>
<td>0,00%</td>
</tr>
<tr>
<td>Aa1</td>
<td>0,00%</td>
</tr>
<tr>
<td>Aa2</td>
<td>0,00%</td>
</tr>
<tr>
<td>Aa3</td>
<td>0,04%</td>
</tr>
<tr>
<td>A1</td>
<td>0,07%</td>
</tr>
<tr>
<td>A2</td>
<td>0,21%</td>
</tr>
<tr>
<td>A3</td>
<td>0,32%</td>
</tr>
<tr>
<td>Baa1</td>
<td>0,44%</td>
</tr>
<tr>
<td>Baa2</td>
<td>0,72%</td>
</tr>
<tr>
<td>Baa3</td>
<td>0,70%</td>
</tr>
<tr>
<td>Ba1</td>
<td>0,70%</td>
</tr>
<tr>
<td>Ba2</td>
<td>1,32%</td>
</tr>
<tr>
<td>Ba3</td>
<td>2,58%</td>
</tr>
<tr>
<td>B1</td>
<td>4,16%</td>
</tr>
<tr>
<td>B2</td>
<td>8,86%</td>
</tr>
<tr>
<td>B3</td>
<td>13,75%</td>
</tr>
<tr>
<td>Caa</td>
<td>27,56%</td>
</tr>
</tbody>
</table>

### Probability of Default

2,15 %
Flexibility in the Selection of Models

Weighing: Assessment = (a * Factor 1 + b * Factor 2 + ...+ N* Factor N) / (a + b + ... N)

Example: Assessment = (3,5 * 63% + 4,5 * 36% + 7,2 * 48%) / (3,5 + 4,5 + 7,2) = 47,9%

Aggregation: Assessment = 1 - (1 – Factor 1) * (1 – Factor 2) * ... * (1 – Factor N)

Example: Assessment = 1 - (1 - 63%) * (1 - 36%) * (1 - 48%) = 87,7%
The described Scoring and Rating Models are based on a hierarchical set of rules, that perform weighing, balance, saturation, K.O. conditions etc. on selected key factors, which determine the debtor's ability to generate revenue, in order to meet its obligations in future periods.
Evolution and Model Improvement

Evaluation of data and experiences
- Historic Data
- Experiences

Debtor rates

Model Development and Adjustment
- Model Development
- Model adjustment
- Model Script
- Risk Rating
- Rating
- OK? Yes No

Risk Rating Model Development and Adjustment
- Rating Model Development and Adjustment
- Adjustment
- Model Script
- Risk Rating
- Rating
- OK? Yes No

Historic Data

Experiences

Debtor rates
System Features

- Several rating models are available for each debtor
- Historical recordings of criteria and ratings in the database
- Application of expert systems
- Determination of correlations between scoring and default probabilities
- Automatic ratings of a debtor group
- Assistant (Wizard) in the model development
- Integration into a credit risk rating system
- Administration and assignment of user rights
Functions of the Rating System

⇒ Rating models consist of: Facts, Criteria, Classes, Results and Rules

⇒ Functions of the Rating Model:
  ⇒ Processing rating models using Rule Script data
  ⇒ Loading debtor data from a database
  ⇒ Linking debtor data with the loaded rating models
  ⇒ Activation of the user interface and processing of data
  ⇒ Storage of debtor data in the database
  ⇒ Launching the mechanism for evaluation and generation of scorings and ratings
  ⇒ Presentation of results on the user interface
  ⇒ Storage of debtor data and results in the database for future usage
Methods for Migration Matrix Generation

Rating Spreads

Historical Cumulative PDs

Market Spreads

PDs Spreads

Synthetic Start Matrix

Regression

Rating System

Historical Changes in Ratings

Matrix Calculation

Setting the Matrix

Calculated Matrix

Calculation of Risks

Large Matrix

Rating Spreads

PDs Spreads

Historical Cumulative PDs

Synthetic Start Matrix

Regression

Rating System

Historical Changes in Ratings

Matrix Calculation

Setting the Matrix

Calculated Matrix

Calculation of Risks

Large Matrix
Migration Matrix Settings (Credit year quality, systematic component)

[2] Dr. Barry Belkin  A one-parameter representation of credit risk and transition matrices
RiskMetrics Group, CreditMetrics® Monitor, Third Quarter 1998
Cumulative PDs

Regression Approach
1. Start matrix
2. Cumulative PDs
3. Matrix grading
4. Matrix regression
   - using the best match
   - by comparing the cumulative PDs with those of the grades
Implicit Cumulative PDs from Rating Spreads

Rating Spreads

Synthetic Matrix

Graph

Spreads [%]

Years

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Implicit Cumulative Default Probabilities from Curve Spreads

Recovery Rate: 50.00%

Currency: EUR

Agency: Moody's

Bank: BNP Paribas

Time Stamp: 25.02.2004

Synthetic Generation

Volatility: 5.0000

Incorporated Volatility: 1.0000

[Spreadsheet with data for different rating categories and years]
### Migration Matrix Aggregation

#### Transition Probability Matrix Aggregation

**Source Transition matrix:** Moody's

<table>
<thead>
<tr>
<th>Source</th>
<th>Time Stamp</th>
<th>Aggregate</th>
<th>Modify</th>
<th>Apply</th>
<th>Cancel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moody's</td>
<td>03.04.2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Result Transition matrix

<table>
<thead>
<tr>
<th>Target</th>
<th>Aaa</th>
<th>Aa1</th>
<th>Aa2</th>
<th>Aa3</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>Baa</th>
<th>Ba</th>
<th>B</th>
<th>Caa</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaa</td>
<td>93,000</td>
<td>6,700</td>
<td>0,000</td>
<td>0,000</td>
<td>0,740</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
</tr>
<tr>
<td>Aa1</td>
<td>2,5467</td>
<td>88,5506</td>
<td>8,000</td>
<td>0,000</td>
<td>0,000</td>
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<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td>0,000</td>
<td></td>
</tr>
<tr>
<td>Aa2</td>
<td>0,1067</td>
<td>1,6132</td>
<td>39,4973</td>
<td>0,3362</td>
<td>0,1567</td>
<td>0,000</td>
<td>0,000</td>
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Migration Matrix, Expectations for Rating Changes
Synthetical Rating Changes (for 3 years, monthly, 1000 debtors)
### Rating Status

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### Rating Changes

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Generation of a Migration Matrix from Rating Changes
Statistical Tracking of Historical Changes

**Statistical Approach**
1. Tracking with monthly frequency
2. Number of rating changes "from-to" for 1, 3, 6 and 12 months
3. Definition of 4 transition matrices
4. Determination of an averaged matrix

**Number of rating changes "from-to"**

\[
S^{\text{Rating}}(t) = 1 - PD^{\text{Rating}}(t)
\]

\[
S^{\text{Rating}}(t) = S^{\text{Rating}}(1 \text{ Year})^t
\]

\[
PD^{\text{Rating}}(t) = 1 - (1 - PD^{\text{Rating}}(1 \text{ Year}))^t
\]
Moody 18 Migration Matrix
Rating System Architecture

Rating Data

Debtor Data

Application Server

Rating Calculations

Criteria

Rule-Network

Knowledge Database

Expert System Core

CLIPS

Windows Desktop

Internet Server

Analysis

Comparison

Statistical Data

Criteria

Rules

Model Development

Rating Models (CLIPS)
Risk Framework Architecture

Terminal Server

Application Server

WEB Application Server

Database Server

Oracle, MS SQL, DB2, My SQL, Tera Data

Internet

Desktop

Risk Framework

Risk Framework

Risk Framework

Risk Framework

Risk Framework

Risk Framework

Risk Framework

Risk Framework
WEB User Interface – Balance Data Evaluation

Windows User Interface - Balance Data Evaluation

Balance analysis:

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</thead>
<tbody>
<tr>
<td>Equity ratio</td>
<td>63.3%</td>
<td>80.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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<tr>
<td>Cashflow ratio before tax</td>
<td>-10.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sales profitability</td>
<td>-10.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Dynamic gearing</td>
<td>-1.0%</td>
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<td>0.0%</td>
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<td>Return on total capital</td>
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Scores - Balance analysis without trend calculation: 39.00

Trend calculation:

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<tr>
<td>Cashflow ratio before tax</td>
<td>0.0%</td>
<td>0.0%</td>
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<tr>
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<td>0.0%</td>
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<td>Return on total capital</td>
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<td>0.0%</td>
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</table>

Scores - Balance analysis with trend calculation: 35.00

Rating of Balance analysis:

- Calculated estimate: 4.25
- Estimate correction: 3.20
- Score after correction: 90.00

Rating: 8888
WEB User Interface in Cyrilic
WEB User Interface – Soft Facts
WEB User Interface – Final Rating
WEB User Interface – Balance Data
Customer Data in QlikView in Cyrilic
OLAP Reports in QlikView in Cyrilic
### БАЛАНСОВАЯ АНАЛИЗ

<table>
<thead>
<tr>
<th>БАЛАНСОВЫЕ ИНДИКАТОРЫ</th>
<th>Въезд/внутренние</th>
<th>Точки</th>
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<tbody>
<tr>
<td>Квота на собственную капитал</td>
<td>0.22 %</td>
<td>0.73</td>
</tr>
<tr>
<td>Процент CF через дань</td>
<td>0.18 %</td>
<td>0.33</td>
</tr>
<tr>
<td>Рентабельность на оборот</td>
<td>0.07 %</td>
<td>0.15</td>
</tr>
<tr>
<td>Ликвидность на задолженности</td>
<td>8.67 %</td>
<td>56.64</td>
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<tr>
<td>Лик./ставка на ср.капитал</td>
<td>0.03 %</td>
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Точки за Балансовый анализ без учета тенденции: 11.69

### ОПРЕДЕЛЕНИЕ НА ТЕНДЕНЦИЯ

<table>
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<tr>
<th>Балансовые показатели / точки за последние три года</th>
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<th>2015 г.</th>
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Точки за Балансовый анализ с учетом тенденции: 10.20

### ОЦЕНКА И РЕЙТИНГ ЗА БАЛАНСОВАЯ АНАЛИЗ

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<td>Коррекция на оценку</td>
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<td>Замечания</td>
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Оценка слад коррекция: 5.40

Точки слад коррекция: 10.20

Рейтинг: CCC