Intranet-Based Distribution of Credit Risk Modeling Technology and Ex Ante RoRAC Calculations

Presentation for the Seminar on EU insolvency law – Reform of the capital adequacy Directive
Budapest, September 26, 2002
Brendan McInerney
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Central Role of Banks in Risk Transformation

One of the fundamental roles of banks in an economy is the assumption, monitoring and mitigation of risks.

In the current business environment of the global banking industry, efficiency in performing these tasks has become a clear driver for competitive advantage.

Overriding goals of risk control and risk management:
1. Measurement of risks and their drivers
2. Ensure appropriate returns for the assumption of risk
3. Optimize risk-return trade-off

Ultimate Goal: Creation of Shareholder Value
## Why are Credit Portfolio Models Relevant?

<table>
<thead>
<tr>
<th>Buy-Side Competition</th>
<th>Sell-Side Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Banks face competition from debt capital markets in their traditional lending business (disintermediation)</td>
<td>▶ Shareholders are demanding risk transparency</td>
</tr>
<tr>
<td>▶ Banks traditionally make lending (buy) decisions on a “stand-alone” basis, often employing return on regulatory capital metrics instead of measures based on risk contribution</td>
<td>▶ Shareholders are demanding superior risk-adjusted returns</td>
</tr>
<tr>
<td></td>
<td>▶ Banks face increasing competition from asset managers who now offer exposure to the same asset classes (i.e. high-yield bonds or syndicated loans) as an alternative to investing in bank equity</td>
</tr>
</tbody>
</table>

Banks have an overriding need to identify the economic value associated with transaction and business activities.
Risk-Adjusted Return Metrics: Why Bother?

Return Metrics as an Input to the Credit Decision Process

- In order to determine whether to commit to a given transaction or not, an assessment regarding the “profitability” of the transaction is necessary.

Need for Ordinal Ranking of Proposed Transactions Necessitates:
- Definition of methodology to calculate common-sized return metric
- Harmonization of input parameters
- Distribution channel for transaction pricing
- Organizational buy-in and consistent implementation

Potential Application of “Hurdle Rate“

- Through the definition of a minimum return expected from individual transactions (“Hurdle Rate“), the common-sized return metric can be used for an explicit decision rule in the credit process.

Choice of Type of Capital: Return on Regulatory Capital (RoRC) vs. Return on Risk Capital
Dresdner Bank’s Approach to Risk Adjusted Return Metrics

► Return Metrics are calculated during the origination process and submitted as part of the approval process
► Calculation of Return Metrics is automated to ensure consistent results
► Automation achieved via an Intranet-based application: “ExPLORER” – All calculated transactions can be saved and used as the basis for analysis of various risk / reward measurement methodologies and for support of marketing strategies

Best practice portfolio management starts at the point of origination
Credit Risk Modeling Framework

- Acquisition and Pricing of Proposed Transactions
- Integration of all booked deals in reference portfolios
- Portfolio Credit Risk and RoRAC Measurement
- Portfolio Risk/Return Reporting and Analysis
- Active Portfolio Optimization Functions

- Portfolio credit risk profile by reference portfolio as input for pricing of proposed transactions based on a marginal risk impact
- Performance measurement on the basis of improvements in risk-adjusted return metrics and relative to applicable benchmarks
- Integration of portfolio risk/return metrics into reporting and analysis
- Portfolio reports and analysis as input for portfolio optimization

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Risk Quantification and Loan Pricing Infrastructure

**Heterogeneous Source Systems**
- System A
- System B
- System C
- System D
- System E
- Etc.

**Data Integration / Data Warehouse**
- Integration of portfolio data from various source systems to a common platform
- Standardized data structures
- Obligor Identification
- Source for internal and external

**Data Preprocessing for Portfolio Risk/Return Calculations**
- Assignment of credit risk parameters (EDF, LGD, UGD etc.)
- Consolidation of Account ID to Obligors
- Application of current market conditions

**Portfolio Risk/Return Calculations**
- Risk calculations separate for each reference portfolio
- Stress testing
- Sensitivity Analysis
- Mark-to-Model valuations

**Performance Measurement**
- Economic P&L
- CreditVaR Limit monitoring

**Active Portfolio Management**
- Risk / Return Optimization
- Execute Trades

**Input for RoRAC Loan Pricing Process**
- Based on marginal contribution to portfolio risk

**Portfolio Analysis**
- Analysis of risk / return contribution by various dimension (country, industry, rating, product etc.)
- Identification of risk concentration
- Risk Advisory to senior management
- Input to Port. Optim.

**Results by Reference Portfolio**
- Overall
- Branch A
- Branch B
- Division C
- Division D
- Etc.

**Calculation of RoRAC based on User Inputs**
- Utilization of Intranet-based loan pricing tool

**By, sell, hedge**

**Origination of new loan assets**

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RCO Group CC
Risk Control
Risikocontrolling
Credit & Counterparty Risks

Dresdner Bank
Advice you can bank on
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Credit Risk Methodology: Overview

The Drivers of the Loss Distribution of the Reference Portfolio

Economic Capital (Credit VaR):
Joint Default Correlations of obligors impose shape (leptokurtosis, fat tail) on the portfolio loss distribution. The amount of outliers beyond a certain cut-off determines Credit VaR in a quantile calculation.

Driver of the Unexpected Loss:
Full probabilistic revaluation of the assets at the end of the time horizon yields unexpected loss on a stand-alone basis which is subsequently aggregated to the portfolio level.

Driver of the Expected Loss:
- Default Probabilities of Obligors (e.g. EDF from KMV Credit Monitor; calibration of internal ratings)
- Loss Given Defaults (LGDs) of Exposures: Capture actual losses net of mitigating factors (e.g. collateral)
- Usage Given Default (UGD): Incorporate the draw-downs on open limits (e.g. Credit Lines Undrawn)
- Time Horizon: Time frame for which the effects of credit migration in the future is to be evaluated.
The Evaluation of Single Exposures Within The Context of a Portfolio of Credit-Risky Assets

Risk Contribution of Single Exposure to the Variance (Risk) of the Overall Portfolio

\[ C_B = \frac{RC_B}{UL_P} \]

Economic Capital Allocated to Single Exposure

RORAC\(_B\) := \( \frac{\text{Return} - \text{Expected Loss (Stand - Alone)}}{\text{Economic Capital Allocated to Single Exposure}} \)
Choice of Reference Portfolio: The Effect Of Diversification on Measured Risk

Selected Branches at a 99,95% Confidence Level

50% Reduction of measured risk through integrated calculation of branch portfolios

Sum of risk of individual branch portfolios (=100%)

Compared with: Regulatory Capital (8% of RWA)

Regulatory Capital

100%

100%

83%

43%

67%

30%

Branch A

Branch B

Branch C

Branch D
Transaction Pricing Based On RoRC- and RoRiskCap-Metrics

Spread and Fee Revenues of Credit Transaction (Originating Unit Income)
- Standardized Administrative Costs
- Expected Loss due to Credit Risk (“Standard Default Costs”)
- Expected Loss due to Transfer Risk
- Liquidity Costs (Long Term Funding Policy)
+ Capital Benefit
- Taxes (based on location specific tax rates)

\[ \text{Net Return after Taxes} = \frac{\text{Spread and Fee Revenues of Credit Transaction}}{\text{Risk Capital}^{1)}} + \text{Capital Benefit} - \text{Taxes} \]

\[ = \text{Net Post-Tax Profit} \]

RoRiskCap = \(\frac{\text{Net Return after Taxes}}{\text{Risk Capital}^{1)}}\)

RoRC = \(\frac{\text{Net Return after Taxes}}{\text{Regulatory Capital Usage}^{2)}}\)

1 Based on the Group Risk Capital Methodology version 2.0 which replaced Economic Capital version 1.5
2 Based on the Target Tier I Capital Ratio of 7.25% of risk-weighted assets (Basel I) or an estimation of Basel II Advanced Approach capital.
Economic Value Added (EVA)
Transformation from Return on Capital Metrics

\[ \text{EVA} = \frac{\text{Net Return after Taxes}}{\text{Risk Capital}} - \text{Risk Capital} \times \text{Hurdle Rate} \]

After tax hurdle rate was set by Allianz Group at 9.95% for Dresdner Bank
The Impact of Applying Regulatory vs. Risk Capital to the Pricing of Single Transactions

**Basic Intuition:** By replacing the regulatory capital usage as the basis for risk-adjusted pricing by risk capital, yet another driver of differentiation among proposed transactions is introduced.

**Result:** Ordinal rank order of single transactions and the associated banking relationships may change dramatically, especially towards transactions with obligors of high credit quality.

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**Diagram:**

- **Capital Usage** vs. **Credit Quality**
- **RoRiskCap < RoRC**
- **RoRiskCap > RoRC**
- 8.00% and 7.25% capital usage levels
- Measured Credit Risk ("Risk Capital")
- Regulatory Tier I and II Capital Usage for Corporates
- Target Tier I Capital Ratio
### Impact of Reference Portfolio Choice on RoRAC-Based Loan Pricing

#### RoRACs based on Possible Reference Portfolios

<table>
<thead>
<tr>
<th></th>
<th>Branch</th>
<th>Business Division</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction with customer A</td>
<td>Return = 5/20 = 25%</td>
<td>Return = 5/30 = 17%</td>
<td>Return = 5/50 = 10%</td>
</tr>
<tr>
<td>Transaction with customer B</td>
<td>Return = 3/30 = 10%</td>
<td>Return = 3/15 = 20%</td>
<td>Return = 3/12 = 25%</td>
</tr>
</tbody>
</table>

**Sample Hurdle Rate 20%**

**Fictive Example** - Choice of reference portfolio should be consistent with degree of centralization of portfolio management function(s)

**Only the group level view is relevant from the shareholder’s perspective!**
The Cost Components of Risk-Adjusted Pricing Metrics: Expected Losses due to Credit Risk

Expected Losses due to Credit Risk = PD × LGD × EAD

Probability of Default (PD, also called EDF - Expected Default Frequency)
- Reflects the credit quality of the obligor and is usually a function of the underlying credit rating or scoring system over a one-year time horizon

Draw-down in the Event of Default (EAD – Exposure at Default)
- Estimation of the currency amount owed in the event of a default.

Loss in the Event of Default (LGD - Loss Given Default, EAD - Exposure at Default)
- Reflects the actual credit loss in percent of the UGD expected in the event of default, which is a function of the level of seniority and collateralization of the transaction in question
The Cost Components of Risk-Adjusted Pricing Metrics: Expected Losses due to Transfer Risk

An additional operating cost inherent in foreign lending to be recovered through adequate pricing

Drivers of Expected Losses due to Transfer Risk

- **Expected Transfer Event Frequency (ETEF)**
  - Quantifies the probability that cash flows from credit transactions cannot be transferred across borders due to sovereign actions such as capital controls etc.

- **Loss Given a Transfer Event (Loss Severity)**
  - An estimate of the actual write-downs due to transfer events

- **Foreign Collateral as a Source and Mitigant of Transfer Risk**
The Revenue Components of Risk-Adjusted Pricing Metrics: Capital Benefit Revenue

Underlying Assumption:

- The bank’s book equity capital is not employed to fund/refinance the lending activities. For the purpose of transaction pricing, all assets are thought to be fully refinanced with debt.

Capital Benefit Revenue

- Single transactions are credited with the implicit returns generated by investing the bank’s equity capital in government bonds via a long-term, risk-free rate of return of 6% p.a. on the respective (regulatory or economic) capital usage.

Analogy to Capital Benefit in Management Accounts
Capital Concepts Currently Offered in ExPLORER

ExPLORER currently offers Return Metrics and EVAs calculated on the basis of a variety of Capital Concepts:

- Regulatory Capital Basel I
- Economic Capital (ECAP Policy 1.5 of the Investment Bank)
- Risk Capital (Dresdner Bank Group Risk Capital Policy 2.0)
- Regulatory Capital Basel II (approximation of Basel II Advanced Approach)
- Credit VaR (based on KMV Portfolio Manager / Deal Analyzer)
Time Horizon Concepts Currently Offered in ExPLORER

ExPLORER offers annualized multi-period Return Metrics and EVAs calculated over various time horizon concepts:

- Calculation Date to one year in the future (“One Year” Return Metrics)
- Calculation Date to Expected Maturity Date - EM (“Multi-Year Average” Return Metrics)
- Calculation Date to Contractual Maturity Date - CM (“Multi-Year Average” Return Metrics)

An additional time-horizon concept will be added to ExPLORER this fall

- Calculation date to Interest Fixing Date - IM (“Multi-Year Average” Return Metrics)

The multi-year time horizon concepts are used for calculating minimum margins
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Multi-Period Calculations
Example Transaction: revolving line on cash credit with step-up usage

Best Estimate of Usage Amounts
Credit Exposure Amount in Default (CEAD) in Each Period
Example Transaction: revolving line on cash credit with step-up usage

<table>
<thead>
<tr>
<th>Period</th>
<th>Credit Exposure Amount in Default (CEAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
</tr>
</tbody>
</table>

Best Estimate of Usage Amounts
Credit Loss Amount in Default (CLAID) With Collateral

Example Transaction: Revolving Line on Cash Credit
with Cash Collateral Deposited at Dresdner Bank

<table>
<thead>
<tr>
<th>Transaction Limit Amount</th>
<th>Credit Exposure Amount in Default (CEAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Credit Loss Amount in Default (CLAID)</td>
</tr>
</tbody>
</table>

(Expected Present Value of Aggregate Cash Inflows after Accounting for Transfer Risk - Economic Costs of Credit Defaults) for (I, II, III, IV)
Expected Loss due to Credit Risk Amounts (ELCRA)

Example Transaction: Revolving Line on Cash Credit with Cash Collateral Deposited at Dresdner Bank

Probability of Default in 
\( (T = [0 \;; \; i]) \) := Basis for Survivorship Adjustment

Expected Loss due to Credit Risk Amounts (ELCRA) in 
\( (H) = [i \;; \; i+k] \) = Credit Loss Amount in Default (CLAID) in \( (H) \) * Probability of Default in \( (H) \mid \) No Default prior to \( i \) 
* Survivorship Adjustment \( (T) \)

Credit Loss Amount in Default (CLAID)

Collateral (e.g. Cash)

\( i \)
\( 1 \)
\( 2 \)
\( 4 \)
\( 5 \)
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EXPLORER – Current Features

- True web server application – no local installation or maintenance necessary
- Graphical User Interface with multi-language capability
- Simple transactions as well as custom (e.g. irregular) cash flows can be modeled
- Automated calculation of a variety of return metrics and EVA results
- Aggregation of multiple exposures to obligor level return metrics and EVA results
- Inclusion of “cross selling benefits” at the obligor level
- Return Metrics / EVAs based on multiple capital concepts available
  (Basle I and Basle II AA regulatory capital, economic capital v1.5, risk capital v2.0, KMV Portfolio Manager Credit Value at Risk)
- Reports generated in Adobe Acrobat format for easy handling
The Calculation Engine is the **KMV Deal Analyzer 2.1** running as a Corba Object under an NT Corba Object Broker - Visibroker from Inprise.

Visual Edge’s E-server, a COM-Corba Bridge Server product, allows multiple connections to the Corba Object from the Web Application, from a Visual Basic Wrapper Object.

The Visual Basic objects communicate to both the KMV Corba Object as well as the Oracle Database to store and retrieve data for Exposures and Obligors.
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ExPLORER
Ex ante Pricing and Loan Origination for Risk and Expected Return

Login

User ID: greg.steiniger@dresdner-bank.com
Password: ********
Role: User

For further information and questions please contact
RoRAC Help Desk at rorachelpdesk@dresdner-bank.com
Best viewed in Microsoft Internet Explorer 5.0 and above

Click here to change your password
Overview Screen

All Return Metrics at the Obligor Level Include Cross Selling Benefits

<table>
<thead>
<tr>
<th>Obligor Name</th>
<th>Limit</th>
<th>Usage</th>
<th>Re-calc Date</th>
<th>RoRC Basel I Multi Year Expected Maturity</th>
<th>RoRC Multi Year Contractual Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>test obligor level</td>
<td>14,000,000,000</td>
<td>14,000,000,000</td>
<td>12/2/2002</td>
<td>52.72%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test_mpf</td>
<td>N/A</td>
<td>N/A</td>
<td>20/11/2001</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>test_mpf (2)</td>
<td>12,007,942</td>
<td>7,925,024</td>
<td>26/11/2001</td>
<td>59.75%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test_KMV</td>
<td>1,227,206,005</td>
<td>660,642,002</td>
<td>29/9/2001</td>
<td>13.16%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test_KMV</td>
<td>N/A</td>
<td>N/A</td>
<td>14/1/2002</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>test_LGD</td>
<td>N/A</td>
<td>N/A</td>
<td>15/5/2002</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>test_ROPEC</td>
<td>N/A</td>
<td>N/A</td>
<td>14/1/2002</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>test_admin_costs</td>
<td>N/A</td>
<td>N/A</td>
<td>5/9/2001</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>test_custom</td>
<td>570,415,026</td>
<td>432,509,139</td>
<td>9/1/2002</td>
<td>-20.11%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test_interest_income</td>
<td>N/A</td>
<td>N/A</td>
<td>21/9/2001</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

All Return Metrics at the Exposure Level Exclude Cross Selling Benefits

<table>
<thead>
<tr>
<th>Exposure Name</th>
<th>Limit</th>
<th>Usage</th>
<th>Re-calc Date</th>
<th>RoRC Basel I Multi Year Expected Maturity</th>
<th>RoRC Multi Year Contractual Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>test 1</td>
<td>1,000,000,000</td>
<td>1,000,000,000</td>
<td>12/2/2002</td>
<td>9.79%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test 2</td>
<td>1,000,000,000</td>
<td>1,000,000,000</td>
<td>12/2/2002</td>
<td>15.71%</td>
<td>NO CALC</td>
</tr>
<tr>
<td>test 3</td>
<td>10,000,000,000</td>
<td>10,000,000,000</td>
<td>12/2/2002</td>
<td>16.92%</td>
<td>NO CALC</td>
</tr>
</tbody>
</table>
### Cross Selling Benefits

<table>
<thead>
<tr>
<th>Description</th>
<th>Time Period in Years</th>
<th>Total Cumulative Amount (After Tax)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>30.00</td>
<td>18,119,675.20</td>
</tr>
</tbody>
</table>

### Legal Entity
- **Dresdner Bank AG**

### Business Line
- **CB DELA**

### Exposure List

<table>
<thead>
<tr>
<th>Exposure Name</th>
<th>Limit</th>
<th>Usage</th>
<th>Re-calc Date</th>
<th>RoE Basel I Multi Year Expected Maturity</th>
<th>RoE Basel I Multi Year Contractual Maturity</th>
<th>MR Expect</th>
</tr>
</thead>
<tbody>
<tr>
<td>kmv EL 1 day</td>
<td>100,000.000</td>
<td>100,000.000</td>
<td>13/6/2002</td>
<td>3.79%</td>
<td>3.18%</td>
<td></td>
</tr>
</tbody>
</table>
## Exposure Input

### Product Type
- Term Loan

### Trade Related Deal?
- Yes

### Exposure Currency
- EURO

### Transaction Limit at Origination
- 1,000,000,000.00

### Principal Type
- Bullet

### Coupon Type
- Fixed

### Current Utilization %
- 0.00

### Expected Utilization %
- 100.00

### Seniority of Claim
- Senior

## Summarized Results

<table>
<thead>
<tr>
<th>Recalc Date</th>
<th>RoE Basel I Multi Year</th>
<th>Expected Maturity</th>
<th>RoE Basel I Multi Year</th>
<th>Contractual Maturity</th>
<th>RoE One Year</th>
<th>Expected Maturity</th>
<th>RoE One Year</th>
<th>Contractual Maturity</th>
<th>RoE Basel I Multi Year</th>
<th>Expected Maturity</th>
<th>RoE Basel I Multi Year</th>
<th>Contractual Maturity</th>
<th>RoE Basel I One Year</th>
<th>Expected Maturity</th>
<th>RoE Basel I One Year</th>
<th>Contractual Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/6/2002</td>
<td>3.66%</td>
<td>3.60%</td>
<td>3.60%</td>
<td>2.00%</td>
<td>3.23%</td>
<td>3.23%</td>
<td>2.22%</td>
<td>2.00%</td>
<td>2.69%</td>
<td>2.69%</td>
<td>2.69%</td>
<td>2.00%</td>
<td>2.75%</td>
<td>2.75%</td>
<td>2.00%</td>
<td>2.75%</td>
</tr>
</tbody>
</table>
### Exposure Input

<table>
<thead>
<tr>
<th>Description</th>
<th>Collateral Type</th>
<th>Collateral Value Before haircut</th>
</tr>
</thead>
<tbody>
<tr>
<td>first</td>
<td>Residential Real Estate</td>
<td>1,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Country of Collateral</td>
<td>Indonesia</td>
</tr>
<tr>
<td></td>
<td>Currency</td>
<td>EURO</td>
</tr>
<tr>
<td></td>
<td>Covers Credit Risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Covers Transfer Risk</td>
<td></td>
</tr>
</tbody>
</table>

### Collateral & Guarantee Input

<table>
<thead>
<tr>
<th>Description</th>
<th>RoEC Basel I Multi Year Contractual Maturity</th>
<th>RoEC Multi Year Contractual Maturity</th>
<th>RoEC One Year Contractual Maturity</th>
<th>RoEC Basel I One Year Contractual Maturity</th>
<th>RoRC Basel I Multi Year Contractual Maturity</th>
<th>RoRC Basel I One Year Contractual Maturity</th>
<th>RoRC Basel I One Year Contractual Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-calc Date</td>
<td>13/6/2002</td>
<td>3.35%</td>
<td>2.10%</td>
<td>3.25%</td>
<td>3.34%</td>
<td>2.69%</td>
<td>2.62%</td>
</tr>
</tbody>
</table>
### Exposure Return Metrics

**Results Displayed in EUR on an Annualized Basis as of Calculation Date (Except Where Specified)**

<table>
<thead>
<tr>
<th>Component</th>
<th>RoEC Base I Multi Year Expected Maturity</th>
<th>RoEC Multi Year Contractual Maturity</th>
<th>RoEC Multi Year Expected Maturity</th>
<th>RoEC One Year Expected Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spread Revenue</td>
<td>10,000,000</td>
<td>10,000,000</td>
<td>10,000,000</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Fee Revenue</td>
<td>1,350,594</td>
<td>1,350,594</td>
<td>1,350,594</td>
<td>1,350,594</td>
</tr>
<tr>
<td>Capital Benefit Revenue</td>
<td>5,673,578</td>
<td>5,673,578</td>
<td>4,225,871</td>
<td>4,746,171</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>16,224,171</td>
<td>14,644,165</td>
<td>15,306,285</td>
<td>15,042,969</td>
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<tr>
<td>Cost Components</td>
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<tr>
<td>Expected Loss Due to Credit Risk</td>
<td>10,512,742</td>
<td>10,512,742</td>
<td>10,512,742</td>
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<tr>
<td>Expected Loss Due to Transfer Risk</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Administration Costs</td>
<td>8,665</td>
<td>8,665</td>
<td>8,665</td>
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<tr>
<td>Liquidity Costs</td>
<td>1,300,000</td>
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<td>1,300,000</td>
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<td>Liquidity Penalty Costs</td>
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<td>180,311</td>
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<tr>
<td>Total Costs</td>
<td>11,824,406</td>
<td>12,769,477</td>
<td>11,824,406</td>
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<tr>
<td>Return Before Taxes</td>
<td>4,657,463</td>
<td>3,940,666</td>
<td>3,720,053</td>
<td>4,270,362</td>
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<td>Taxes</td>
<td>2,960,808</td>
<td>2,173,223</td>
<td>1,757,792</td>
<td>2,007,164</td>
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<td>Return After Taxes</td>
<td>2,496,630</td>
<td>1,767,443</td>
<td>1,962,261</td>
<td>2,263,204</td>
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<td>Capital Usage</td>
<td>72,478,750</td>
<td>49,665,837</td>
<td>60,726,732</td>
<td>67,888,219</td>
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<tr>
<td>Return Metrics and EVA</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Return Metrics and Calculation Date</td>
<td>3.36797%</td>
<td>2.0967%</td>
<td>2.2531%</td>
<td>3.22794%</td>
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<tr>
<td>Target Handle Rate in Percent</td>
<td>6.9900%</td>
<td>8.9300%</td>
<td>8.9600%</td>
<td>8.9500%</td>
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**Data Not Saved**
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<th>Date Due (dd/mm/yyyy)</th>
<th>Currency</th>
<th>Limit</th>
<th>Usage</th>
<th>Principal Payment</th>
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<td>19/12/2001</td>
<td>EURO</td>
<td>1,000,000,000.00</td>
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<td>26/02/2007</td>
<td>EURO</td>
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<td>0.33</td>
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### Group Risk Control

**CC - Risikocontrolling**

**Credit & Counterparty Risks**

### RCO

#### Results: Obligor Return Metrics

<table>
<thead>
<tr>
<th>Results Displayed in EUR on an Annualized Basis as of Calculation Date (Except Where Specified)</th>
<th>RoEC Basel I Multi Year Expected Maturity</th>
<th>RoEC Basel I Multi Year Contractual Maturity</th>
<th>RoEC Basel I Multi Year Expected Maturity</th>
<th>RoEC Basel I One Year Expected Maturity</th>
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</thead>
<tbody>
<tr>
<td>Return After Taxes Excluding CSBs</td>
<td>1,207,312</td>
<td>819,061</td>
<td>824,543</td>
<td>1,021,576</td>
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<td>Cross Selling Benefits After Taxes</td>
<td>947,005</td>
<td>947,005</td>
<td>947,005</td>
<td>947,005</td>
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<tr>
<td>Return After Taxes Including CSBs</td>
<td>2,154,317</td>
<td>1,706,060</td>
<td>1,771,540</td>
<td>1,580,600</td>
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<tr>
<td>Capital Usage</td>
<td>37,611,061</td>
<td>36,306,851</td>
<td>27,553,641</td>
<td>31,759,871</td>
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<tr>
<td>Return Metrics and EVA</td>
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<tr>
<td>Target Handle Rate in Percent</td>
<td>9.6000</td>
<td>9.6000</td>
<td>9.6000</td>
<td>9.6000</td>
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<tr>
<td>Obligor Results Including CSBs</td>
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</tr>
<tr>
<td>Return Metrics Per Calculation Date</td>
<td>5.7294%</td>
<td>5.8254%</td>
<td>6.4295%</td>
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<tr>
<td>Economic Value Added (Annualized)</td>
<td>-4,042,666</td>
<td>-25,046,667</td>
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<tr>
<td>Economic Value Added (Cumulative)</td>
<td>-36,978,756</td>
<td>-36,960,823</td>
<td>-26,715,827</td>
<td>-26,715,827</td>
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<tr>
<td>Obligor Results Excluding CSBs</td>
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<tr>
<td>Return Metrics Per Calculation Date</td>
<td>2.1209%</td>
<td>2.7043%</td>
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<tr>
<td>Economic Value Added (Annualized)</td>
<td>-42,789,652</td>
<td>-26,688,832</td>
<td>-26,992,867</td>
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<td>Economic Value Added (Cumulative)</td>
<td>-75,012,529</td>
<td>-56,994,604</td>
<td>-55,749,426</td>
<td>-55,749,426</td>
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<tr>
<td>Cross Selling Benefit Shortfall</td>
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<td></td>
<td></td>
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<tr>
<td>CSB Shortfall After Taxes (Annualized) for 29.06.05 Expected Maturity / 29.06.05 Contractual Maturity Years</td>
<td>1,566,552</td>
<td>1,244,556</td>
<td>970,023</td>
<td>1,244,556</td>
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<tr>
<td>CSB Shortfall After Taxes (Cumulative)</td>
<td>46,978,756</td>
<td>36,960,823</td>
<td>26,715,827</td>
<td>26,715,827</td>
</tr>
</tbody>
</table>
Contents

▶ Introduction
▶ Overview of Concepts
▶ Fundamentals of Multi-Period Calculations
▶ ExPLORER – Current Features
▶ ExPLORER – Screen Shots
▶ Outlook
Separation of Ownership and Origination Functions

**Traditional Structure**
Combining ownership and origination

- **Client**
  - Origination
  - Portfolio
  - Branch A: P & L
  - Branch B: P & L
  - Branch C: P & L

**Innovative Structure**
Separating ownership and origination

- **Client**
  - Origination
  - Portfolio
  - Risk-Adjusted Pricing
  - Portfolio Management
    - P & L
    - Sell, Hedge
    - Buy
    - External markets

**Overall Bank Financial Results**

© Dresdner Bank AG · Title of presentation · Date · 44
<table>
<thead>
<tr>
<th>Challenges</th>
<th>Risk Measurement Infrastructure</th>
<th>Active Portfolio Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measurement of historical default and recovery rates; definition of default</td>
<td>Separation of “origination” and “ownership” functions</td>
</tr>
<tr>
<td></td>
<td>Calibration and validation of internal rating systems</td>
<td>Choice of “reference portfolio” (decentralized or centralized portfolio management)</td>
</tr>
<tr>
<td></td>
<td>Measurement of the term structure of default probabilities</td>
<td>Potential for conflict with “relationship managers”</td>
</tr>
<tr>
<td></td>
<td>Portfolio risk calculation infrastructure (data warehouse for transaction and obligor integration at group level)</td>
<td>Establishment of real and synthetic secondary market opportunities</td>
</tr>
<tr>
<td></td>
<td>Infrastructure to support decentralized loan pricing and neutral transfer pricing from “originators” to “owners”</td>
<td>Management of risk-return profile of existing portfolio; diversification away from traditional country and industry concentrations</td>
</tr>
<tr>
<td></td>
<td>Choice of benchmarks for performance measurement</td>
<td>Evolution away from individual name limits towards risk-based portfolio limits (CreditVaR limits)</td>
</tr>
<tr>
<td></td>
<td>Consistency with traditional “book value” accrual accounting</td>
<td></td>
</tr>
</tbody>
</table>