



*Fondo Interbancario di Tutela dei Depositi*



# Deposit Guarantee Fund in the Banking System

Option Development Analytics

National Bank of Romania

**Technical Seminar**

Bucharest, 18 November 2005

**CONFIDENTIAL**

# This Is A “Convergence” Review

**“Convergence”**<sup>1</sup> is a financial sector development program for South-East Europe focused on:

- Undertaking, as an “honest broker”, analytical tasks of micro-institutional issues as a basis for identifying solutions tailored to country circumstances
- Taking EU integration as a strategic perspective
- Building awareness of market participants, involving them in the search of market-building solutions, and fostering their dialogue with authorities
- Using the experience of regional former policy makers and local experts whenever possible
- Working in partnership with other institutions

# The Assignment

- Romanian authorities wish to make an updated assessment of the level of banks' contributions to the Deposit Guarantee Fund (DGF)
  - *“This assessment should take into consideration the latest developments in the Romanian banking sector, the international practice, as well as the need to maintain a well-funded guarantee scheme to preserve the confidence of depositors.”*
    - » DGF Letter to Convergence, May 2005

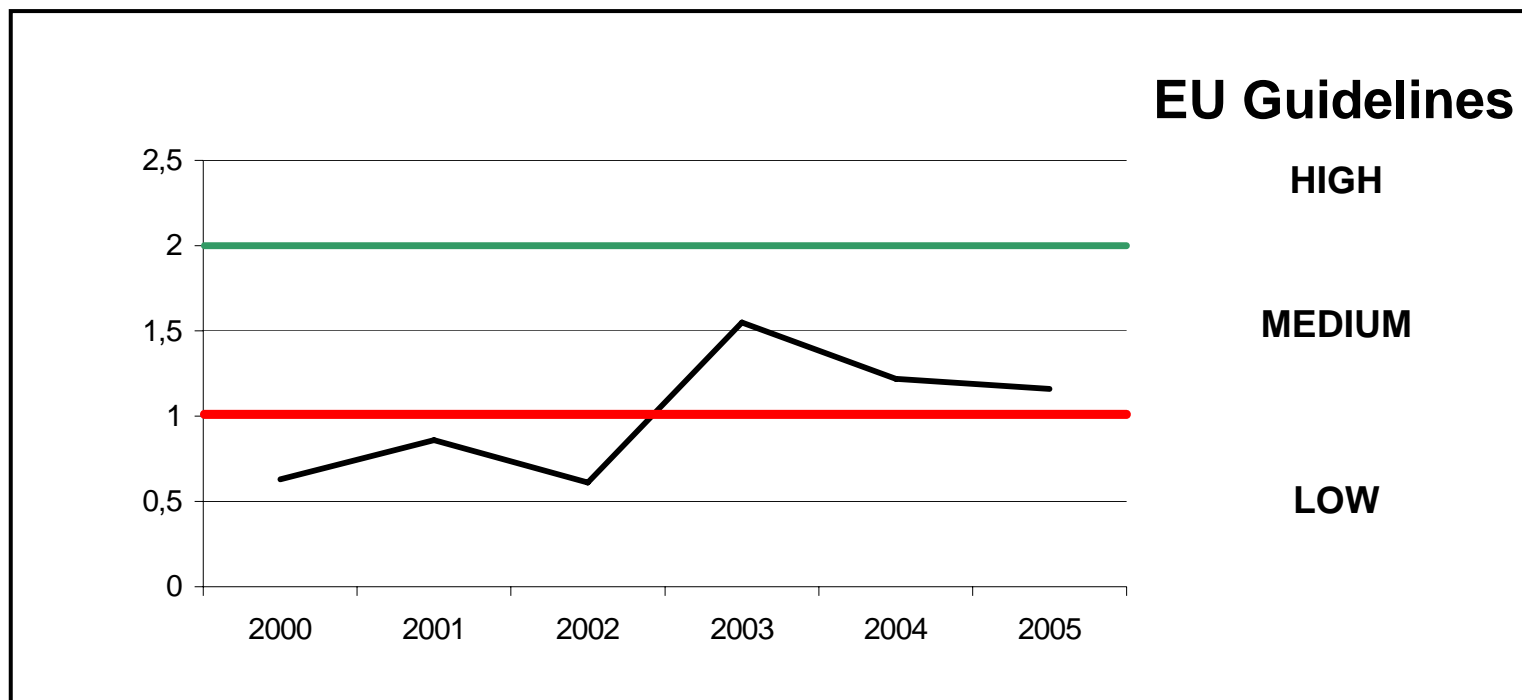
# EU Deposit Insurance Framework

**Ex-ante funding as % of Guaranteed Deposits  
(GD Exposure Coverage Ratio)**

| <b>Amount</b>  | <b>Rating</b>   | <b>Countries</b>                                    |
|----------------|---|---|
| <b>&gt; 2%</b> | <b>High</b><br><i>"... the fund will be able to face an important crisis ..."</i> | some Scandinavian countries, some New Member States |
| <b>1 – 2%</b>  | <b>Medium</b><br><i>"enables the scheme to withstand severe disturbances."</i>    | DK, FI, HU  |
| <b>&lt; 1%</b> | <b>Low</b><br>" _ "   | IE, FR  |

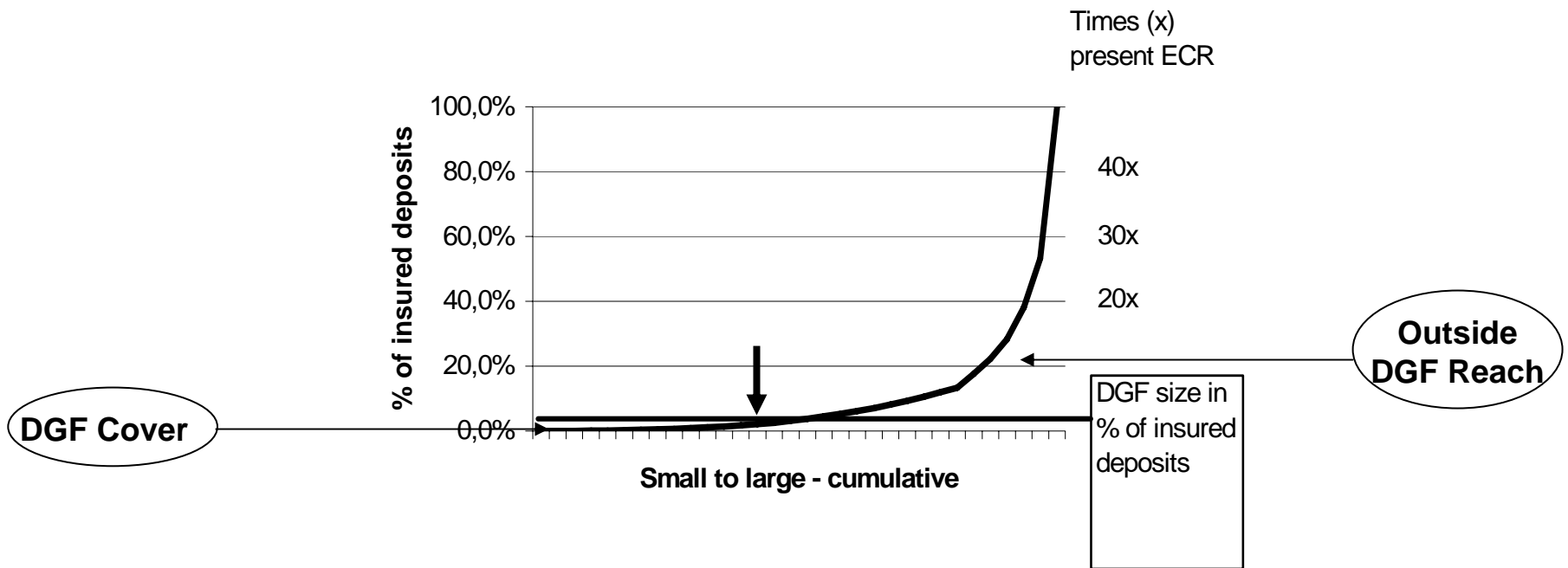
# Romania's GD-Exposure Coverage Ratio

(in % of Guaranteed Deposits)



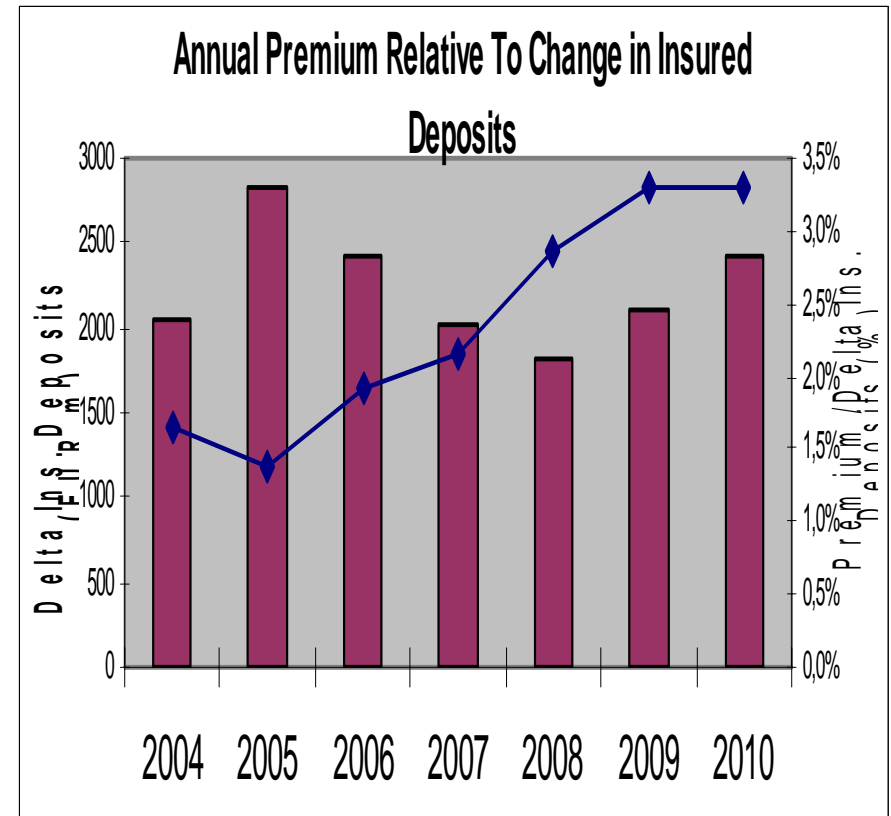
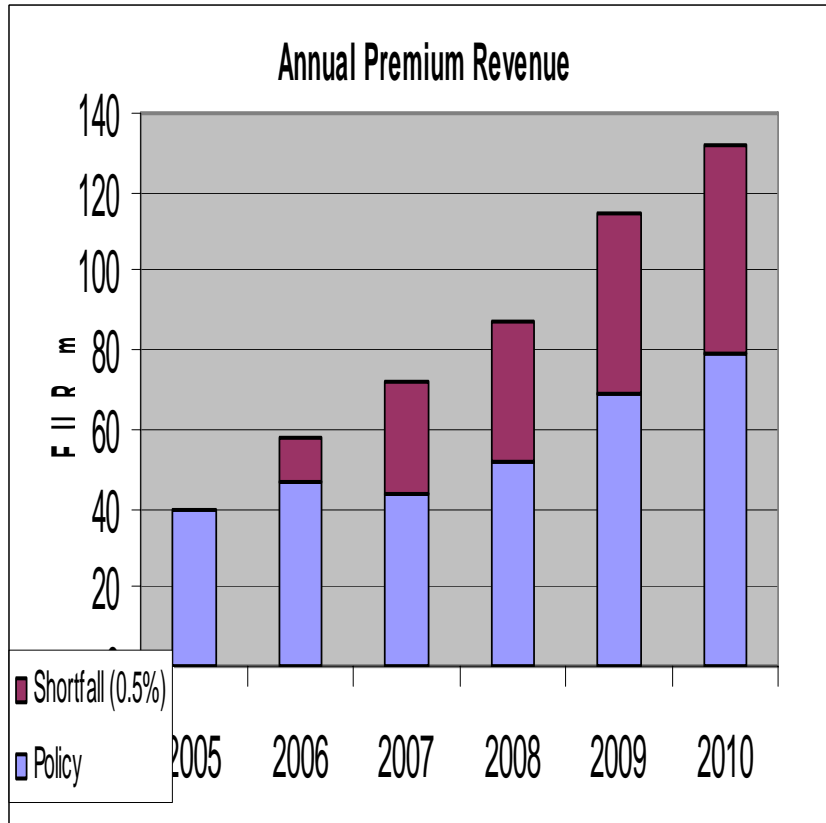
- **Can DGF “withstand severe disturbances”?**
- **How will Exposure Coverage Ratio evolve, with premium declining further from 0.5% to 0.3%?**

# The Largest Bank DGF Can Cover Belongs to Bottom 15% of Market



Can Premium Be Decreased Further?

# Premium Cut Affecting DGF Cash-Flow



...But keeping in line with new risks

# DGF Cash-Flow Projection: ECR Expected to Grow

|   | 2004         | 2005         | 2006         | 2007         |
|---|--------------|--------------|--------------|--------------|
| <b>Premium applied</b>  | <b>0.60%</b> | <b>0.50%</b> | <b>0.40%</b> | <b>0.30%</b> |
| Fund size (BoY)   | 71           | 96           | 140          | 196          |
| Insured deposits (BoY)  | 2,624        | 4,748        | 7,111        | 8,533        |
| <b>ECR (BoY)</b>  | <b>3.96</b>  | <b>2.85</b>  | <b>2.64</b>  | <b>2.81</b>  |
| Investment income   | 15           | 13           | 11           | 14           |
| Outflow, net  | -23          | -9           | -2           | -2           |
| <b>ECR (EoY)</b>  | <b>2.02</b>  | <b>2.45</b>  | <b>2.30</b>  | <b>2.34</b>  |
| Guaranteed deposits<br>(CEC included)   | 7,846        | 12,037       | 14,444       | 17,333       |
| ECR (Guaranteed Deposits)   | 1.22         | 1.16         | 1.36         | 1.45         |
| <b>Notes:</b>   |              |              |              |              |
| Guaranteed deposits growth in 2005: 35%, 2006: 20%, 2007: 20%   |              |              |              |              |
| Insured deposits growth: 20%  |              |              |              |              |
| Investment in 2005: 85% (with 8,5%) and 15% (with 17%); from 2006 onwards 6%                                |              |              |              |              |
| Data on insured deposits end 2004 corresponds as insured beginning 2005 i.e. Coverage 10.000 not 6.000 Euro |              |              |              |              |
| Exchange rate: 31st December 2004; i.e. 39663   |              |              |              |              |

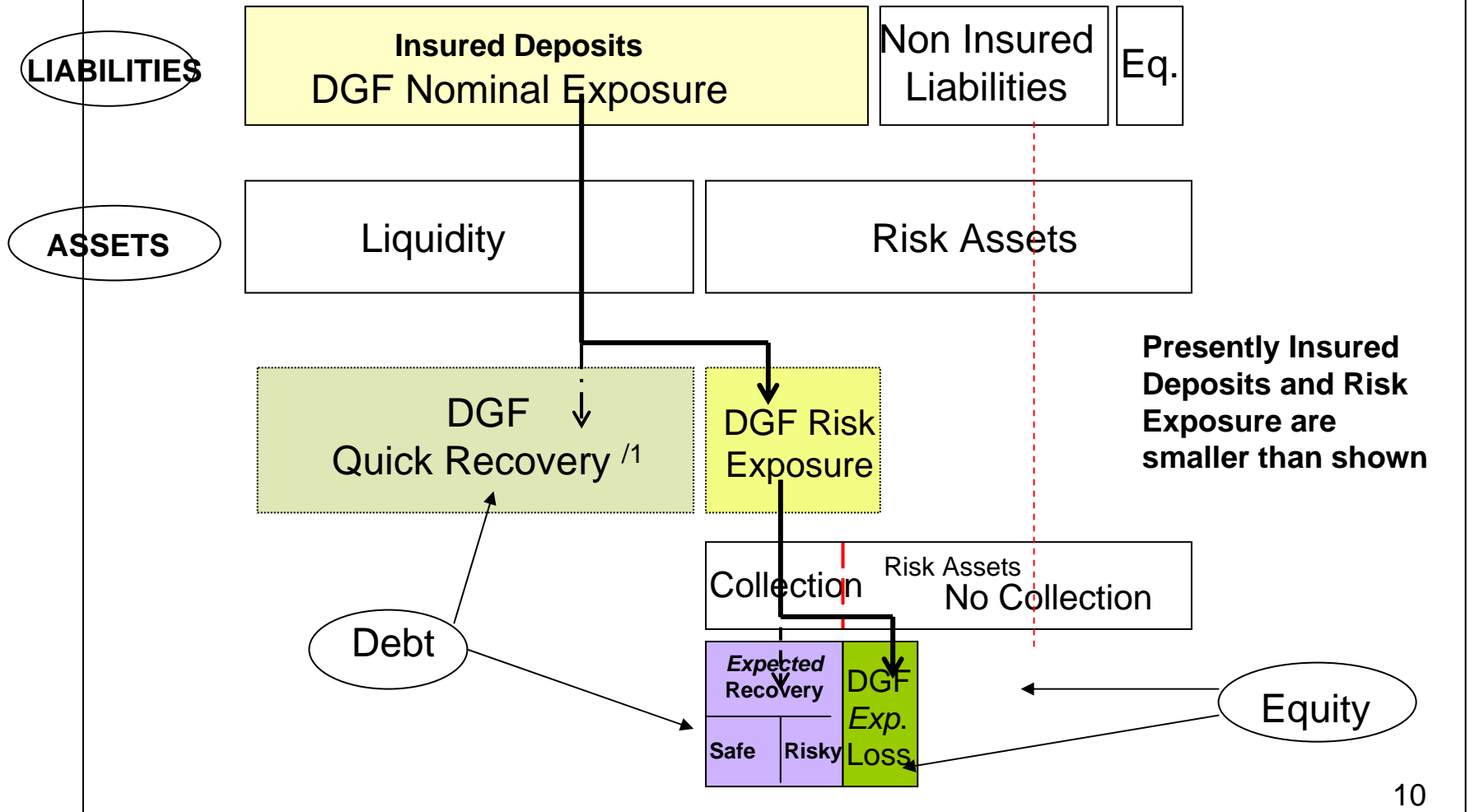


# September Session Summary

- Ongoing large insurance coverage extension makes further lowering of premium problematic
  - DGF reach currently limited to bottom 15% of market
- DGF Risk Exposure is lower than Nominal Exposure
  - Final Loss < Risk Exposure
    - High Liquidity and Non-Insured Liabilities
- DGF size could be extended through stand-by loan from strongest banks
  - Debt: conceptually equivalent to “Ex Post” premium
- Annual premium contributions could be partially substituted with debt capacity

# DGF Nominal Exposure Higher Than Risk Exposure and Final Loss

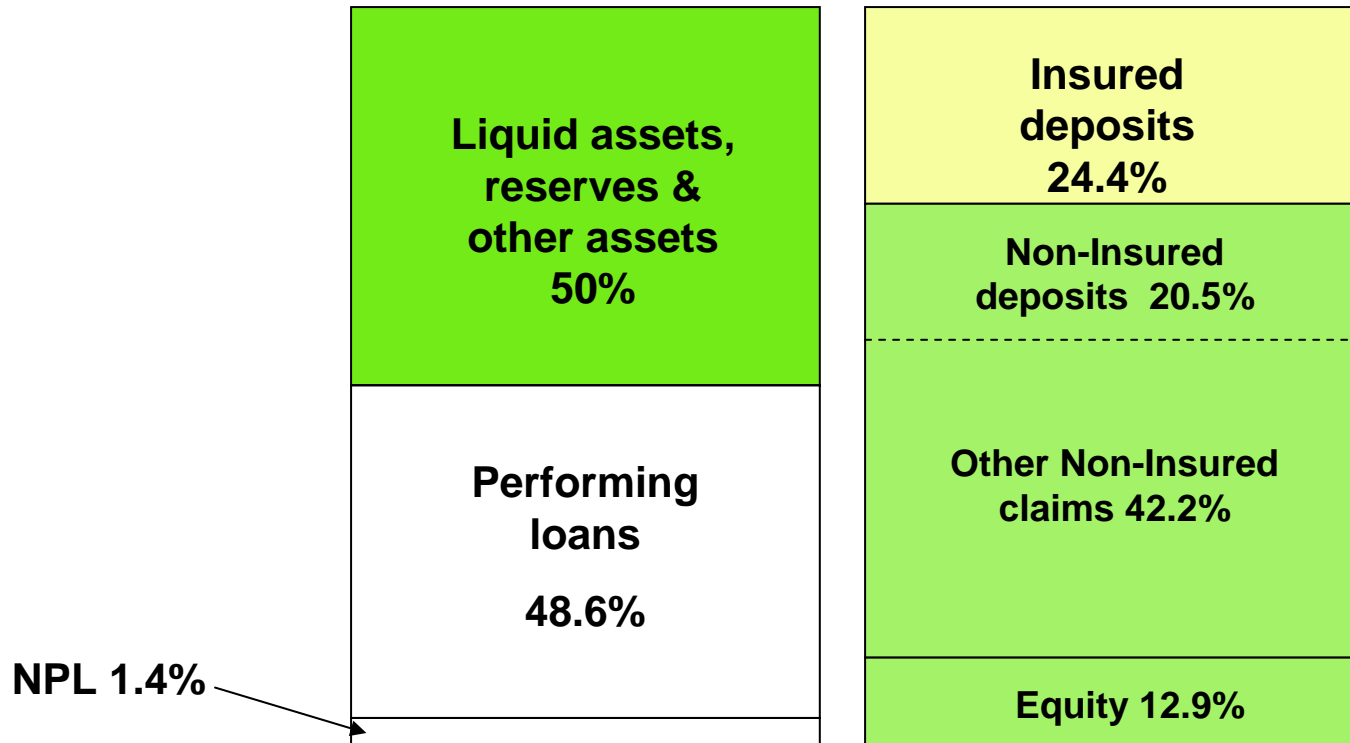
## Conceptual Illustration



<sup>/1</sup> See required legal changes at the end of the presentation

# Large Liquidity and Market Self-Insurance Shield DGF From Systemic Risk Exposure

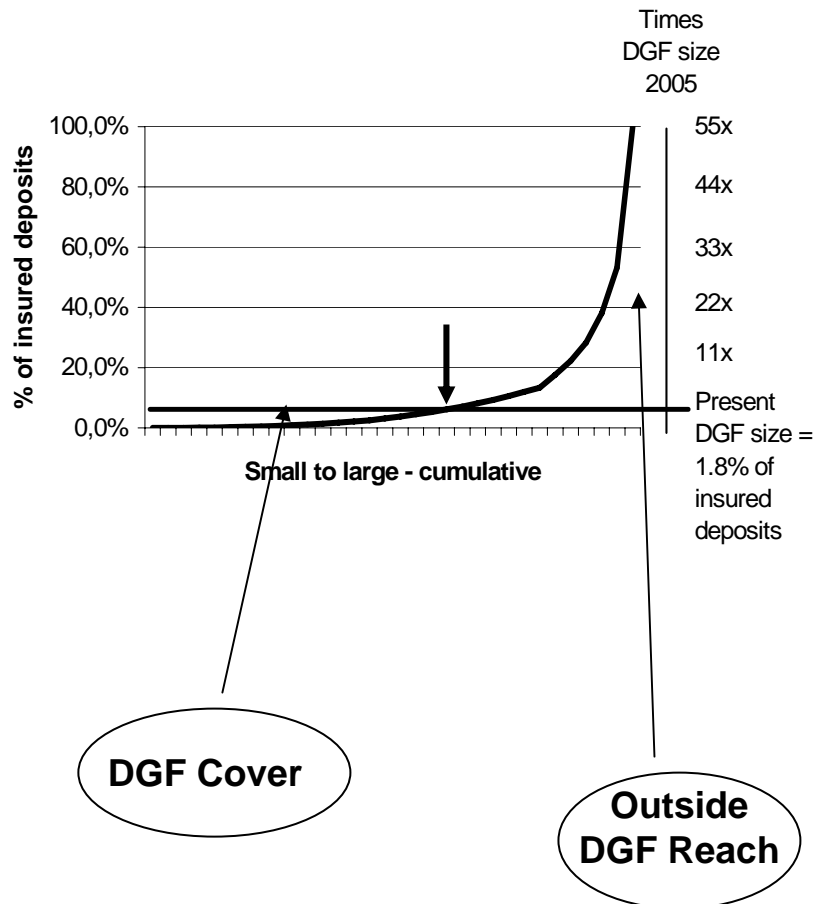
Romanian banking system end 2004 with  
EUR 10.000 coverage (base for 2005 premium)



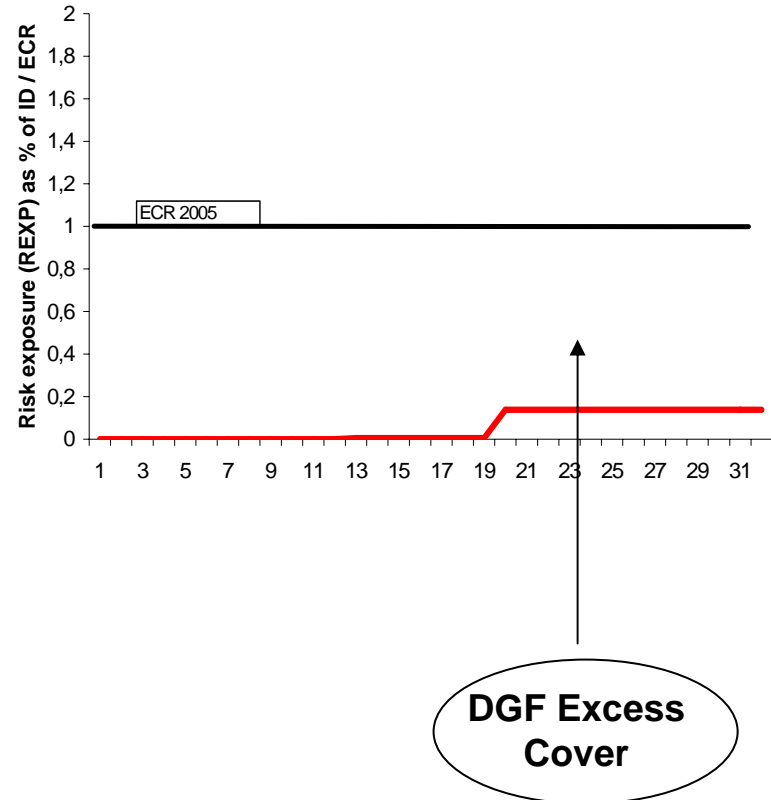
... but what really matters is robustness of individual banks, because market self-insurance of bank A has nothing to do with bank B

# Much Higher DGF Risk Exposure Coverage

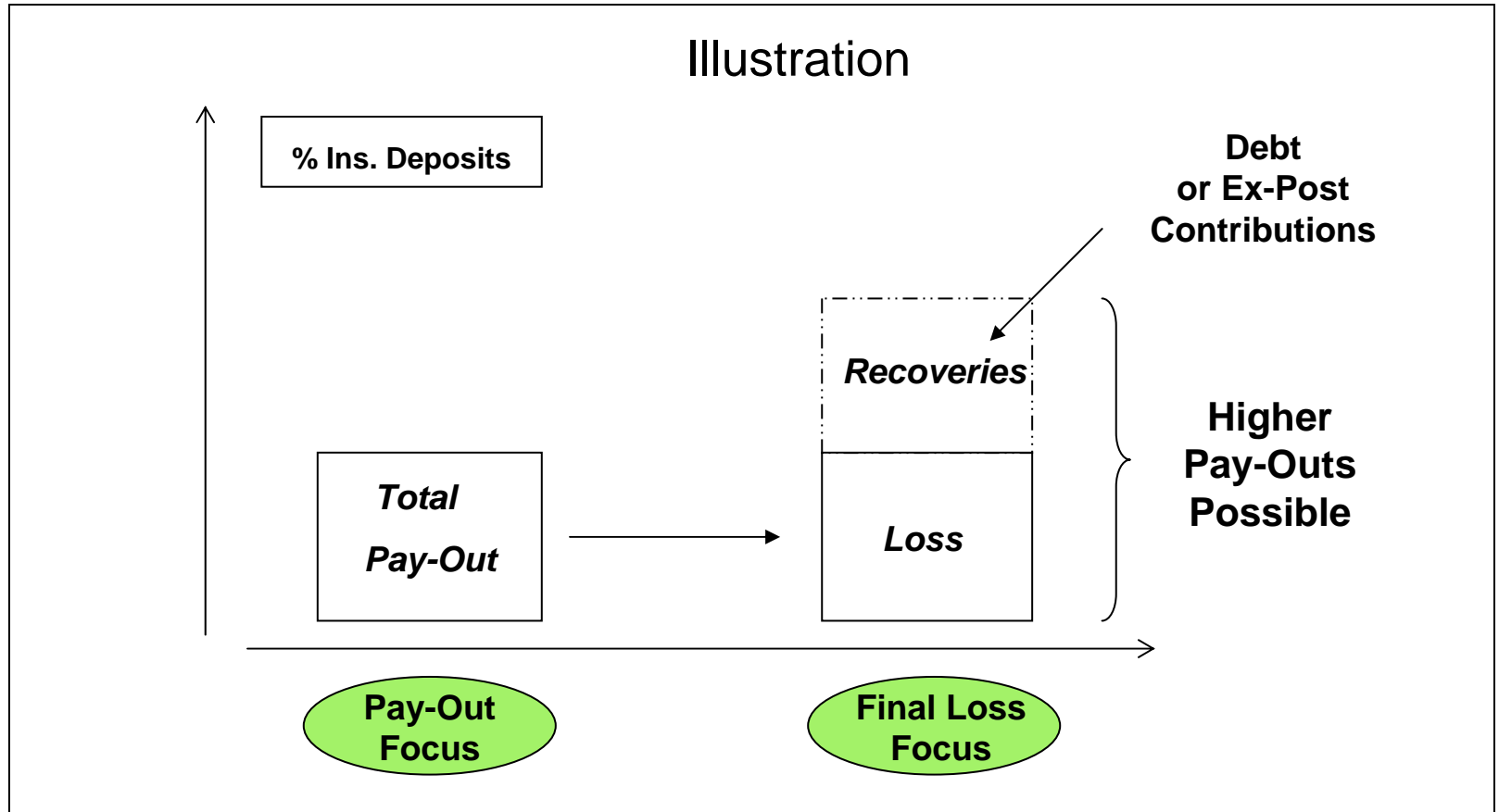
## Nominal Exposure



## Risk Exposure



# Debt Could Further Extend DGF Reach



## Debt Instead of Ex-Post Contributions

# ***Interbank Deposit Protection Fund (FITD)***



## ***Analysis of the Romanian's DIF***

- ***The Risk Assessment Method***
- ***The Optimal Fund Level***
- ***Possible Scenarios***

# *The Risk Assessment Method (RAM)*



The RAM assesses the overall situation of member banks on the basis of 5 financial ratios, regarding three different profiles:

*R1 = Doubtful loans + loss / Total assets*

*R2 = Doubtful loans + loss / Total loans to clients*

**Riskiness**

*C = Synthesis of C1, C2 e C3*

*C1 = Share Capital / Total Assets*

*C2 = Share Capital / Loans*

*C3 = Solvency ratio*

**Capital adequacy**

*P1 = Operating expenses / Total income*

*P2 = Gross Profit / Total income*

**Profitability**

# Thresholds and Coefficients



Three thresholds are set for each indicator, forming four bands in which each bank may be classified. Each band corresponds to a coefficient, as follows:

- **Normality**            **0**
- **Attention**            **1**
- **Warning**            **2**
- **Violation**           **4**

| Ratio   | Class       | Normality                 | Attention                    | Warning                       | Violation                     |
|---|-------------|---------------------------|------------------------------|-------------------------------|-------------------------------|
|   | Coefficient | 0                         | 1                            | 2                             | 4                             |
| <b>R1</b><br><i>Doubtful loans+ Loss / Total Assets</i>         |             | <i>up to 2</i>            | <i>from 2 up to 4</i>        | <i>from 4 up to 6</i>         | <i>over 6</i>                 |
| <b>R2</b><br><i>Doubtful loans+ Loss / Tot loans to clients</i> |             | <i>up to 5</i>            | <i>from 5 up to 10</i>       | <i>from 10 up to 15</i>       | <i>over 15</i>                |
| <b>C</b><br><i>Capital Adequacy</i>                             |             | <i>3 ratios respected</i> | <i>1 ratio not respected</i> | <i>2 ratios not respected</i> | <i>3 ratios not respected</i> |
| <b>P1</b><br><i>Operating expences / Total income</i>           |             | <i>up to 70</i>           | <i>from 70 up to 80</i>      | <i>from 80 up to 90</i>       | <i>over 90</i>                |
| <b>P2</b><br><i>Gross Profit / Total income</i>                 |             | <i>over 10</i>            | <i>from 5 up to 10</i>       | <i>from 0 up to 5</i>         | <i>less than 0</i>            |





# *Riskiness Classes*

The sum of the coefficients gives an

## **Aggregate Indicator (AI)**

Depending on the AI value, banks are assigned to six riskiness classes:

| <i>Class</i> | <i>AI</i> | <i>Macro-Class</i> |
|--------------|-----------|--------------------|
| <i>L1</i>    | 0 - 2     | <i>Low Risk</i>    |
| <i>L2</i>    | 3 - 5     |                    |
| <i>M1</i>    | 6 - 8     | <i>Medium Risk</i> |
| <i>M2</i>    | 9 - 10    |                    |
| <i>H1</i>    | 11 - 12   | <i>High Risk</i>   |
| <i>H2</i>    | oltre 12  |                    |

| <i>Classes</i> |           | <i>2003</i> | <i>2004</i> |
|----------------|-----------|-------------|-------------|
| <b>Low</b>     | <i>L1</i> | 12          | 13          |
|                | <i>L2</i> | 7           | 8           |
| <b>Medium</b>  | <i>M1</i> | 10          | 6           |
|                | <i>M2</i> | 2           | 3           |
| <b>High</b>    | <i>H1</i> | 0           | 2           |
|                | <i>H2</i> | 1           | 0           |

# RAM output



We selected a final set of

**10 high risk banks**

applying the following three criteria:

|               |   |
|---------------|---|
| <i>Bank19</i> | <b>Rated in class<br/>M2, H1 or H2<br/>2003-2004</b>              |
| <i>Bank13</i> |   |
| <i>Bank17</i> |   |
| <i>Bank25</i> |   |
| <i>Bank5</i>  | <b>Highest sum<br/><math>AI_{03} + AI_{04}</math></b>             |
| <i>Bank18</i> |   |
| <i>Bank20</i> |   |
| <i>Bank16</i> | <b>Deteriorating AI<br/><math>AI_{04} - AI_{03} &gt; 4</math></b> |
| <i>Bank31</i> |   |
| <i>Bank30</i> |   |

1. banks rated in one of the three highest classes (M2, H1 and H2) in 2003 and 2004;
2. banks with the highest sum of the AI from 2003-4 ;
3. banks with AI increasing of more than 4 between 2003 and 2004.

# *The Optimal Fund Level (OFL)*



## **Default Probability**

$$PD_i = A_i * 100 / A_{max}$$

## **Optimal Fund Level**

$$OFL = \sum_i (ID_i * PD_i)$$

## **Optimal Coverage Ratio**

$$OCR = [OFL / ID_{tot}] * 100$$

# The OFL and OCR Calculation



| <b>Bank</b>   | <b>Insured Deposits</b> | <b>PD</b>   | <b>ID*PD</b>        |
|---------------|-------------------------|-------------|---------------------|
| <i>Bank19</i> | 14.392,16               | 0,625       | 8.995,10            |
| <i>Bank13</i> | 501.304,23              | 0,500       | 250.652,11          |
| <i>Bank17</i> | 858.596,22              | 0,475       | 407.833,20          |
| <i>Bank25</i> | 82.887,46               | 0,475       | 39.371,54           |
| <i>Bank5</i>  | 8.165.031,73            | 0,350       | 2.857.761,11        |
| <i>Bank18</i> | 177.437,57              | 0,350       | 62.103,15           |
| <i>Bank20</i> | 113.254,71              | 0,350       | 39.639,15           |
| <i>Bank16</i> | 491.742,87              | 0,225       | 110.642,15          |
| <i>Bank31</i> | 3.024,73                | 0,200       | 604,95              |
| <i>Bank30</i> | 242.536,53              | 0,125       | 30.317,07           |
|               |                         |             |                     |
| <b>Total</b>  | <b>10.650.208,21</b>    | <b>0,36</b> | <b>3.807.919,52</b> |

OFL is equal to 3.808 billions ROL while OCR is 1,97% of total ID.

***OCR is equal to 2% of Total Insured Deposits.***

# *Ex-post contribution*



|  |                      |
|--|----------------------|
| <b>Total Guaranteed Deposits 12/2004</b> | <b>313.160.389,9</b> |
| <b>Total Insured Deposits 12/2004</b>    | <b>192.893.909,6</b> |
| <b>OFL 2005</b>                          | <b>3.807.919,5</b>   |
| <b>OCR 2005</b>                          | <b>1,97%</b>         |
| <b>EX-POST</b>                           | <b>4.357.112,2</b>   |
| <b>Percentage</b>                        | <b>1,39%</b>         |

## Ex-post Contribution

the difference between the total insured deposits of bank 5 and the ex-ante OFL is

***1,4% of the Total Guaranteed Deposits***

Summing-up:

## **MIXED CONTRIBUTION SYSTEM**

**Ex-ante** - 2% of Total Insured Deposits

**Ex-post** - 1,4% of Total Guaranteed Deposits

# *Possible Scenarios*



## *Fund's Growth Forecast*

| <b>Year</b> | <b>Contribution</b> |          | <b>Fund</b> | <b>%</b> |
|-------------|---------------------|----------|-------------|----------|
| <i>2004</i> | 0,8                 | 1.325,83 | 3.812,00    | 1,98%    |
| <i>2005</i> | 0,5                 | 1.565,80 | 5.377,80    | 2,14%    |
| <i>2006</i> | 0,4                 | 1.628,43 | 7.006,24    | 2,24%    |
| <i>2007</i> | 0,3                 | 1.526,66 | 8.532,89    | 2,37%    |

The annual decreasing contribution, established by the Romanian authorities up to 2007, respects the OFL and OCR indications



# Possible Scenarios

| Year | Scenarios    |           |              |           |              |           |
|------|--------------|-----------|--------------|-----------|--------------|-----------|
|      | A            |           | B            |           | C            |           |
|      | Contribution | CR Target | Contribution | CR Target | Contribution | CR Target |
| 2006 | 0,40%        | -         | 0,40%        | -         | 0,25%        | 2,04%     |
| 2007 | 0,30%        | -         | 0,30%        | -         | 0,20%        | 2,06%     |
| 2008 | 0,10%        | min 2,75% | MC           | 2,75%     | MC           | 2%        |

*MC = Maintenance Contribution  
(to cover the operating expenses)*

# Additional Convergence Analyses

- How to determine the annual premium policy?
  - To keep equity size adequate
- What is a prudent DGF “equity” size?
  - To absorb “final loss”
- What is a desirable DGF debt-equity ratio?
  - Debt to fund recoverable pay-out
    - Conceptually equivalent to “Ex Post” considerations

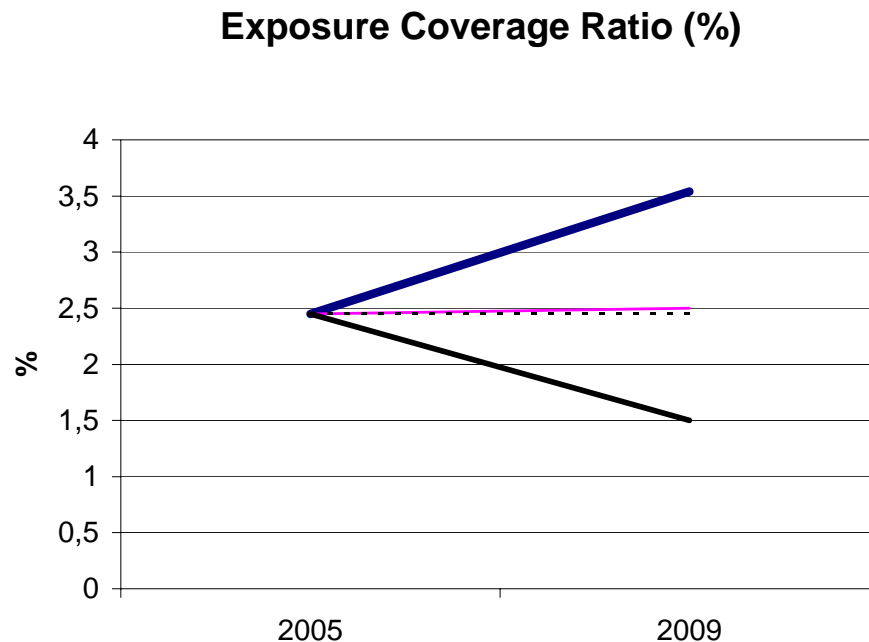


# Annual Premium Policy

- With ECR as **policy target**, the annual premium is the **instrument** to achieve the desired level of ECR
  - Taking into account other variables which influence ECR, such as:
    - Growth of guaranteed deposits
    - Relative growth of insured deposits
    - Investment income
    - Other cash flow components

# A Rigid Premium Policy Can Put ECR Off-Target

Market forces (interest rates, deposit growth etc.) may drive the ratio away from flat line with inflexible premium.  
Figure below shows ECR trend with premium constant at 0.3%



| Scenario input parameters |                |                        |
|---------------------------|----------------|------------------------|
| Guaranteed deposit growth | Rate of return | Insured deposit growth |

|          |            |           |            |
|----------|------------|-----------|------------|
| <b>A</b> | <b>15%</b> | <b>8%</b> | <b>10%</b> |
| <b>B</b> | <b>15%</b> | <b>8%</b> | <b>20%</b> |
| <b>C</b> | <b>20%</b> | <b>6%</b> | <b>20%</b> |
| <b>D</b> | <b>20%</b> | <b>3%</b> | <b>35%</b> |

**PREMIUM IS AN INSTRUMENT, NOT A TARGET OF DEPOSIT INSURANCE POLICY!**

# Market Developments Determine The Annual Premium To Keep ECR Constant To Keep ECR Constant

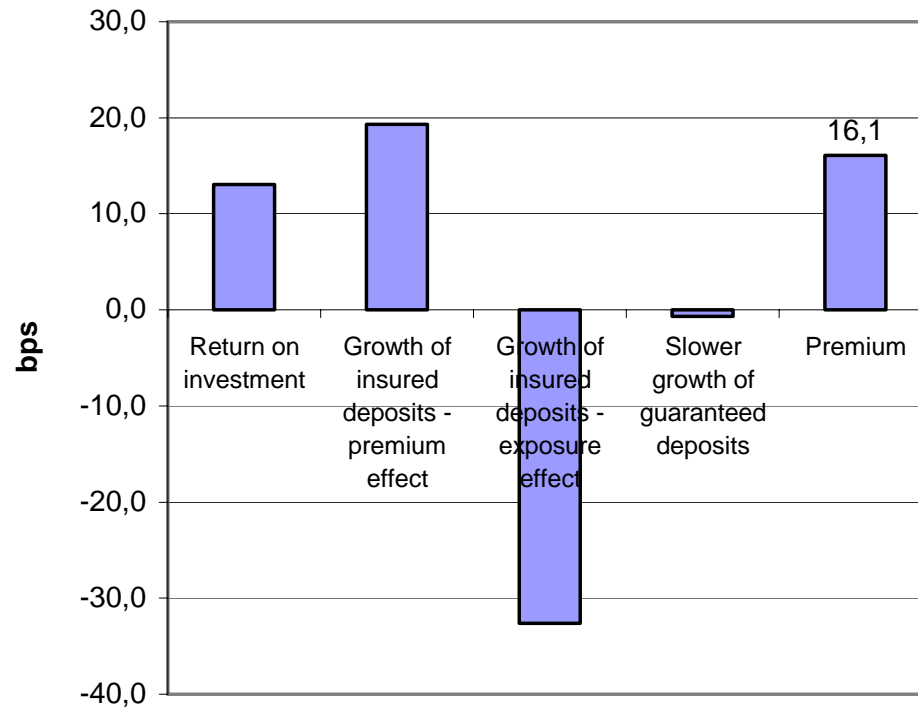
(% of Guaranteed Deposits – Annual Premium equivalent)

**Assumptions  
(scenario B):**

**8%**

**+20%**

**+15%**



**This figure shows impacts of different factors that influence ECR and required premium to keep ECR constant, all variables in proportion to guaranteed deposits**

# Premium Should Be Calculated Annually To Keep ECR On Target

| <u>Factors affecting ECR</u>                                       | <u>ECR Impact</u> |
|--|-------------------|
| End previous year<br>Exposure Coverage Ratio                       | 2.45              |
| Premium 0.4%   | 3.05              |
| Return on<br>investment  | 3.25              |
| Insured deposit<br>growth effect                                   | 2.71              |
| Guaranteed<br>deposit growth<br>difference effect                  | 2.70              |
| Target ECR   | 2.45              |
| Annual premium needed to<br>bring ECR in line with<br>1.80% target | 0.16%             |

Following the same scenario B, this calculation shows contribution of different impact variables to ECR

Model based calculations serve for illustrative purposes only. Calculations that should support decision making should be based on the cash-flow projections.

# Annual Premium to Keep ECR Constant Under Different Market Scenarios

| <b>Guaranteed<br/>Deposit<br/>Growth</b> | <b>Insured<br/>Deposit<br/>Growth</b> | <b>Annual<br/>Premium<br/>(bps)</b> |
|--|---------------------------------------|-------------------------------------|
| <b>10%</b>                               | <b>8%</b>                             | <b>2</b>                            |
| <b>20%</b>                               | <b>16%</b>                            | <b>10</b>                           |
| <b>25%</b>                               | <b>24%</b>                            | <b>17</b>                           |

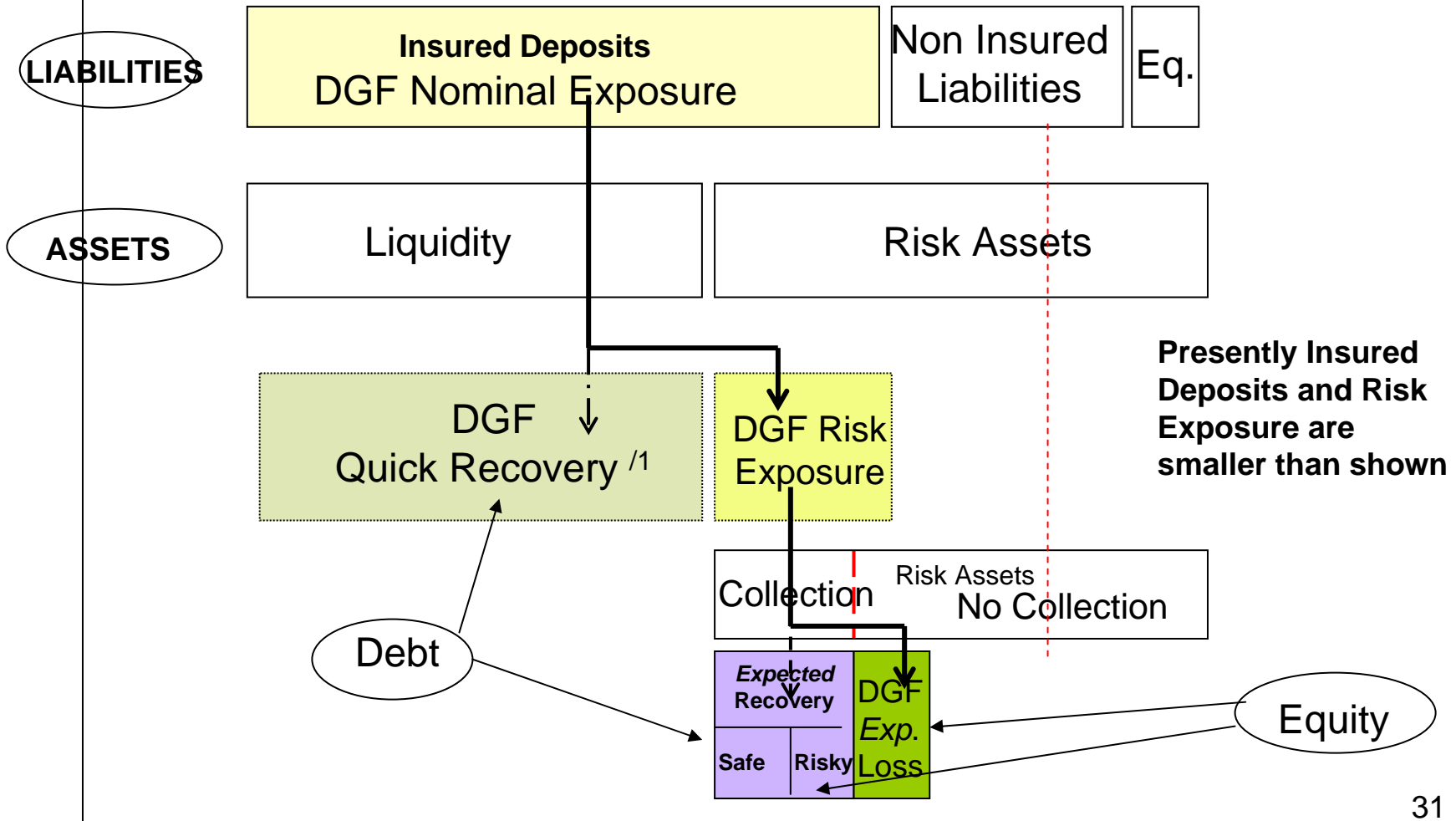
**Assumed Investment Return = 6% p.a.**

# Additional Convergence Analyses

- How to determine the annual premium policy?
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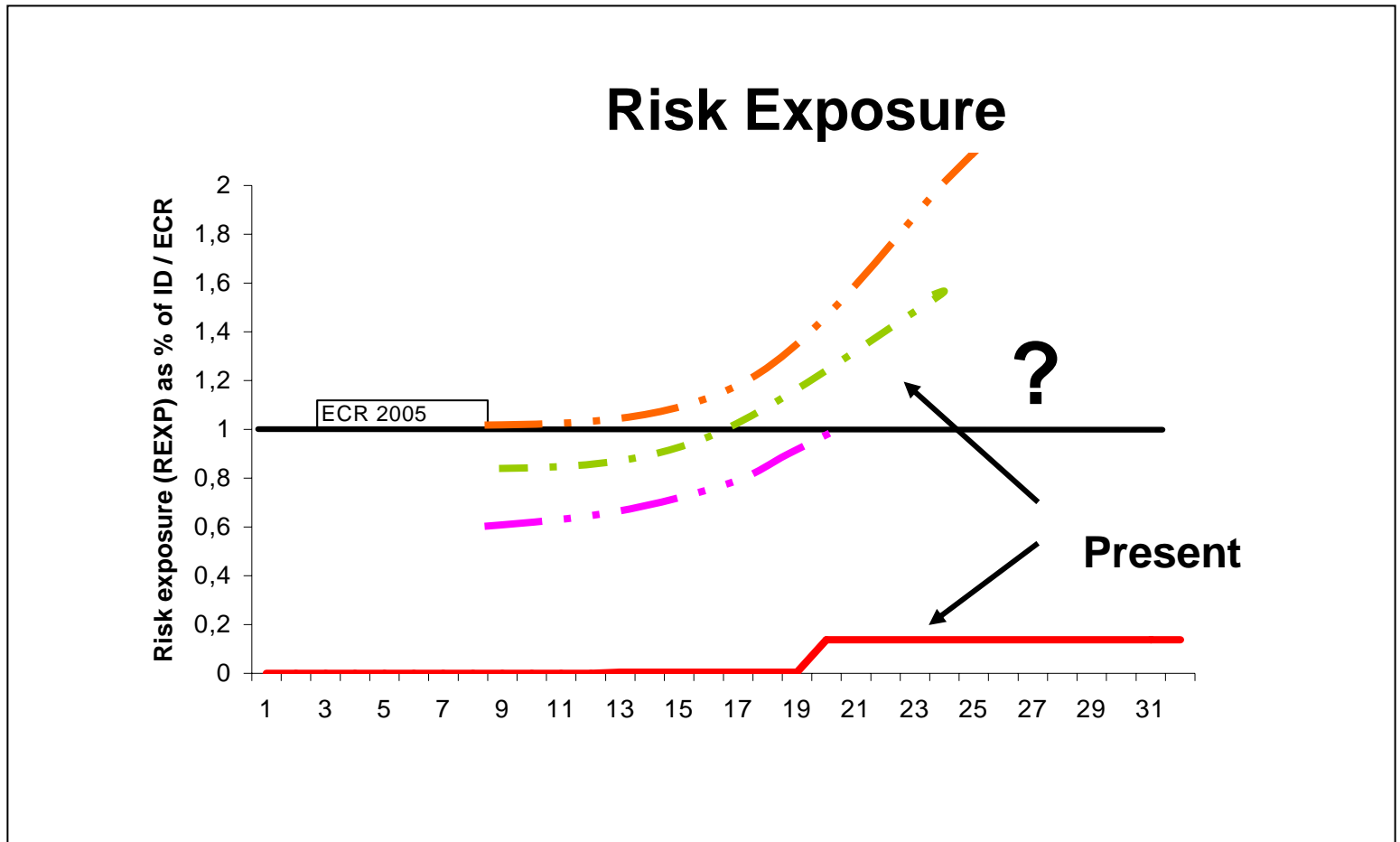
# Equity Should Cover Expected Final Loss and Risk of Collection

## Conceptual Illustration



<sup>/1</sup> See required legal changes at the end of the presentation

# How Does Risk Exposure Change Under Shocks?





# DGF “Equity” Adequacy: Scenario Analysis

**Generate  
credit risk shock  
scenarios**

**Generate liquidity  
erosion scenarios**

**Impacts on DGF Loss**

**occur if**

**bank fails and carries risk  
exposure that is higher than  
recovery,**

**with implications for DGF  
financial instruments and  
policy**

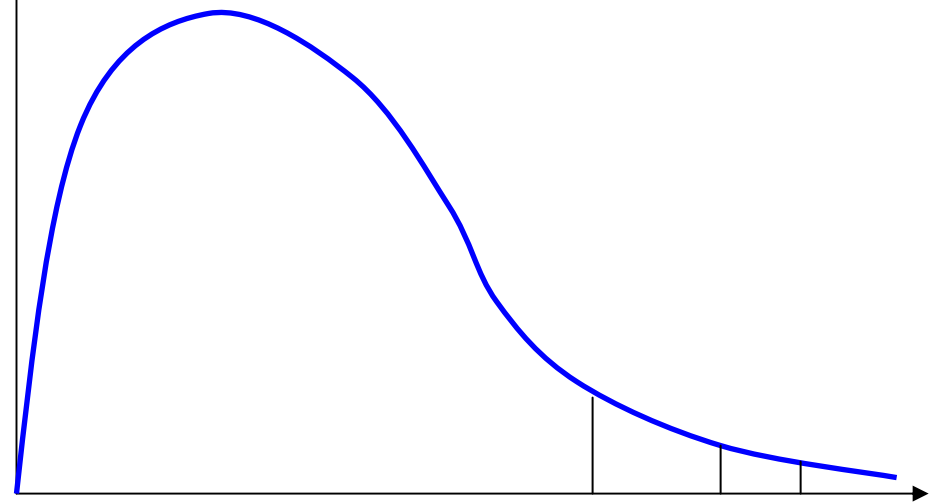
# Our Scenarios

Conceptual illustration of stress testing approaches

Loss frequency.

**ALLBANKS**

| <i>Risk Exposure (%ID)</i> | <b>Liquidity Shock</b> |      |      |
|----------------------------|------------------------|------|------|
| <b>Credit Shock</b>        | Nbre                   | -20% | -50% |
| Nbre                       | 0,25                   | ?    | ?    |
| IMFFSSA                    | ?                      | ?    | ?    |
| Convergence Base           | ?                      | ?    | ?    |
| Convergence Severe         | ?                      | ?    | ?    |



Scenario Details In Appendix

- IMF's credit risk scenario
- Convergence Base risk scenario (2x IMF credit risk)
- Convergence Severe risk scenario (fast growing banks accumulate bigger losses)

Size of loss

# Risk Exposure Is Mostly Liquidity Driven

## SOLVENT BANKS

| <i>Risk Exposure (%ID)</i> |  | Liquidity Shock |      |       |
|----------------------------|--|-----------------|------|-------|
| Credit Shock               |  | None            | -20% | -50%  |
| None                       |  | 0,25            | 0,68 | 19,7  |
| IMF FSSA                   |  | 0,25            | 0,68 | 19,7  |
| Convergence Base           |  | 0,25            | 0,44 | 18,98 |

Liquidity shocks have stronger impact on generating risk exposure than credit risk shocks.

## INSOLVENT BANKS

| <i>Risk Exposure (%ID)</i> |  | Liquidity Shock |      |      |
|----------------------------|--|-----------------|------|------|
| Credit Shock               |  | None            | -20% | -50% |
| None                       |  | 0               | 0    | 0    |
| IMF FSSA                   |  | 0               | 0    | 0    |
| Convergence Base           |  | 0               | 0,24 | 0,72 |



## INSOLVENT BANKS

| <i>Final Loss (%ID)</i> |  | Liquidity Shock |      |      |
|-------------------------|--|-----------------|------|------|
| Credit Shock            |  | None            | -20% | -50% |
| None                    |  | 0               | 0    | 0    |
| IMF FSSA                |  | 0               | 0    | 0    |
| Convergence Base        |  | 0               | 0    | 0.44 |

# DGF Reach Greatly Enhanced With Risk Exposure Focus

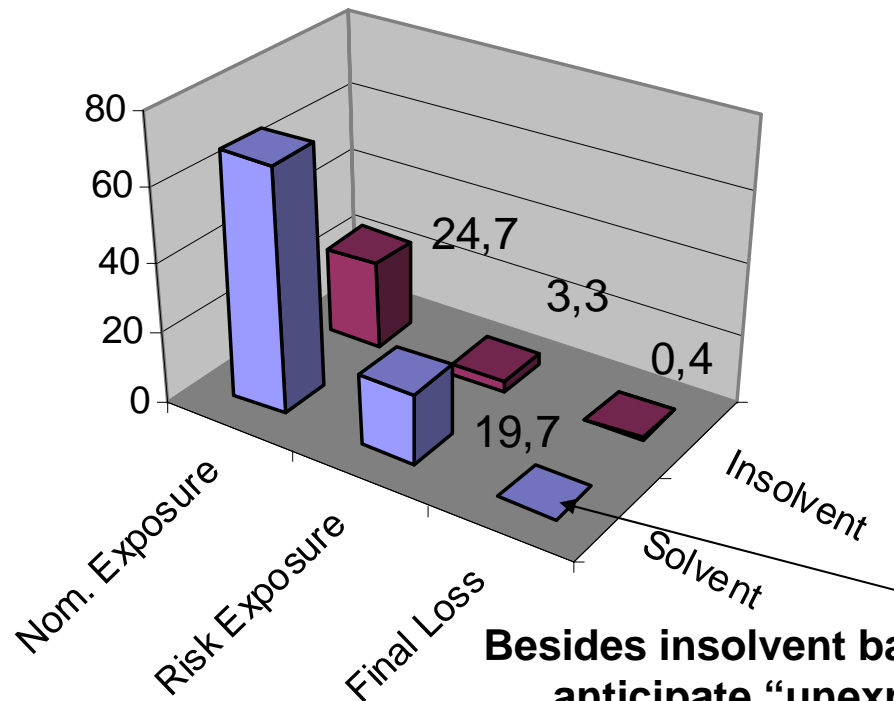
## DGF ADEQUACY CALCULATION

| <b>Individual Bank Failure</b><br>ECR=1.8%; Convergence Base -20% | Nominal Exposure | Risk Exposure |
|---|------------------|---------------|
| Largest Bank Covered  | 8                | 1             |
| Cum. Deposit Share Segment  | 13.3%            | 100%          |
| # of Banks Not Covered  | 7                | 0             |
| Cum. Deposit Share Segment  | 86.7%            | 0             |

| <b>Joint Bank Failure</b>  | Nominal Exposure | Risk Exposure<br>ECR=1.8%; Convergence Base <29% |
|----------------------------|------------------|--|
| # Of Banks Covered         | 13               | 33   |
| Cum. Deposit Share Segment | 1.7%             | 100%   |
| # of Banks Not Covered     | 20               | 0  |
| Cum. Deposit Share Segment | 98.3%            | 0%   |

# What About “Unexpected” Losses?

## Impact of Most Severe Scenario on Solvent Banks



**Besides insolvent banks, we should also anticipate “unexpected” insolvencies among expected solvent banks. We want to estimate their associated Risk Exposure and Final Loss <sup>1/</sup>.**

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# DGF “Equity” Seems Adequate

2005 Exposure  
Coverage Ratio

**1.8%**

UNEXPECTED DGF  
FINAL LOSSES (0.4%)

+ 0.4%

“EXPECTED” DGF  
FINAL LOSSES (0.4%)

+0.4%

**1.0%**

MINIMUM DGF  
(EQUITY) SIZE

**Models have their limits! Reserve for errors and omissions!**

**Use a quantitative method (e.g. stress testing) to assess risks (final losses)**

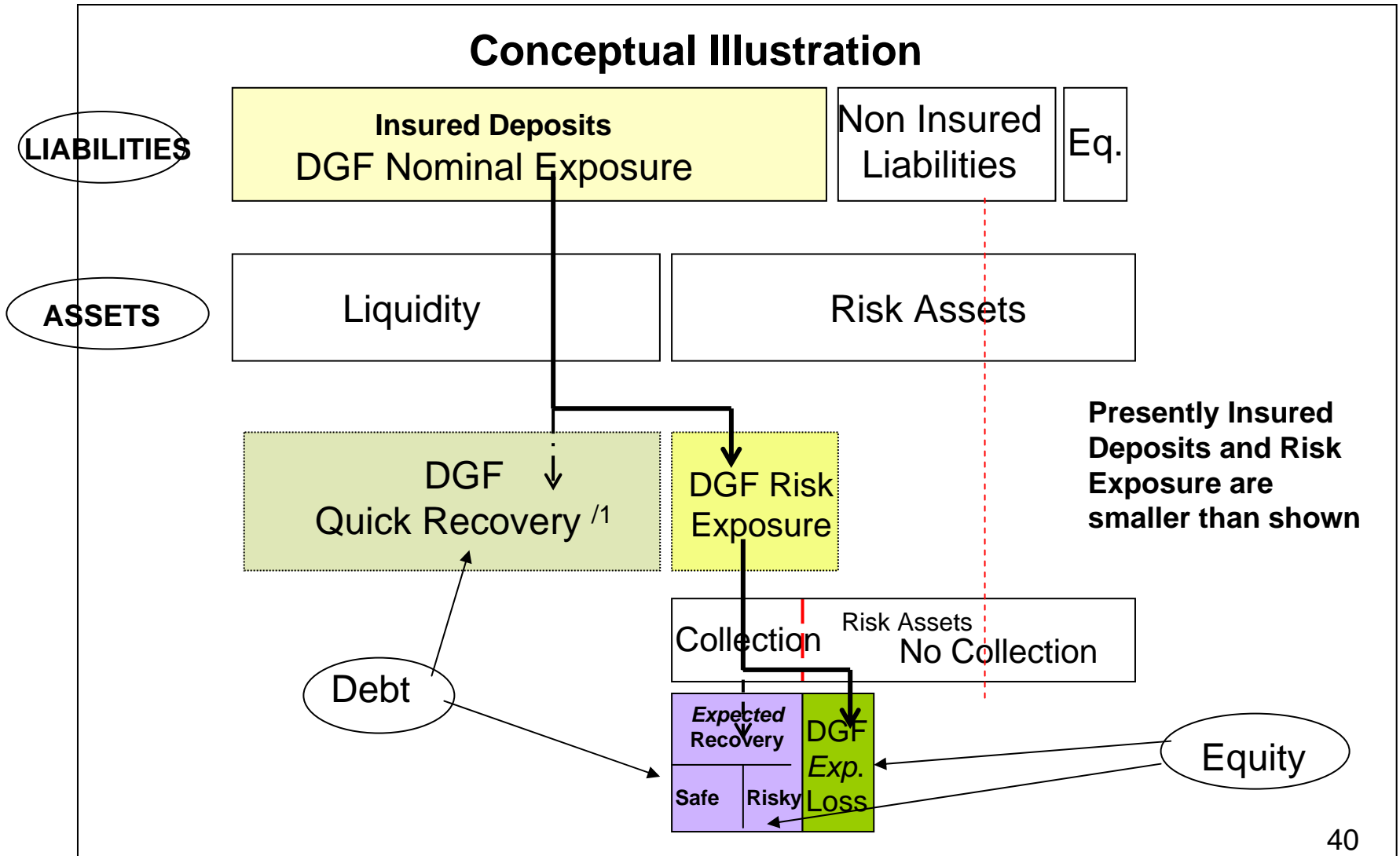
**EU standard: minimum 1% in order to be moderately capitalized. Minimum size should be kept around 0.7 - 1%. This part also covers collection risk.**

# Additional Convergence Analyses

- How to determine the annual premium policy?
  - To keep equity size adequate
- What is a prudent DGF “equity” size?
  - To absorb “final loss”
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  - Debt to fund recoverable pay-out
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# Debt = Safe Collections

## Conceptual Illustration



<sup>/1</sup> See required legal changes at the end of the presentation



# Debt-Equity Calculation

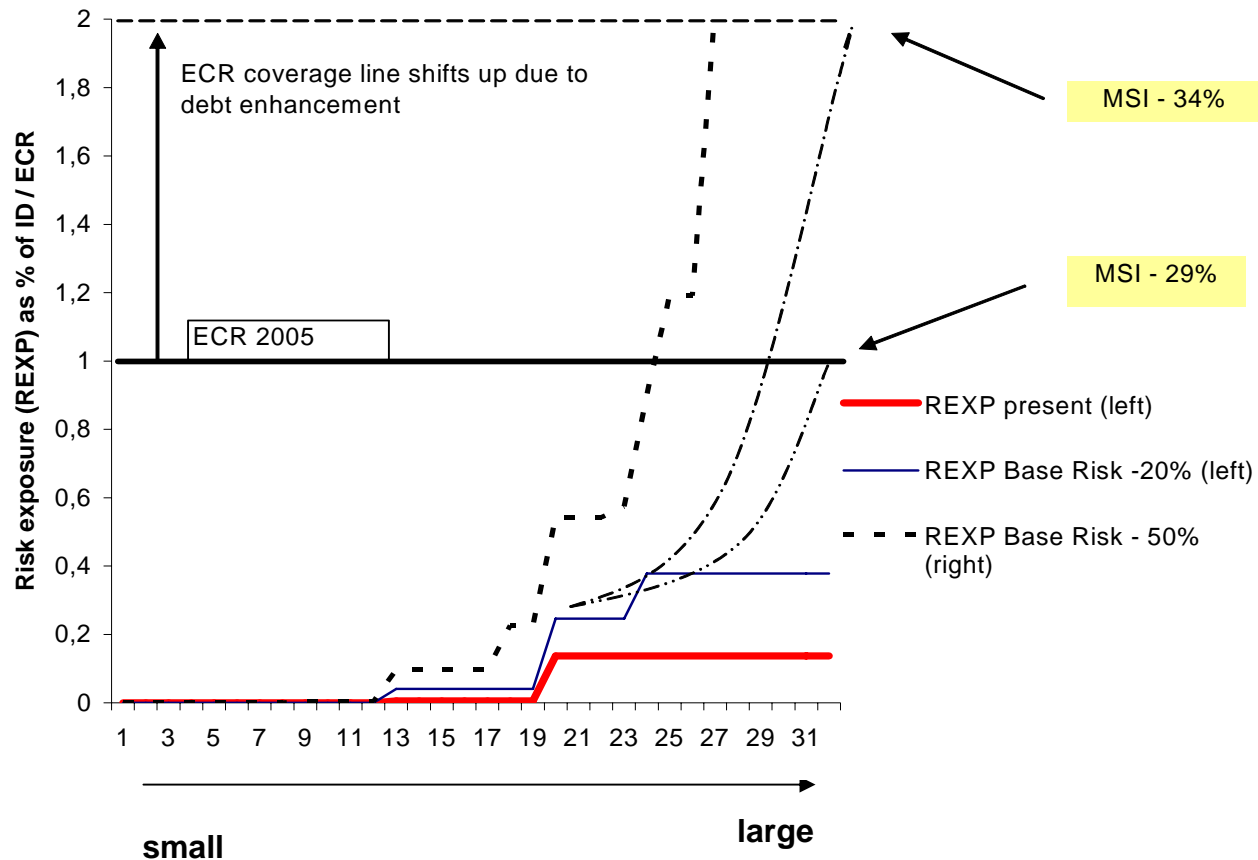
| In % of ID |                                     |      |
|------------|-------------------------------------|------|
| 3.7%       | Estimated Pay Out*                  |      |
| -0.8%      | DGF "Final" Loss (equity-funded)    | 2    |
| =2.9%      | Expected Recoveries                 | Debt |
| 1.9-2.2%   | Debt-Funded Exp. Recoveries **      |      |
| (0.7-1.0%) | (Equity-Funded Expected Recoveries) |      |

|          |                   |        |
|----------|-------------------|--------|
| 1.5-1.8% | DGF Equity        |        |
| +0.4%    | Unexpected Losses | 1      |
| +0.4%    | Expected Losses   | Equity |
| 0.7-1.0% | Minimum DGF size  |        |

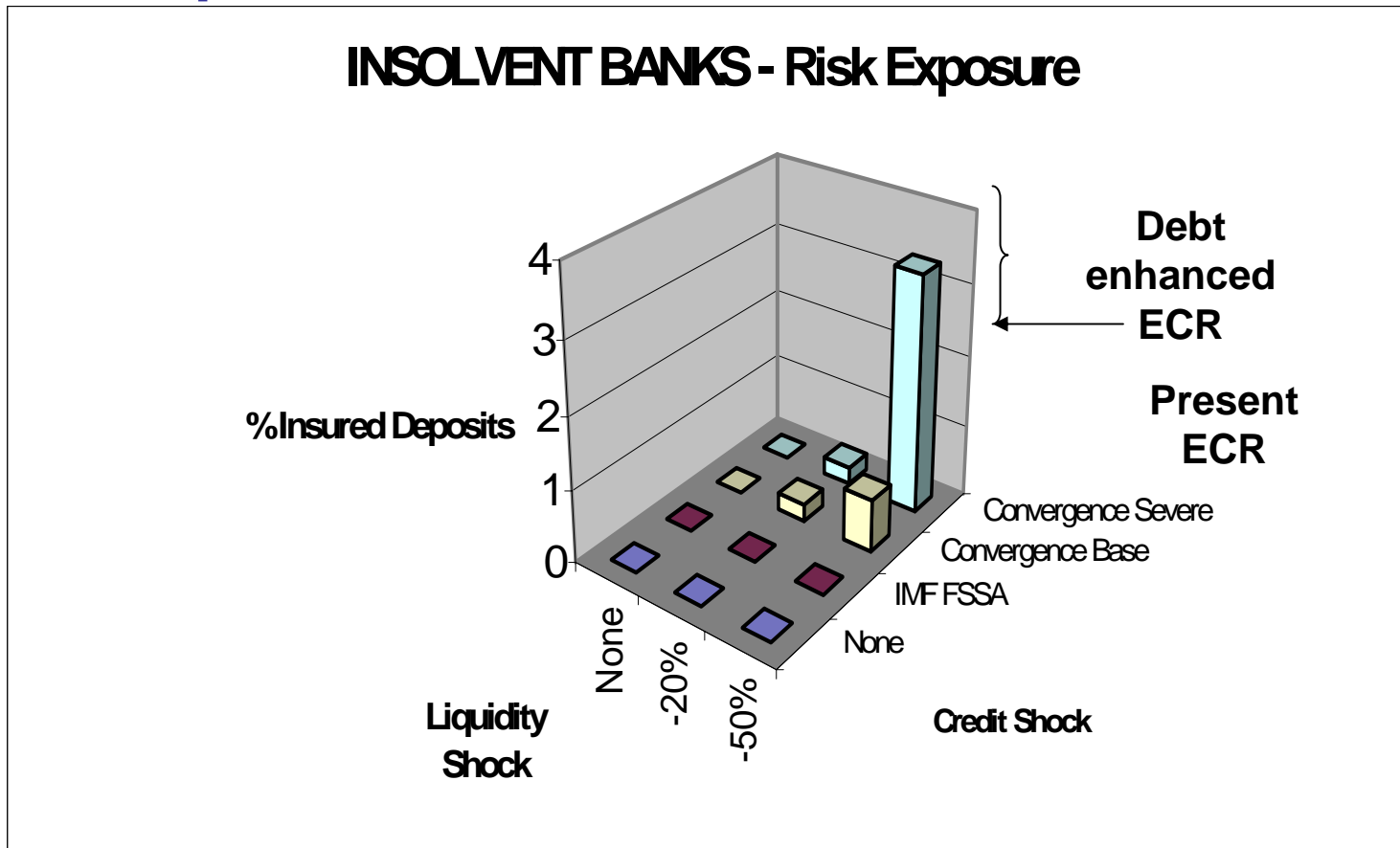
\* 110% of risk exposure in insolvent banks in severe scenario with 50% withdrawal

\*\* (66-76% of expected recoveries 2.9%); remainder (0.7-1.0) funded out of unallocated equity

# A Debt-Enhanced DGF Keeps Full Risk Exposure Cover Up To -34% Shock

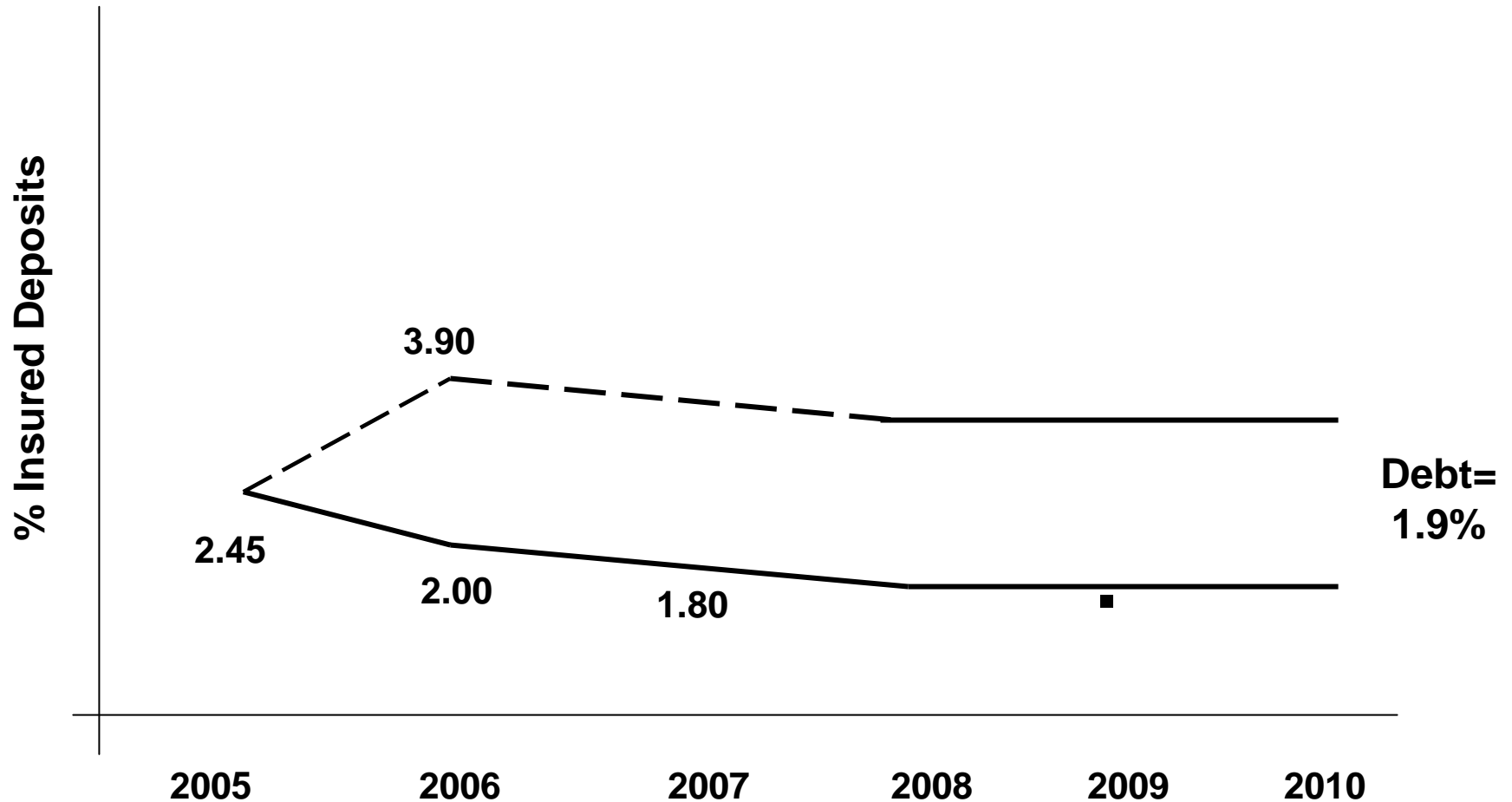


# Even Under Most Severe Scenario<sup>1/</sup>, A Debt-Enhanced DGF Covers Risk Exposure Of Insolvent Banks



<sup>1/</sup> Convergence "Severe" Scenario Minus 50% Liquidity Shock

# A Possible DGF Size Trajectory?



# Technical Seminar Conclusions

- Exposure Coverage Ratio (ECR) is relevant DGF policy indicator – not annual premium
- Presently, ECR is “Medium Strength”, according to EU guidelines
- If debt-enhanced, ECR would enable DGF to withstand multiple IMF credit shock scenario
  - Involving a quarter of banking market (nom. exposure)
- ECR equity portion may be “right-sized”
  - Annual premium may be lowered under favourable market developments
- Need for flexible annual premium setting policy
  - “Premium instrument, not a target”

# Policy Decisions For Future Consideration

- NBR to set indicative long-term ECR target
  - $>2\% + X$
- NBR to endorse DGF stand-by borrowing strategy
  - Indicative leverage ratio
    - $0.75X-1.25X?$
- DGF to negotiate annual stand-by line of credit
- DGF to calculate annual premium to keep ECR level on target ( $\pm 10\text{bp}$ )
  - Given attained debt capacity
    - DGF Law to set maximum “reference” premium level
      - With sufficient room for NBR and DGF administration

# APPENDIX

# Methodological Notes



# Data Description

- 32 out of 39 banks are included in the analysis (data on CEC bank and foreign branches were missing). We assume that inclusion of missing banks cannot radically alter conclusions.
- Risk exposure is assumed to be equal to loans, which introduces a high degree of approximation and a need to interpret results with caution.
- We certainly recommend repeating the whole analytical exercise within NBR with much more detailed data before making the final decision.

# Our Assessment Depends on Following Assumptions

1. No major reversal in banks' financial condition can happen due to: (a) under-reporting of bad assets, (b) improper collateral valuation (that may have led to under-provisioning).
2. No major sudden reversal in banks' financial condition can happen due to: (a) failure in owners' scrutiny and/or (b) any other major failure in banks' corporate governance, beyond those that were captured in our shock scenarios.
3. Non-insured claims on banks, particularly international and shareholders' lending to banks, have contractual terms that cannot be radically altered under distress.
4. As credit continues to grow, banks' risk management and in particular credit screening abilities remain within recent historical performance
5. Banks are resilient to any macroeconomic shock related to high growth of domestic demand and associated widening of current account deficit.

# Sources of ECR Measurement Problems

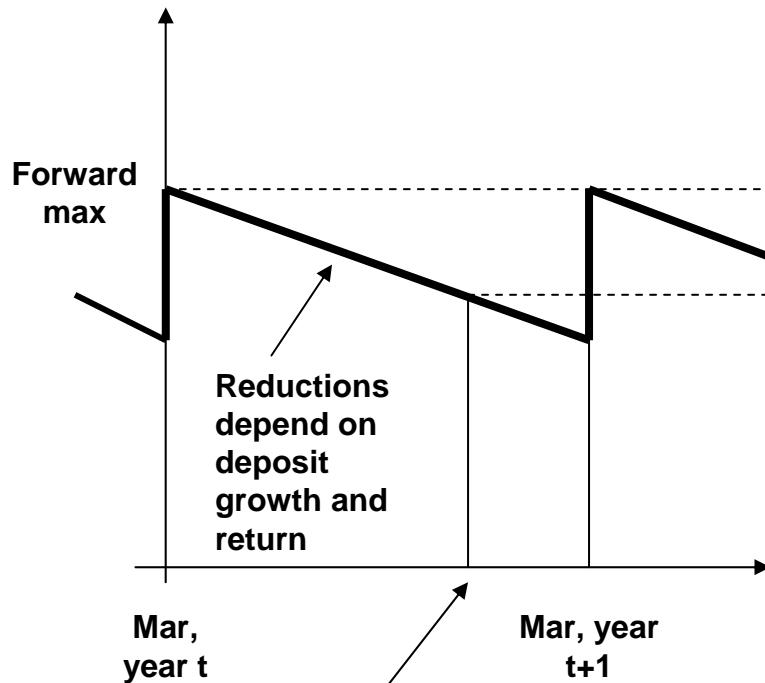
**Backward vs. forward looking measurement**

**Premium paid only once a year (March)**

- **Should March premium be added to the last 31st of Dec DGF assets data and compared to insured deposits on that date (backward looking)?**
- **Should end year assets be compared to insured deposits by that date (forward looking)?**

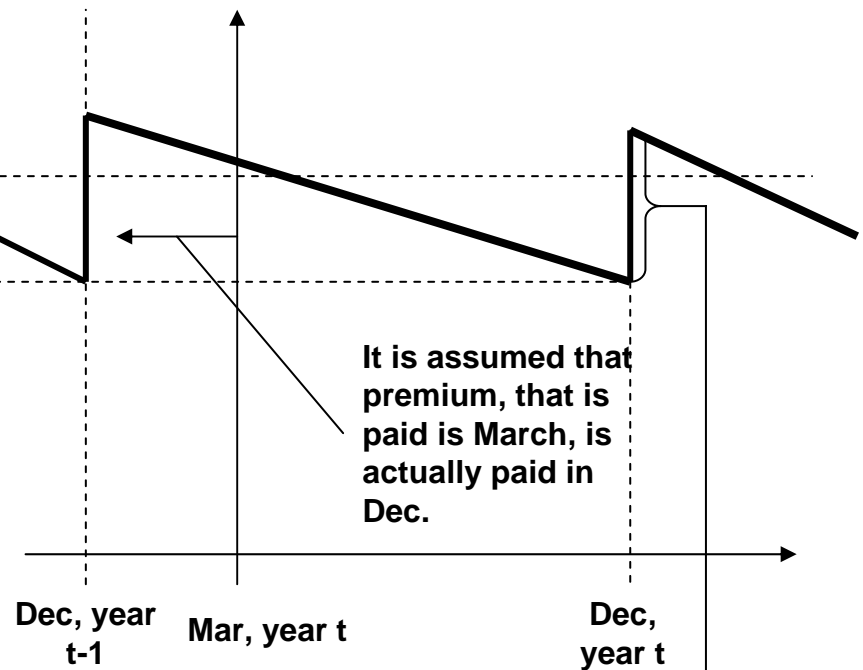
# Graphical Representation of the Measurement Problem

## Forward looking (Conservative Measurement)



Measurement at this point in December is close to minimum within the forward looking framework

## Backward looking (Optimistic measurement)



This fraction represents a (static) difference between two methods at December level.

# Desired Premium Calculation

**Assumption: premium grows in parallel to nominal exposure, as if it is paid in the moment of measurement of ECR within the forward looking way of measurement. Possibility of multiple intrayear payments is allowed. This is the method “between” pure forward and pure backward looking method.**

$$F_{t-1}^{BW} = F_{t-1}^{FW} + \rho GD_{t-1}$$

$$ECR_{t-1} = \frac{F_{t-1}^{FW}}{ID_{t-1}}; ECR_t = \frac{F_{t-1}^{FW} (1+i)^{\frac{n}{N}} + \sum_{n=1}^N \left( \frac{\rho}{N} \right) GD_{t-1} (1+i)^{1-\frac{n}{N}} (1+k)^{\frac{n}{N}}}{ID_{t-1} \left[ \prod_{n=1}^N (1+g)^{\frac{n}{N}} \right]}$$

$$n = N \Rightarrow ECR_t = \frac{F_{t-1}^{FW} (1+i) + \rho GD_{t-1} (1+k)}{ID_{t-1} (1+g)}$$

$$ECR_n = ECR_{t-1} \Rightarrow \rho^* = \frac{F_{t-1}^{FW} [(1+g) - (1+i)]}{GD_{t-1} (1+k)}$$

*BW* - backward looking

*FW* - forward looking

*ID* - insured deposits

*GD* - guaranteed deposits

*F* - fund' s assets

*N* - number of intra - year periods

*n* - intra - year period when premium is paid

*i* - investment return

*g* - growth rate of insured deposits

*k* - growth rate of guaranteed deposits

*ρ* - rate of premium

**Zero premium condition:**

$$(1+g) = (1+i)$$

**Formulas to the left can be easily adjusted to include outflows components such as operational costs or payments of insured deposits.**

# Assessment of the Soundness of the Banking System

# Comparison to IMF's FSSA 2003

|   | Total FSSA<br>March 2003 | Total<br>Convergence<br>March 2005 |
|---|--------------------------|------------------------------------|
| Number of banks   | 39                       | 39                                 |
| Share of assets in %                                      | 100,0                    | 100,0                              |
| Share of deposits in %                                    | 100,0                    | 100,0                              |
| Share of loans in %                                       | 100,0                    | 100,0                              |
| <b>Capital adequacy</b>                                   |                          |                                    |
| CAR (%)   | 25,0                     | 19,1                               |
| Tier 1 / RWA in %   | 22,9                     |                                    |
| Capital / Total Assets in %                               | 11,3                     | 12,4                               |
| <b>Asset quality</b>                                      |                          |                                    |
| NPLs/Loans in %   | 11,8                     | 8,3                                |
| NPLs/Capital in %   | 42,0                     | 29,5                               |
| Loan provisions and loan risk<br>reserve / NPLs in %      | 29,6                     | 15,0                               |
| Loan provisions and loan risk<br>reserve / Capital in %   | 12,5                     | 4,4                                |
| <b>Earnings and Profitability*</b>                        |                          |                                    |
| ROAA (%)  | 2,4                      | 2,4                                |
| ROAE (%)  | 16,9                     | 18,8                               |
| Net interest income less provisions<br>/assets (%)        | 0,9                      | 3,7                                |
| Net interest income less provisions<br>/ gross income (%) | 7,2                      | 13,9                               |
| Non interest expenses / gross<br>income (%)               | 76,6                     | 76,3                               |
| <b>Liquidity</b>  |                          |                                    |
| Liquid Assets/Total Assets**                              | 43,6                     | 50,9                               |

**“... the banking system currently appears well capitalized, liquid and generally well supervised. However, 40% average credit growth in real terms ... raises concerns. To avoid potentially higher NPLs from their current level of 12% of loans (March 2003), NPLs should be managed and monitored carefully. Currently, high liquidity mitigates immediate banking risks.”**

**IMF (2003): “Romania: FSSA”**

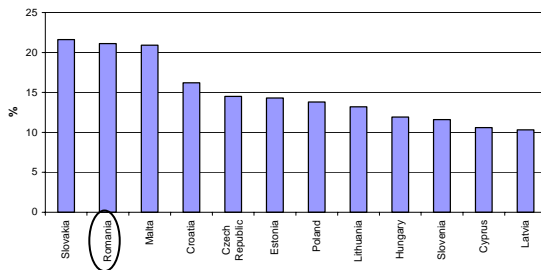
**Convergence analysis did not uncover any new facts that would point to substantially different conclusions from those presented by the IMF two years ago.**

**Convergence (2005)**

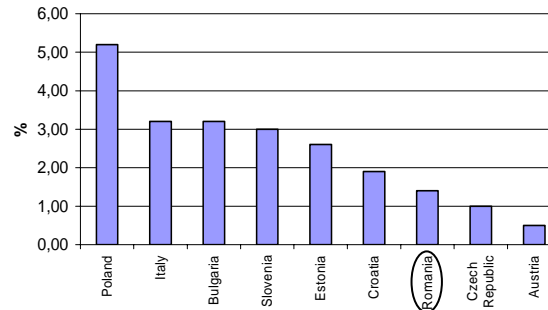
**\* 2004 data; \*\* Total assets minus fixed assets and loans to customers. March 2003 data are not IMF's data, but our proxy at the basis of end 2003.**

# Sound Banking Indicators

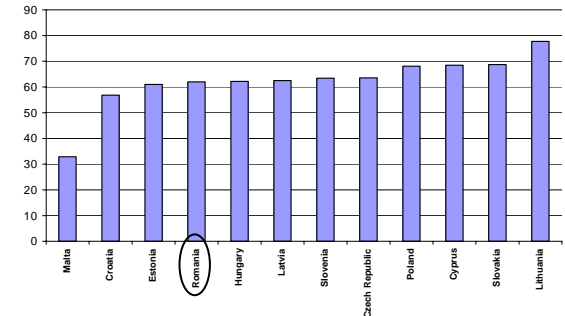
## Capital Adequacy 2003



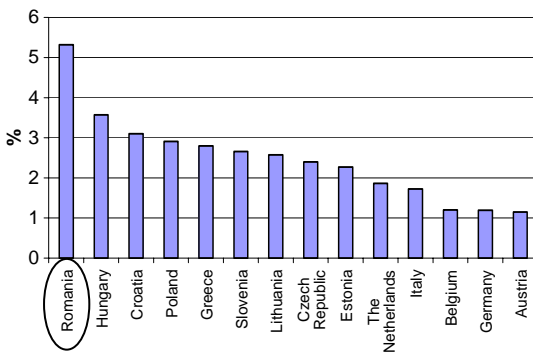
## Bad (D&E) loans to total assets 2003



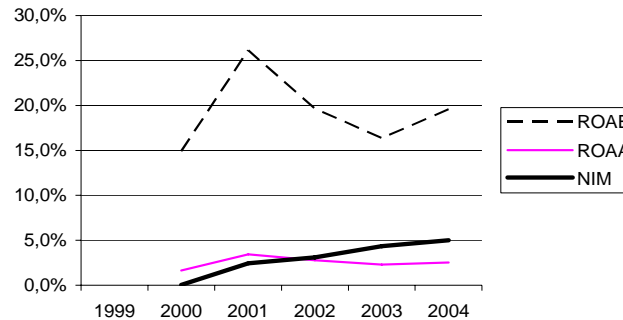
## Cost/income ratio 2003



## Net interest margin: comparison 2004



## Returns and net interest margin 2000 - 2004



**Banking system appears sound, with a good perspective to continue to attract capital and generate sufficient profits**



# Risk Analysis

# “DGF specific” Stress testing in Relation to IMF Stress Testing

- First stress-testing: IMF FSSA 2003
- NBR starts to perform stress-testing within its Financial Stability Department
- IMF’s scenarios:
  - Market risk 1 (crisis): 20% exchange rate depreciation + 1000bps interest rate increase
  - Credit risk: 10% of loans becoming NPLs with 50% required provisioning (equal to 5% of loan portfolio loss effect)
  - Market risk 2: 2.5% - 5% narrowing of net interest margins
- IMF’s 2003 results: *“Overall, the stress tests indicate that the banking system is resilient to a range of market and credit risk shocks, reflecting in part its relatively small – although rapidly growing – credit portfolio”*
- Note that IMF did not generate MSI erosion (confidence/liquidity) shocks
- DGF specific stress testing has to complement standard stress testing by introducing combinations of credit risk scenarios with confidence / liquidity shock scenarios that reflect erosion of market self-insurance and lead to increase of DGF’s risk exposure.

# Scenario I: Credit Shock without Liquidity Withdrawal

|  | IMF FSSA<br>Scenario | Convergence<br>Base Scenario | Convergence<br>Severe Scenario         |
|--|----------------------|------------------------------|--|
| <b>Size of shock (loss)<br/>as % of loan portfolio</b> | <b>5 (all banks)</b> | <b>10 (all banks)</b>        | <b>12.7 (average<br/>across banks)</b> |
| <b>All banks with risk exposure</b>                    |                      |                              |  |
| Number   | 2                    | 2                            | 2                                      |
| DGF nominal exposure as % of ID                        | 1.23                 | 1.23                         | 1.23                                   |
| DGF risk exposure as % of ID                           | 0.25                 | 0.25                         | 0.25                                   |
| <b>Insolvent banks</b>                                 |                      |                              |  |
| Number   | 1                    | 6                            | 11                                     |
| DGF nominal exposure as % of ID                        | 0.27                 | 8.5                          | 24.7                                   |
| DGF risk exposure as % of ID                           | 0                    | 0                            | 0                                      |
| DGF final loss as % of ID                              | 0                    | 0                            | 0                                      |

➤ **Despite large number of bank insolvencies in the two Convergence credit shock scenarios, DGF has no risk exposure and no loss because Market Self-Insurance (e.g. interbank loans and deposits, other non-insured deposits etc.) absorbs excess of losses over equity. DGF needs liquidity, but has no losses. This result should be interpreted with caution because increase in credit risk is usually accompanied by liquidity withdrawal which has not been taken into account in this scenario.**

# Scenario II: Credit Shock with 20% Liquidity Withdrawal

|  | IMF FSSA<br>Scenario | Convergence<br>Base Scenario | Convergence<br>Severe Scenario         |
|--|----------------------|------------------------------|--|
| <b>Size of shock (loss)<br/>as % of loan portfolio</b> | <b>5 (all banks)</b> | <b>10 (all banks)</b>        | <b>12.7 (average<br/>across banks)</b> |
| <b>All banks with risk exposure</b>                    |                      |                              |  |
| Number   | 3                    | 3                            | 3                                      |
| DGF nominal exposure as % of ID                        | 2.51                 | 2.51                         | 2.51                                   |
| DGF risk exposure as % of ID                           | 0.68                 | 0.68                         | 0.68                                   |
| <b>Insolvent banks</b>                                 |                      |                              |  |
| Number   | 1                    | 6                            | 11                                     |
| DGF nominal exposure as % of ID                        | 0.27                 | 8.5                          | 24.7                                   |
| DGF risk exposure as % of ID                           | 0                    | 0.24                         | 0.24                                   |
| DGF final loss as % of ID                              | 0                    | 0                            | 0                                      |

➤ **Partial liquidity withdrawal in failed banks creates a limited DGF risk exposure. But there is no DGF loss because risk exposure is offset by performing loans that are collected in the bankruptcy process. Results should be interpreted with caution, because size of liquidity withdrawal is mild.**

# Scenario III: Credit Shock with 50% Liquidity Withdrawal

|  | IMF FSSA<br>Scenario | Convergence<br>Base Scenario | Convergence<br>Severe Scenario         |
|--|----------------------|------------------------------|--|
| <b>Size of shock (loss)<br/>as % of loan portfolio</b> | <b>5 (all banks)</b> | <b>10 (all banks)</b>        | <b>12.7 (average<br/>across banks)</b> |
| <b>All banks with risk exposure</b>                    |                      |                              |  |
| Number   | 13                   | 13                           | 13                                     |
| DGF nominal exposure as % of ID                        | 68.8                 | 68.8                         | 68.8                                   |
| DGF risk exposure as % of ID                           | 19.7                 | 19.7                         | 19.7                                   |
| <b>Insolvent banks</b>                                 |                      |                              |  |
| Number   | 1                    | 6                            | 11                                     |
| DGF nominal exposure as % of ID                        | 0.27                 | 8.5                          | 24.7                                   |
| DGF risk exposure as % of ID                           | 0                    | 0.72                         | 3.32                                   |
| DGF final loss as % of ID                              | 0                    | 0.44                         | 0.44                                   |

➤ Deeper liquidity erosion increases DGF risk exposure 12X. In turn this leads to a DGF loss equal to 0.44% of insured deposits (1/4 of present Exposure Coverage Ratio).

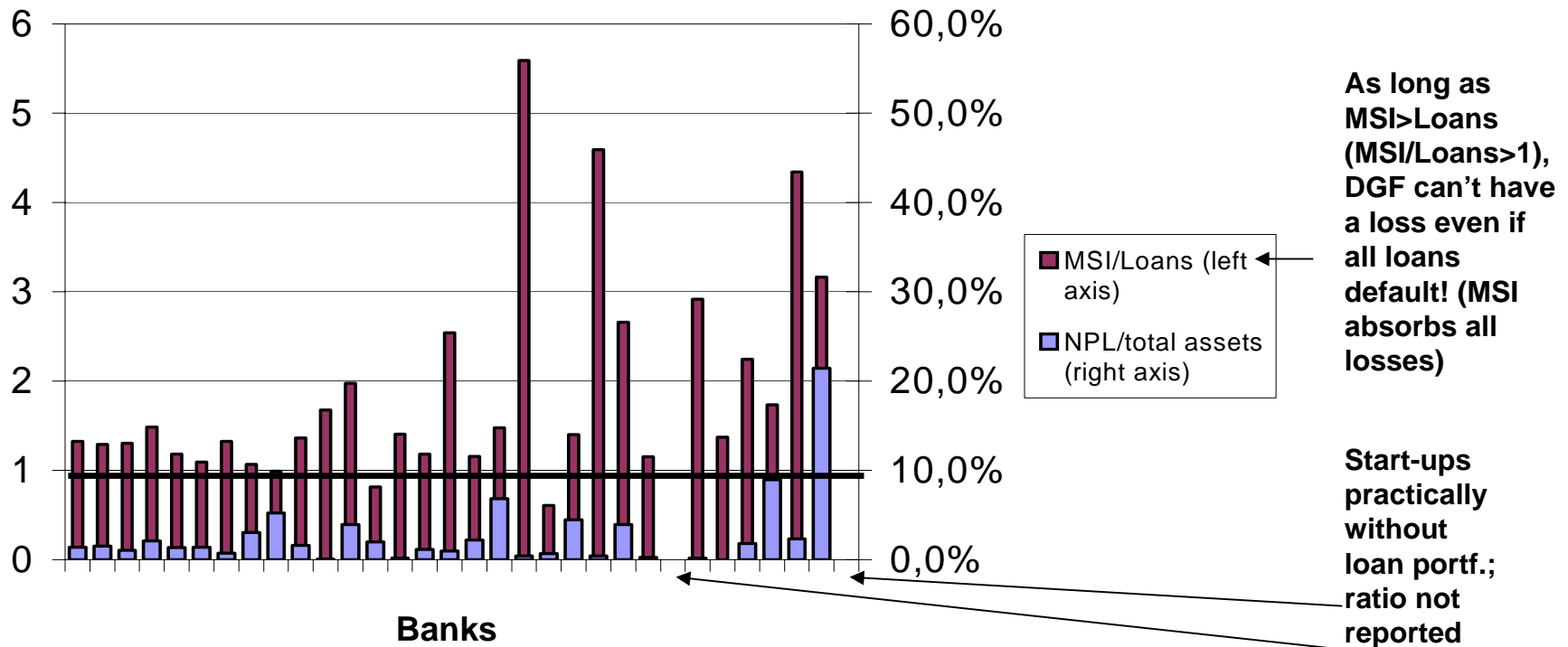
# Assessing Balance Sheet Structures of Individual Banks

and their impacts on DGF risk  
exposure and loss

# Most Banks Seem Fairly Robust: Static Assessment

## Non-Insured Liabilities (Market Self-Insurance) Greater Than Loan Portfolios in Most Banks

Banks are sorted according to size, from large banks (left) to small banks (right)



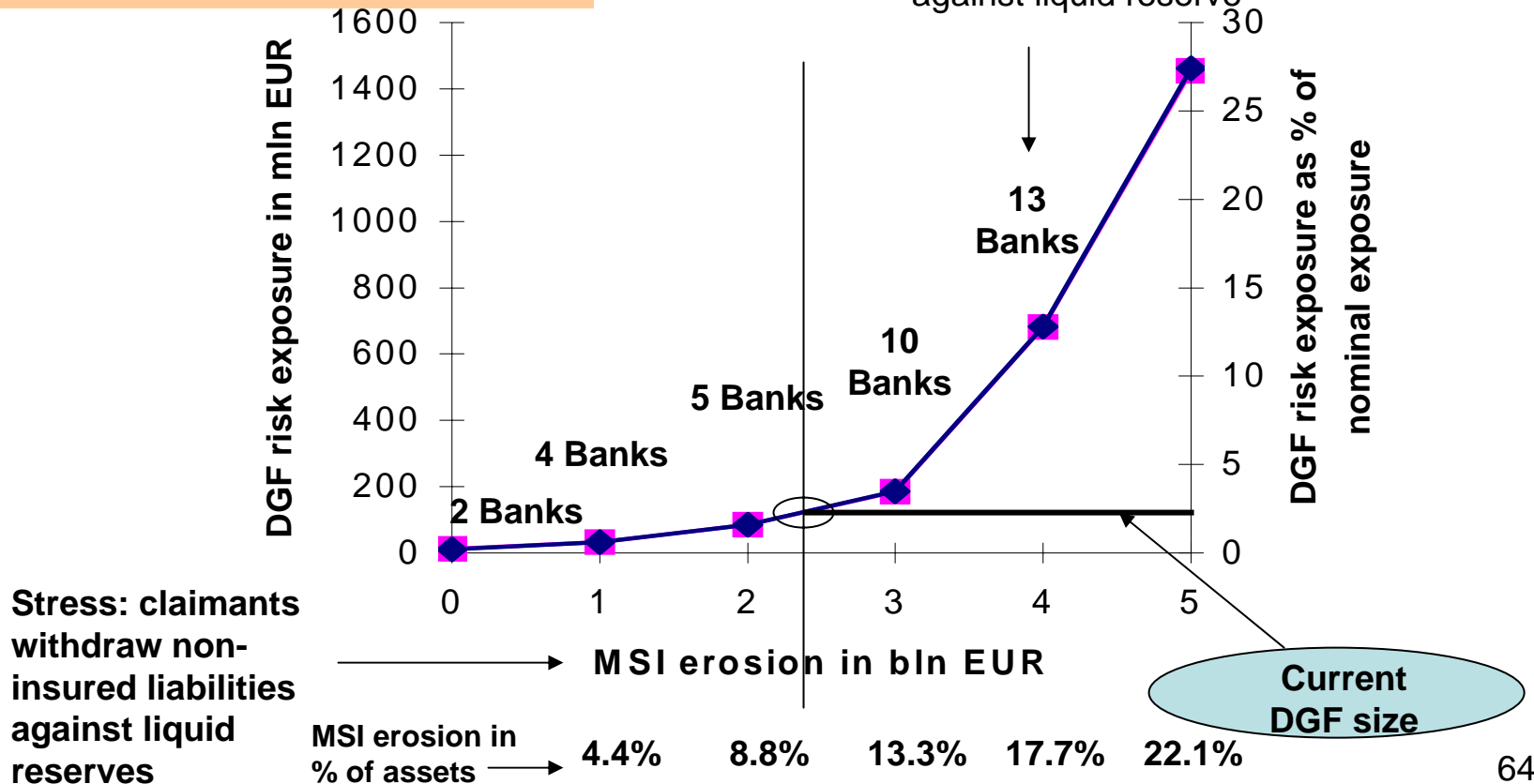
On average, smaller banks have relatively higher equity buffer and Market Self-Insurance. Market pressures lead them to “buy” confidence and reputation by holding higher equity buffers.

Note: Bank 23 has likely error in data; NPLs are doubtful and loss (D&E)

# Strong System-Wide Risk Absorption Capacity: Market Self-Insurance Erosion at the Existing Level of Asset Quality

Current DGF size covers present risk exposure, and potential risk exposure in a case of severe liquidity / confidence shock

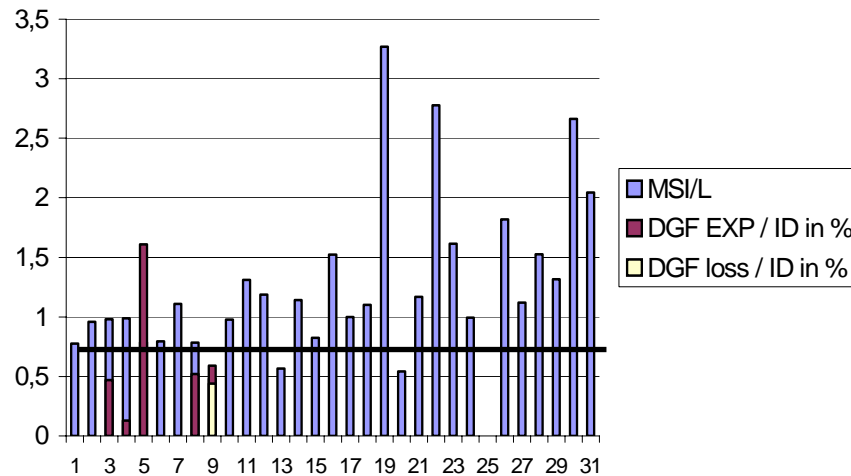
Number of banks that create DGF's risk exposure increases as non-insured liabilities are withdrawn against liquid reserve





# Details of Stress-testing Results in our Worst-case Scenario

**Banks sorted from largest to smallest after stress**



**DGF loss here  
(yellow); DGF risk  
exposure (red)**

- 13 banks have MSI < Loans after shock.
- 11 banks are technically insolvent, o/w 5 create DGF risk exposure because MSI < Loans. Their total risk exposure is equal to 3.32% of insured deposits (1.8x exposure coverage ratio)
- Large banks fail in this scenario (3,4,5,8,9)
- MSI is still high enough to absorb losses. Only one bank with 1.18% share in insured deposits creates DGF loss in proportion to 0.44% of insured deposits (25% of exposure coverage ratio)

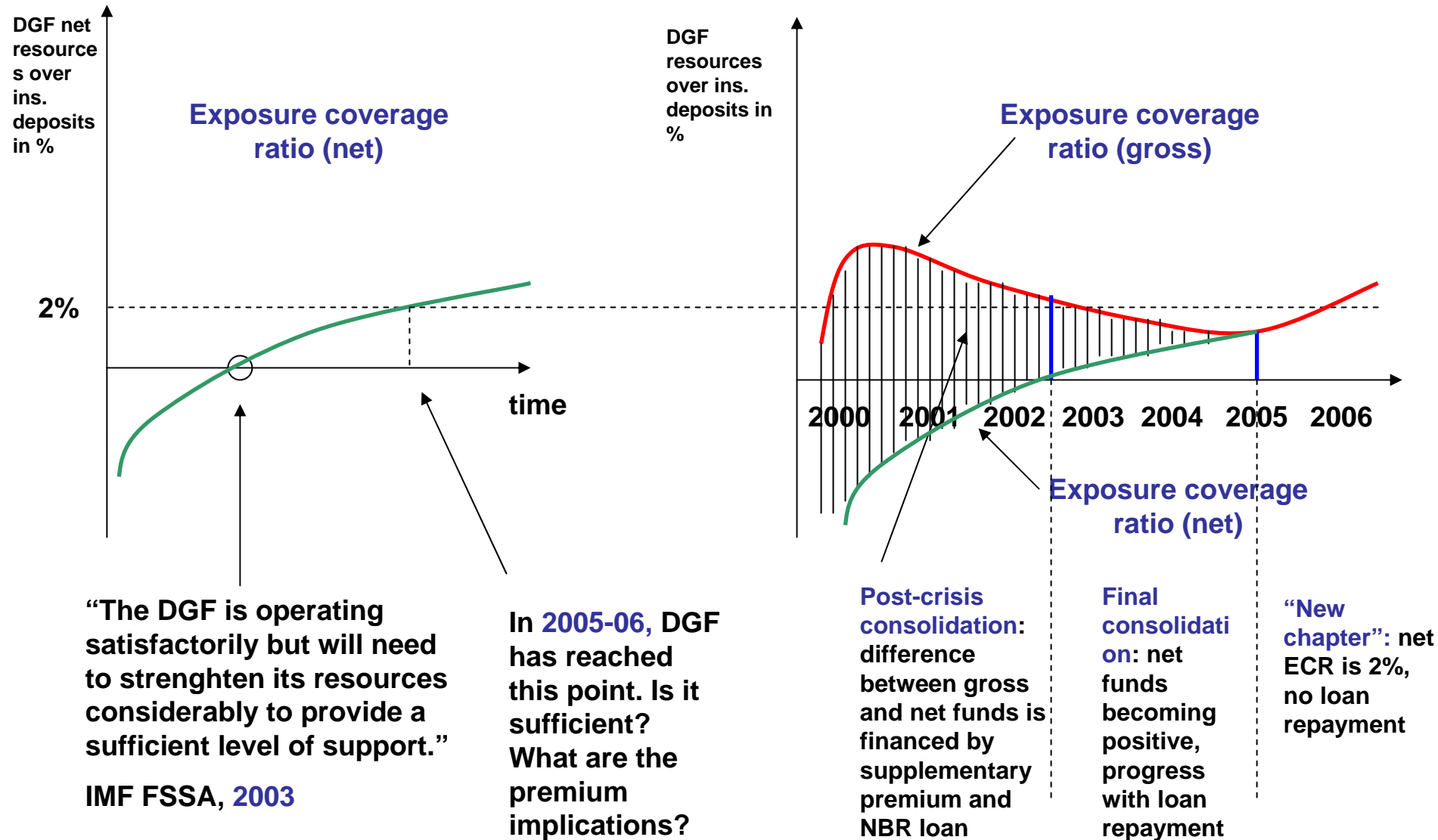
Other

# DGF Financial Exposure

## Basic Concepts and Definitions

- **Nominal exposure** – amount of insured deposits
- **Risk exposure** – a portion of nominal exposure that is not covered by riskless assets
- **Nominal exposure at default** – amount of insured deposits in a failed bank
- **Risk exposure at default** – a portion of nominal exposure that is not covered by riskless assets in a failed bank
- **DGF's (final) loss (given default)** – a portion of risk exposure at default that was not recovered in the bankruptcy process
- **Exposure Coverage Ratio (ECR)** – ratio of DGF's funds to nominal exposure (total insured deposits)

# Past Premium is Not a Criteria for Judging Future Premium Levels: Three Different Periods



# Is DGF Size Really Adequate?

## QUESTIONS (DOUBTS)

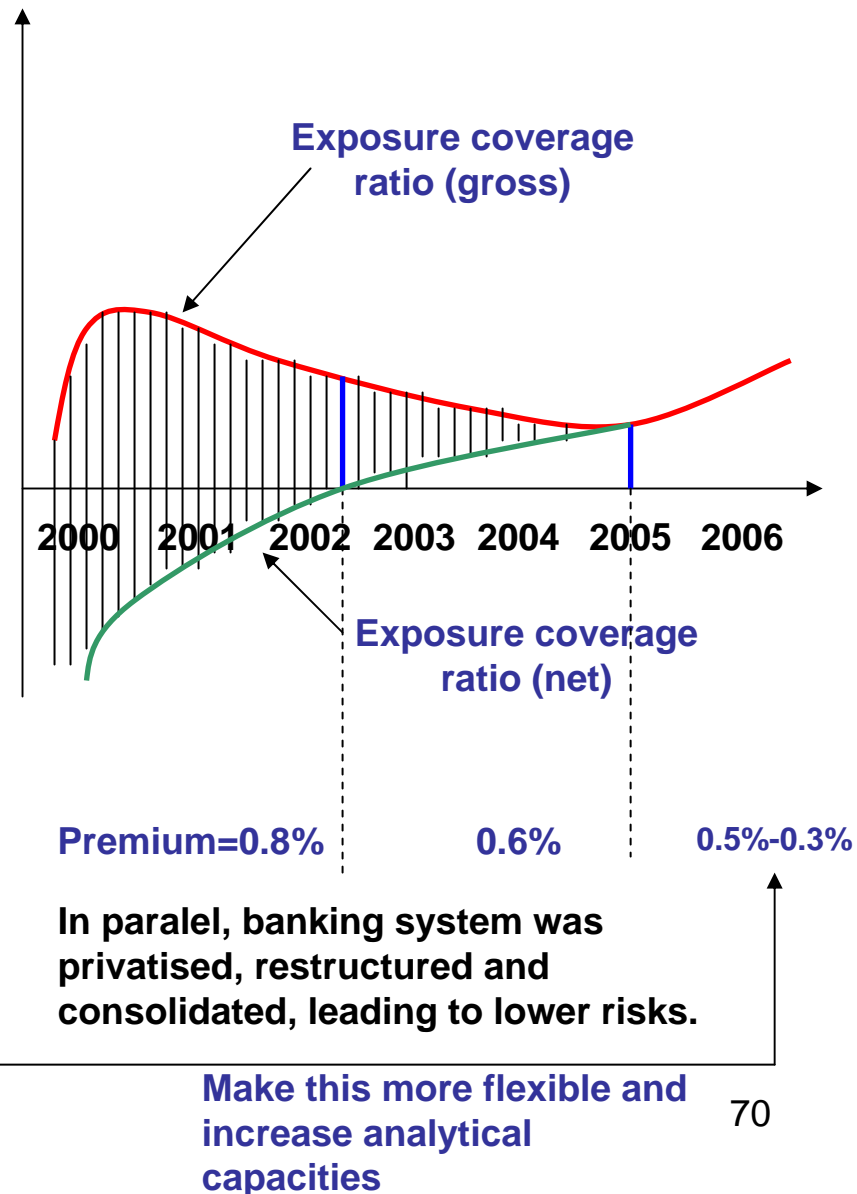
- Are we sure that we made reasonable estimates of expected DGF losses?
- What if banks turn out to be more deeply insolvent than anticipated?
- What if a larger portion of the loan portfolio proves uncollectible?
- Is the >1% reserve for unexpected DGF losses adequate?

## POSSIBLE ANSWERS

- So long as the system remains reasonably liquid and with reliance on non-insured liabilities, yes!
- Deep insolvency does not affect DGF so long as there are non-insured creditors to absorb it
- Again, large amounts of non-insured liabilities hedge DGF from this risk
- This reserve would cover a major fraud case in a medium-to-large bank

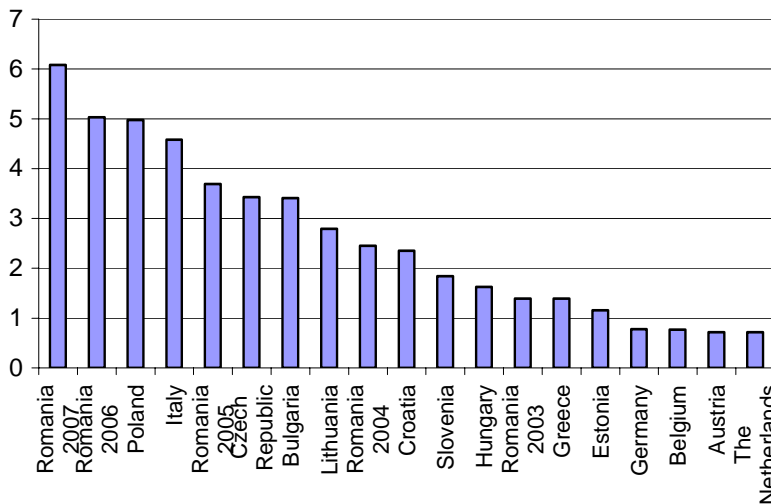
# Making Premium More Flexible is Fine-tuning Existing Legislation

- Policy makers correctly envisaged a room for decrease in base premium after DGF's net funds became positive
- There is a possibility to acquire analytical skills which can help to determine optimum premium in order to target optimum size of DGF
- Also, there is a possibility to build up institutional and financial capacity of DGF
- If such increases in capacities are possible, envisaged downward path of premiums (0.4% in 2006 and 0.3% in 2007) should be replaced by a flexible premium system where the Law sets an upper limit for the base premium (e.g. 0.4%) or a range, while effective annual premiums are determined at the basis of analytical outputs
- Such practice is common in developed countries, and is used in some transition countries (e.g. Hungary – see the next slide)



# Coverage and Premium in International Perspective

Coverage to GDP per capita



| Country         | Coverage in EUR, 2004 | CR3   | Coinsurance | Premiums           | Base* for calculating premiums | Risk adjusted premiums** |
|-----------------|-----------------------|-------|-------------|--------------------|--------------------------------|--------------------------|
| Poland          | 22500                 | 0,419 | 10%         | 0,1%+0,4% ex post* | RWA                            | N                        |
| Romania         | 6000                  | 0,662 | N           | 0,50%              | GD                             | Y                        |
| Lithuania       | 14500                 | 0,794 | 10%         | 0,45%              | ID                             | N                        |
| Bulgaria        | 12821                 | 0,468 | N           | 0,50%              | TD                             | Y                        |
| Czech Republic  | 25000                 | 0,702 | 10%         | 0,10%              | ID                             | N                        |
| Hungary         | 23000                 | 0,540 | N           | up to 0,2%         | ID                             | Y                        |
| Croatia         | 13500                 | 0,575 | N           | 0,50%              | ID                             | Y                        |
| Slovenia        | 21000                 | 0,606 | N           | 2,5% ex post       | ID                             | N                        |
| Estonia         | 6390                  | 0,982 | 10%         | 0,07%              | ID                             | N                        |
| Greece          | 20000                 | 0,631 | N           | 0,025-1,25%        | TD                             | N                        |
| Austria         | 20000                 | 0,798 | 10%         | ex post            | -                              | N                        |
| Belgium         | 20000                 | 0,830 | 10%         | 0,02%              | TD                             | N                        |
| The Netherlands | 20000                 | 0,833 | N           | ex post            | -                              | N                        |
| Italy           | 103000                | 0,405 | N           | 0,4-0,8% ex post   | -                              | Y                        |

\* RWA – risk weighted assets, ID – insured deposits, GD – guaranteed deposits, TD – total deposits; \*\*Yes for systems that have this option in the law (regardless if the option is excerscised)

Romania is climbing to the top of the list of countries in terms of coverage to GDP per capita, implying that more than 99% of depositors will have deposits fully insured without any incentive to monitor the banks (moral hazard) – this danger is present already at the existing level of coverage. Co-insurance can be introduced as a partial remedy.

In international comparison, Romanian premium is high. However, implication for premium remains ambiguous due to growth of coverage, and the fact that there is high market concentration. Concentration can either motivate higher premiums (to be on the safe side) or justify “too big to fail” argument (give up from insurance system to take care after large banks).

# Our Assessment Depends on Following Assumptions

1. No major reversal in banks' financial condition can happen due to: (a) under-reporting of bad assets, (b) improper collateral valuation (that may have led to under-provisioning).
2. No major sudden reversal in banks' financial condition can happen due to: (a) failure in owners' scrutiny and/or (b) any other major failure in banks' corporate governance
3. Non-insured claims on banks, particularly international and shareholders' lending to banks, have contractual terms that cannot be radically altered under distress.
4. As credit continues to grow, banks' risk management and in particular credit screening abilities remain within recent historical performance
5. Banks are resilient to any macroeconomic shock related to high growth of domestic demand and associated widening of current account.