convergence

Fondo Interbancario di Tutela dei Depositi

Deposit Guarantee Fund in the Banking System

Complement to PPT Presentation

Summary

(Analytical Background)

Informal Discussions

Bucharest, December 2005

The Summary is a complement to the PPT presentation presented by the Convergence - FITD team in December 2005.
It is meant as a reading guide for a better understanding of the accompanying slides.
It is not a paper per se.

Summary of Analytical Background Presentation

Romania's Exposure Coverage Ratio (in % of Guaranteed Deposits)[1] (slide 4)
Exposure Coverage Ratio (ECR) is term that stands for available resources of the Deposit Guarantee Fund (DGF) over guaranteed (or insured) deposits.
Guaranteed deposits, as defined by Romanian legislation, is total amount of all "deposits of which reimbursement is guaranteed by the Fund up to the guarantee limit level." In other words, guaranteed deposits are total deposits minus non-guaranteed deposits.
Insured deposits (or guaranteed deposits under the guarantee ceiling) are total amount of all guaranteed deposits up to the prescribed coverage amount.
According to EU parameters, there are different categories of schemes in terms of funding and coverage:

- low ex-ante funding where ECR is lower than 1% of guaranteed deposits
- medium ex-ante funding where ECR is around 1 and up to 2% of guaranteed deposits and
- high ex-ante funding where ECR is 2% or more of guaranteed deposits.

Romania was in the group of "low ex-ante funding", according to EU parameters until 2003. Since 2003 to 2005 Romanian ECR as % of guaranteed deposits is "medium ex-ante funding", but close to the lower end.
According to current legislation, in 3 years Romania increases coverage more than 3 times from 6.000 in 2004 to 20.000 Euro in 2007.

Two important questions are rising instantly:

1. Can Romanian DGF "withstand severe disturbances" in the near future?
2. How will ECR evolve, with premium declining further from 0,5% to 0,3%?

Answers to these simple and logical questions are the most crucial ones.

Namely, "at first sight" there may be a conclusion that in next few years DGF's ECR will be lower because there will be increase in coverage and decrease in premium, at the same time. Increase in coverage means DGF's larger exposure (toward depositors with insured deposits) and decrease of premium means lower resources for pay-out.
But, this is ad hoc answer, not based on calculation or analysis, which may be misleading.

Exposure Coverage Ratio Trend (slide 5)

[1] Although Exposure Coverage Ratio (in % of Guaranteed Deposits) is used, for operational (analytical) uses **we recommend Exposure Coverage Ratio as % of Insured Deposits**.

In order to provide answer on question number 2, "how will ECR evolve with premium declining further from 0,5% to 0,3%", simple projection of ECR has to be made.
Figures were derived on presumptions on growth of guaranteed deposits by 35% in 2005 and 20% in 2006 and 2007; growth on insured deposits of constantly 20% over the three year period, investment strategy in 2005 as 85% of resources invested with yield of 8,5% and 15% of resources invested with yield of 17%; projected yield on investments from 2006 onwards is 6%.
As figures in Table on slide 5 indicates, DGF's liquid assets at the end of each year will increase significantly in absolute amounts.
ECR on guaranteed deposits, increases, too, from 1,32 at the end of 2005 to 1,45% at the end of 2007.

Large Liquidity and Market Self-Insurance Shield DGF from Systemic Risk Exposure (slide 6)
We still owe to answer the question number 1: Can Romanian DGF "withstand severe disturbances" in the near future?
Let us look at Romanian banking system at the end of 2004 (when coverage was 10.000 Eur-o) i.e. real numbers.

Figure shows us that insured deposits (as potential liability of the DGF) presents only 24,4% of total liabilities in Romanian banking sector. As far as assets side of the balance sheet of Romanian banks is concerned, the figures are even more striking. Liquid assets, obligatory reserves and other assets are 50% of total assets, performing loans are 48,6% and non-performing loans are only 1,4% of total assets! However, credit growth was substantial in the last couple of years, so the non-performing loans ratio may be underestimated. It remains controversial whether credit growth is excessive (and whether provisions are adequate). But, banks' ownership structures, risk management practices and capital adequacy provide cushions against larger disruptions in the banking system.
If we treat capital and other non-insured liabilities as legally equal safety cushions against bank's losses i.e. losses caused by non-performing loans, we must admit that there is market self-insurance that provides shield from systemic risk exposure.
In other words, high probability of default in several banks would not represent a problem for DGF if there were a large „safety belt" of non-insured deposits.

But, the robustness of individual banks is what is really important, because "market self-insurance" of bank A has nothing to do with bank B who may go bankrupt.

DGF Pay-out Exposure Higher than Risk Exposure and Final Loss (slide 7)
Slide 7 provides the overall conceptual illustration as introduction into methodology for DGF financial policy modeling.
Romanian balance sheet structure now is transposed onto DGF's exposure.
Until now, we looked only at *DGF's nominal exposure (DGF Pay-Out Exposure)* i.e. the amount of total insured deposits in particular bank at the time of bankruptcy proceedings announced.
In other words, DGF's nominal exposure is amount of insured deposits in insolvent institution that should be paid out to depositors. This amount represents a liability of DGF.

But, as taking into account significant liquidity assets in banks that may be used for deposit

payout purposes efficiently (respecting some recommended legal changes), we may conclude that DGF's exposure is lower than previously thought.
If we decrease our first assumed exposure i.e. nominal exposure for quick recovery i.e. any liquid assets, obligatory reserves and other assets that may "cover" part of insured deposits in bankrupted banks, what is left is *DGF's risk exposure*.
Part of the risk assets will be collected, but part of it will never be collected. That part of risk assets that will never be collected for DGF means *final loss* (non-recoverable in the bankruptcy proceedings).
What is the evidence, one part of paid-out insured deposits may be expected to represent a loss for DGF, while the other part may be recovered during the bankruptcy process.
Two elements of nominal exposures may have different financing implications. Loss may be financed from DGF's own resources – we will call it *equity* (e.g. payments of premium, capital injections from the government, profits on investments etc.). *Borrowing* may finance part of paid-out insured deposits, which will be recovered later.
There is no need for DGF to collect premiums and creates funds for total nominal exposure.

Risk-Based Pricing Methodology (slide 8)
In order to identify overall DGF's risk exposure, the risk exposure in each individual bank should be identified.
FITD's *Risk-Based Pricing Methodology* is analytical tool that uses risk parameters in order to identify risky banks (as low risk, medium risk and high risk).

The *Risk-Based Pricing Methodology (RBM)* is based on a set of five balance sheet and financial statement ratios:
2 Riskiness ratios (R),
1 Ratio of Capital Adequacy (C) expressed as synthesis of three, and
2 Profitability ratios (P).

R - (Riskiness)
R1 = Doubtful loans + loss / Total assets
Ratio R1 indicates the percentage of Doubtful loans and losses compared to Total Assets. A safe bank should have a low level of R1.
R2 = Doubtful loans + loss / Total loans to clients
Ratio R2, indicates how large the part of loans valued as doubtful is. Also in this case a safe bank should have a low level of R2.

C – (Capital Adequacy)
C = synthesis of C1, C2 and C3
C1 = Share Capital / Total Assets
C2 = Share Capital / Loans
C3 = Solvency ratio
Ratio C1 indicates how large the Capital coverage of the Assets is. For deposit insurance purposes, low values are not sound.
Ratio C2 indicates how large the portion of the loans guaranteed by the capital is. Even for C2 ratio, low values are not sound.
C3 Solvency Ratio is calculated as Risk Capital over Weighted Assets and BCR supplied it already calculated.

P - (Profitability)
P1 = Operating expenses / Total income
This ratio, measures the operating expenses impact over the total income; the lower the ratio, the safer the bank.
P2 = Gross Profit / Total income
Ratio P2 gives a measure of the gross profit weight compared to the total income. The higher the value of the ratio, the safer the bank.

First of all, *Thresholds and Classes* for risk indicators have to be explained.
Using the FITD's Method of Percentiles[2], we proceeded to establishing three thresholds for each ratio; these thresholds forms four classes where the bank may be rated.
For each ratio the percentiles at 75%, 85% and 95% were figured out for every year from 2000 to 2004, together with the average, the median, the variance, the standard deviation and the asymmetry.
Thresholds of Riskiness and Profitability ratios have been set as the average of the percentiles calculated for each five years above mentioned.
For C1 and C2 Capital Adequacy ratios a single threshold was applied, as commonly used for capital requirements, figured out as the average diminished of half standard deviation.
For ratio C3 both the values furnished and the threshold indicated by BCR, were used in the analysis.
To each class, for each ratio, the method assigns a coefficient variable from 0, to indicate a safe indicator, up to 4, for the unsafe indicator (as shown in the next chart).
For the ratios C1, C2 and C3 a coefficient equal to 1 was applied for values lower than the threshold and the coefficient 0 for higher levels. Ratio C of Capital Adequacy, that is a synthesis of C1, C2 and C3, has a coefficient depending on the number of ratios respected or not.

Chart 1
Ratios, Classes, Thresholds and Coefficients

[2] The Method of Percentiles consists in establishing that 75% of banks has a null risk, 10% has low risk, 10% medium risk and 5% high risk.

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

The Methodology assigns a coefficient to each class and the sum of them determines an Aggregate Indicator (AI) that may vary from 0, when all the ratios are classified in Normality, to 20, when all the ratios are rated in the violation class.
Depending on the AI value, each bank is rated in one of six final **Riskiness Classes** (next chart), from the lowest L1 to the highest H2. These classes are further divided into three macro-classes: Low Risk, Medium Risk and High Risk.

Chart 2
Riskiness Classes

Class	AI	Macro-Class
L1	0 - 2	Low Risk
L2	3 - 5	
M1	6 - 8	Medium Risk
M2	9 - 10	
H1	11 - 12	High Risk
H2	More than 12	

By applying the RBM for years 2003 and 2004, the riskiness frequency distributions of the Romanian banks are as shown in chart 3. Focusing on the high risk, the RBM classifies one bank in class H2 for 2003 and two banks in class H1 for 2004. Between banks in medium risk, the vast majority are classified in class M1 for both years, while 2 banks in 2003 and 3 banks in 2004, are rated in class M2.

Chart 3

Frequency distributions

Classes		2004	2003
Low	L1	12	13
	L2	7	8
Medium	M1	10	6
	M2	2	3
High	H1	0	2
	H2	1	0

Banking Riskiness

Riskiness of the 32 Romanian banks has been figured out only for 2003 and 2004, due to:

- it is of little likelihood that the used set of ratios has a forecasting power of default of three years and over;
- a bias in the ratios values between data referred to 2003-4 and to the previous years;
- ratios thresholds have been fine tuned on the last two years.

By applying the RAM above described, we selected a final set of **7 high risk banks,** using the following two criteria (see slide 9):

- four banks have been added because they were rated in one of the three highest classes (M2, H1 and H2) in 2003 and 2004; the banks selected are called RISK.
- three more banks were included considering the highest sum of AI in 2003-4; the banks selected are called WATCH.

Chart 4
RAM output - Set of Higher Romanian Risky Banks

Bank19	**Rated in class M2, H1 or H2 2003-2004**
Bank13	
Bank17	
Bank25	
Bank5	**Highest sum AI_{03}+ AI_{04}**
Bank18	
Bank20	

As for low risk banks, DGF needs no funding.

But, banks from medium risk (M2) and high-risk (H1 and H2) groups need our special attention. In other words, banks with lower medium risk (M1) we put in “watch” group, and banks with higher medium risk and high risk we put in “risk” group.

In second step we concentrate only on banks requiring some DGF funding and provide DGF exposure calculation at default on bank by bank basis.
DGF Exposure calculation may be structured as Debt ("safe collection") and Equity ("other payout") in line with overall funding principle already explained.
On regular basis, this calculation will ensure the optimal DGF size and derive annual premium (for equity portion).

Early Warning Financial Ratios – Distance to Default (FITD Indicator Methodology) (slide 9)

FITD Indicator Methodology on bank by bank basis leads us toward early warning financial ratios.
For each bank coverage ratio represents Market share (% of insured deposits) x probability of default.
According to Aggregate Indicator (AI) banks are grouped in three groups: low risk, watch and risk group.
As already discussed, banks with lower medium risk (M1) are in "watch" group, and banks with higher medium risk and high risk are in "risk" group.
There is no need for DGF liquid resources for "low risk" group. DGF needs liquid resources only for banks in "watch" and "risk" group.

Applying methodology on Romanian banks, we come out with figure that banks that need our further attention are banks from watch group (4,5% of total insured deposits) and banks from risk group (0,8% of total insured deposits).

Highest Risk Ratings in Smaller Banks (slide 10)

Illustratively, risk-rated individual banks according to FITD Aggregate Indicator in relation to insured deposits i.e. nominal exposure of DGF is presented in Figure on Slide 10.
The riskiest banks are the smallest Romanian banks i.e. on left scale of the graph, while the low risk banks are on the right scale of the graph (expressed as cumulative share in total insured deposits).

Details on Watch and Risk Banks (slide 11)

Up to this point methodology presented was static, using most recent figures on past performances. But, methodology uses historical figures only as starting point for further analysis i.e. combining calculated financial indicators with stress testing.
That is why "risk" and "watch" banks should be "examined" further.
Using real figures for both group of banks ("watch" and "risk"), different ratios are calculated as well as nominal figures identified (for e.g. risk assets, non insured liabilities, liquid assets, insured deposits, minimum loan loss for insolvency, non insured liabilities over risk assets and DGF pay-out exposure (nominal exposure) as % of total insured deposits in identified banks).
Ratios present real financial position of examined banks at the moment of analysis. But, the situation in pre-bankruptcy period may substantially worsen financial condition i.e. worsen ratios.

In next step, there are assumptions to be made, such as % of withdrawal of insured deposits and

non insured liabilities, loan loss over total loans, and DGF risk exposure (as % of insured deposits) in order to take into account potential "worsening" of ratios. *Assumptions are made based on expert judgments in this particular situation.*

Results of Withdrawals and Losses (slide 12)
Each group of banks is analyzed separately. Important figures are compared before insolvency and at insolvency (as we assumed that at time of insolvency certain financial indicators may be worsen than reported earlier).
DGF needs to be on safe side. That's why assumptions and testing should be done.
If the banks from two groups are "shocked" with "worsening assumptions", DGF risk exposure and final loss at the moment of insolvency may be calculable.
Also, minimum expected risk assets collection (as % of risk assets) could be assumed, and based on that assumption; minimum expected asset collection (as % of DGF's risk exposure) might be derived.

Implications for DGF (slide 13)
As we assumed in our exercise DGF Pay-out Exposure as % of insured deposits is 0,6% for "risk" banks and 3,6% for "watch" banks which totals 4,2% for all banks for which funding is needed. These are the figures derived after assumptions at insolvency (not before).
There are several important questions now:
What are DGF financial policy implications?
Should DGF be fully funded (funded at least in amount of 4,2% of insured deposits)?
Or should DGF funding reflect the probabilities of default that are lower than 100%?
Having in mind concept of DGF's risk exposure (instead of nominal exposure i.e. pay-out exposure as % of insured deposits), and assumed % of risk asset collection, "uncovered" collection risk and "safe" collections are calculable in % of insured deposits.
Following this concept, debt and equity funding instruments can be structured in following way:

- Liquid assets recovery could be funded by short-term debt (in our case 1,4% of insured deposits)
- Risk asset collection (20% of all risk assets in 7 banks) could be funded by long-term debt (in our case 1,7% of insured deposits)
- "Uncovered" collection risk could be funded by equity (in our case 1,1% of insured deposits).

Using this concept, DGF needs much lower resources than using concept of Pay-out exposure (only 1,1% in the form of equity instead of 4,2%, and rest of 3,1% could be funded by debt instruments). Conclusively, *everything that is collectable (either faster or slowly) might be funded with debt, leaving equity only for final loss and eventual collections.*

Financial Policy Implications: Calculating Optimal Coverage Ratio (slide 14)
All watch and high risk banks won't fail immediately (actual probability of defaults are less then 100%). So, it is prudent to build financial potential in time by applying different % of funding reserve for different groups of banks and different instruments.
Applying again methodology on real figures, we end with DGF's need for funding structured as:

- Equity: 1,1% of insured deposits

- Debt: 1,9% of insured deposits (even lower than 3,1% as indicated in the previous slide) which represent «optimal coverage ratio».

Namely, for banks in «watch» group we further assumed lowering of debt for 50%, while we keep 100% of calculations for banks in «risk» groups (that is why we don't need 2,5% debt instruments for «watch banks», but only half of it i.e. 1,3%).
Using this approach DGF can calculate needed structure of funds in nominal figures i.e. currency (in this particular case, 105 million Euro debt instruments and 65 million Euro equity funding).

Financial Policy Implications: From Optimal to Target Coverage Ratio (slide 15)
DGF wants to be on safe side meaning that some additional considerations should be taken into account – for e.g. "unexpected" losses.
That is the reason why DGF increases "equity" funding for such "unexpected" losses in % that is arbitrary determined (in our case for further 0,4% of insured deposits which increases equity portion up to 1,5% of insured deposits).
All together debt portion and equity portion of funding (increased by unexpected losses) is DGF's target for coverage ratio (which in Romanian case is 3,4% of insured deposits).
We may say that *target equity coverage ratio* for DGF is 1,5% of insured deposits, but *target overall coverage ratio (including debt)* is 3,4% (1,5% + 1,9%) of insured deposits.
Optimal and targeted ratios are calculated not only for current moment, but also for foreseeable future – at least 3 years period.
This calculation should be part of DGF's financial policy modelling i.e. regular analytical exercises.

Financial Policy Implications: From Actual to Target Equity Coverage Ratio (slide 16)
Reminding, projected calculations of exposure coverage ratio, end of the year, as % of guaranteed deposits are on slide 5.
As we already discussed, for analytical purpose we use exposure coverage ratio as % of insured deposits.
Using real figures and projections based on initial assumptions, ECR as % of insured deposits will be 2,3% at the end of 2007. At the same time, optimal ECR is 1,1% and targeted equity ECR is 1,5% of insured deposits. That conclusion presents a basis for converging real ECR toward target ECR in near future. Adjustment is done gradually.

Financial Policy Implications: From Actual to Target with Debt (slide 17)
If we assume that Romanian equity target is 1,5% (1,1% + 0,4% of unexpected losses) and that overall targeted Exposure coverage ratio in terms of insured deposits is 3,4% (with debt portion), DGF may determine its operational targets for debt and equity funding, starting from current perspective when Exposure coverage ratio is 2,45% at the end of 2005 (lower than optimal and targeted).
Consequently, in order to do that i.e. to converge toward equity target and ECR target, there is need to make two adjustments. Namely, ECR is "split" into: ECR with debt and solely equity portion.
One adjustment is lowering equity portion of ECR in order to be in line with equity target (1,5%) and another is concerning the debt portion of ECR in order Exposure coverage ratio to become close to target (3,4%).
The same may be expressed in terms of guaranteed deposits (as on right graph on the slide). In

comparison with EU parameters, DGF's equity target will continue to be in group of medium ex-ante funding, but accompanied with debt financing, total ECR as % of guaranteed deposits will "jump" into group of high ex-ante funding.

Premium and Stand-By Calculations (slide 18)

Once when optimal and target fund size expressed in % of insured or guaranteed deposits structured as debt and equity financial instruments are determined, the value of equity portion expressed as annual premium applied and the value of debt portion expressed in terms of the amount of stand-by line of credit may be determined, too.

Always dynamic assumptions should be taken into account i.e. growth of deposits, guaranteed deposits, insured deposits.

In order to achieve target ECR at the end of particular year, DGF may calculate equity and debt portion.

It is easy to express equity target in premium applied in that particular year. In this particular case, evidence indicates that DGF will converge toward target ECR with annual premium of 0,2% in 2006 and 0,1% in 2007 accompanied with 162 million Euro stand-by line of credit in 2006 and 42 stand-by line of credit in 2007.

A 3–5 Year Sensitivity Scenario (Can DGF Absorb a Shock?) (slide 19)

After calculating absolute figures, "shock tests" should be done once again.

Namely, in order to avoid any doubts, there are two key questions DGF should answer:

1. Under proposed new DGF financial policies, what are the impacts of these shocks on:
   •Additional debt support?
   •Optimal DGF Equity?
   •Annual premium? And
2. Do the proposed new DGF financial policies create a sufficient buffer for these adjustments to be affordable to the banking system (over a 2-year period starting in 3 years from now)?

Simply, what impacts would credit, capital and profitability shocks have on banks in our three groups – low risk, watch and risky?

What Happens if Some Banks Migrate from "Low Risk" to "Watch"? (slide 20)

We must return now to our basic methodology and remind ourselves on three group risk parameters (credit risk, capital adequacy and profitability) which create Aggregate Indicator (AI) and the graph from our slide 10.

Namely, if we "shock" our indicators i.e. if credit risk increases, capital adequacy decreases and profitability worsen, 4 banks may slide from "low risk" to "watch" group.

How Can Low Risk Banks Turn "Watch" (slide 21)

Using FITD methodology again two warning zone risk indicators for weaker banks to turn "watch" may be identified.

Shocks are:

So, simply, we do the calculation twice – once with real figures, and second time (after the first calculation) using "shocks" in order to see if and how would indicators worsen and how many banks are coming into further "attention".

In our case, 4 more banks turned into the "watch" group.

What do Four More "Watch" Banks Mean for DGF Size? (slide 22)
After second-time analysis (with shocks), we identified four more banks that slides from low risk to "watch" category.
Doing the same exercise again, like we already did in the first place, we identify DGF Pay-out Exposure, Liquid Assets Recovery, DGF Risk Exposure, 20% Risk Assets Collection and "Uncovered" collection risk for group of "four new watch" banks in order to determine funding ratios and funding instruments respectively.
After taking into account "shocks" and resulting figures, we end with optimal equity of 1,5% and optimal debt of 2,8% (compared with 1,9% in the first place)using the same assumptions again and lowering debt funding for 50%.

Financial Policy Implications: Target Coverage Ratio with Four New Watch Banks (slide 23)
Before the shocks, our target equity was 1,5% (1,1% base + 0,4% of "unexpected losses"), debt was 1,9% of insured deposits and ECR target was 3,4% of insured deposits.
After the shocks, because 4 more banks became "watch", our equity target increased to 2% and debt target increased to 2,8%, ending with ECR target (after shock) of 4,8% of insured deposits.

"Post-Shock" Financial Requirements (slide 24)
It should not be forget that shocks were made in order to see implications for DGF in three years from now, for period of 2 years.
Figures expressed as targets need to be transposed into absolute figures i.e. equity target as annual premium applied and debt target as increase in stand-by line of credit.
Calculations evidence how much premium could be applied in 2008 (0,3%) and in 2009 (0,2%) and how much stand-by line of credit could be increased in order DGF be in line with "post-shock" financial requirements i.e. additional 132 million Euro and 106 million Euro respectively.