



CREDIT BUREAUS AND CREDIT SCORING

How they will play an increasing role in the region's lending

For the Mortgage Lending Conference
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Krzysztof Zielinski
Senior Regional Manager
CRIF S.p.A

Agenda

- About CRIF
- Credit risk factors in mortgage lending
- Why scoring ?
- Role of credit bureaus in mortgage lending
- CRIF experiences, project in cooperation with S&P
- Conclusions, Questions

About CRIF

- CRIF is **one of the main international groups** specialized in the **development and management of credit reference agency and decision support systems** for the retail and SME credit markets
- CRIF is leader in Italy, with over 440 client banks and financial institutions and 85% of Italian branches connected daily online with the services offered by:
 - ✓ Eurisc (credit bureau)
 - ✓ Sprint (ASP)
 - ✓ SkyMinder (business information)
 - ✓ (mortgage register)

About CRIF

- Companies in 7 countries
- Credit Bureaus already established in Europe: Italy, Czech Republic, Slovak Republic as CRIF; Russia, Croatia as TransUnion CRIF.
- Insurance Database services established in the UK: CACHE and Elixir 2000
- Users' pool database for SMEs in Germany
- Since 1999 partner of Trans Union for methodology, decision systems and credit bureau activities
- Hundreds of Scoring and Decision Support Systems delivered in over 15 countries all over Europe and outside (Canada, Mexico, Brazil)

About CRIF: where we are, our credit bureau partners



Mexico



Canada



Brazil



Sweden

NBCH

Russia

HROK

Croatia



Germany

schufa



Poland



Ireland

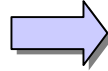
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Risk factors in mortgage lending

According to **Fannie Mae**, American specialist in the mortgage secondary market, mortgage default is influenced by two categories of risk:

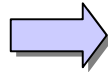
Primary Risk Factors



Main risk factors in a mortgage loan refer to the financial and economic situation of the borrower, in terms of:

- Borrower's **equity**
- Borrower's **credit history**

Contributory Risk Factors



Factors mainly referring to the loan conditions and characteristics, differently correlated to risk, that if considered separately would not represent a sufficient basis on which make a decision (approve, reject)

Risk factors in mortgage lending

Primary Risk Factors

- Borrower's past/current credit performance with the banking system → **Credit Bureau Score**
- Down payment / Loan to Value

+

Contributory Risk Factors

- Socio-demographic variables (Employment type, marital status,...)
- Contractual characteristics (Duration, Type of loan, Property type,...)
- Combination of the above (**Effort Ratio**, i. e. the ratio of a loan payment to the borrower's monthly income)

To be considered together in order to obtain a **complete** and **accurate** assessment of risk in all of its components

This can be achieved through:

- The proper collection of all the data needed to estimate risk
 - The use of advanced statistical tools
- **Credit Scoring**

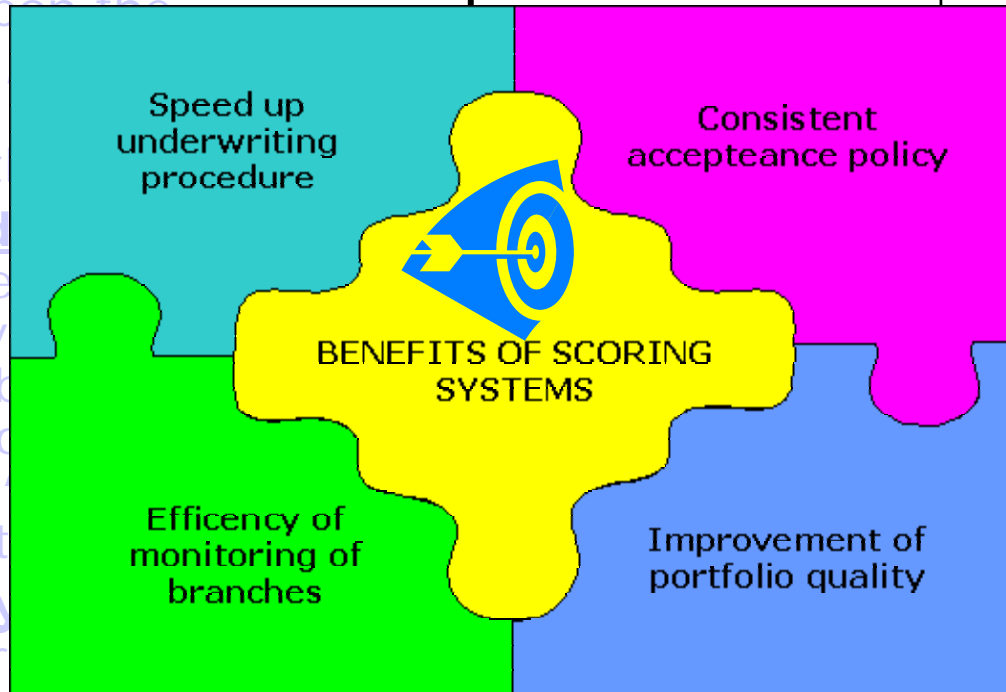
Why scoring ?

- **Scoring** is a statistical method for prediction which is based upon the hypothesis, that the medium or at least near future will be similar to the recent past.
- **Scorecard** is an algorithm which, when executed, returns a value (score) telling the probability, if the examined object becomes in the future "Good" or "Bad" according to the definition.
- **Scoring system** is a number of scorecards which are calibrated to an uniform scale through out all the segments recognised in the portfolio.

+	-
simple, uniform tool, easy to use, objective and flexible	uses criteria which are not straight forward or clear and seem to be not logical
performance can be statistically evaluated on portfolio data	not up to date with the time
speeds up the processes and reduces the costs	discriminates some groups of clients

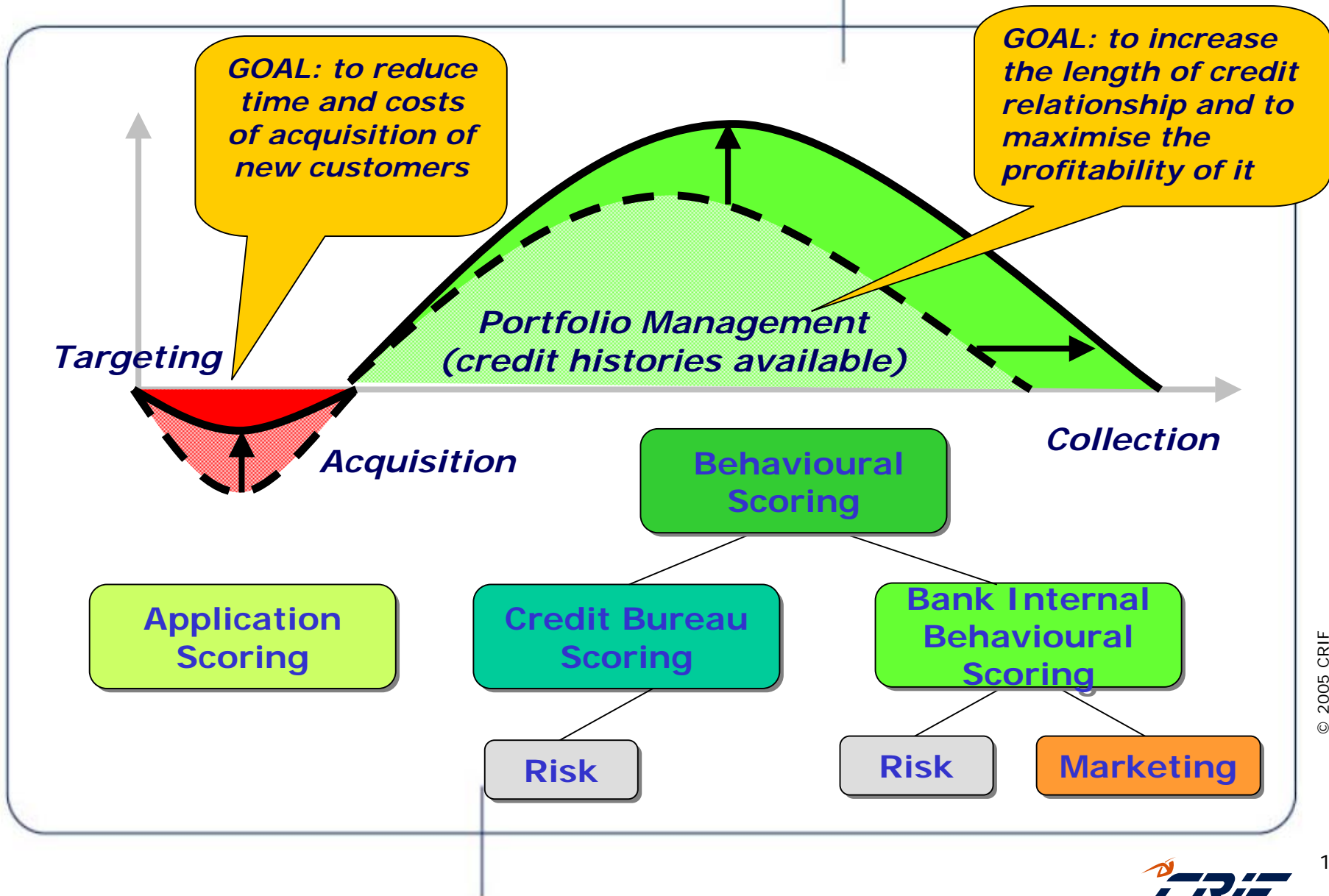
Why scoring ? Benefits prevail

- **Scoring** is a statistical method for prediction which is based upon the hypothesis or at least similar to the hypothesis or at least similar to the hypothesis
- **Scorecard** which, when returns a value the probability of the future according to the scorecard
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Processes and reduces the costs	Processes and reduces the costs
discriminates some groups of clients	discriminates some groups of clients
up to date with the time	up to date with the time

Why scoring, different types and objectives



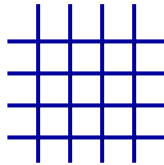
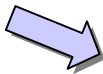
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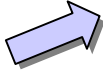
Effective risk assessment tools: Credit Scoring

The role of **Credit Bureau** data: integrated in the application scorecard...

Primary Risk Factors



Contributory Risk Factors



Score = f (LTV, Employment type, ..., **CBS**, ..., Marital status, ...)

Pros

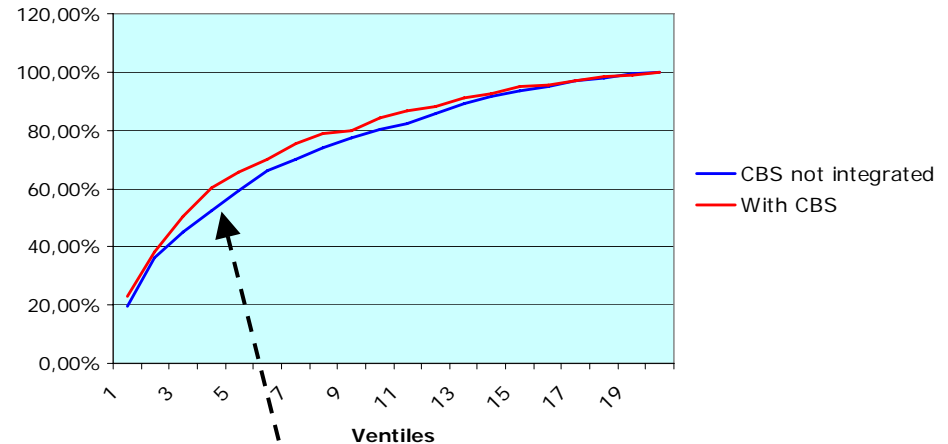
- Enhanced performance of the application model
- Easier cut off definition (based on just one score)
- Immediate and clear indicator of the applicant's risk degree

Cons

- Can be more difficult to monitor and maintain the model (changes in the CBS algorithm...?)
- Need to always inquiry the Credit Bureau to run the model

Bad Cumulative Distributions

Example

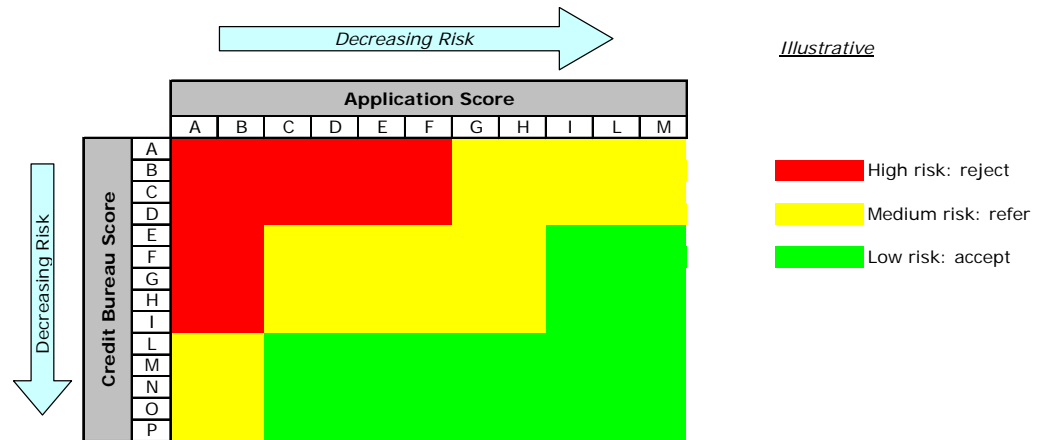


8%/10% more of bad customers are concentrated in the first 20% of the score distribution using CBS as a predictive variable in the application model*

*Source: Custom Application Scorecard development project for a primary Italian Bank – final documentation

Effective risk assessment tools: Credit Scoring

The role of **Credit Bureau** data: ...or crossed with application score



Pros

- No Credit Bureau dependency
- Flexible when new releases of score are available

Cons

- Cut off could be difficult to set
- Statistically sub optimal
- Difficult to track

Role of credit bureaus in mortgage lending

- Availability of credit histories (full picture of the market through all customer segments and credit products)
 - client view (risk)
 - geographical view (geo-marketing)
- Possibility for development of very predictive statistical tools forecasting risk related with an individual or SME
- Credit bureau score can be a very powerful component of the mortgage rating system (see example from the Italian market)

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Standard&Poor's and CRIF Decision Solutions Project

In 2003 **CRIF Decision Solutions and Standard & Poor's** have started a cooperation in order to assess the effectiveness of integrating the CRIF Credit Bureau Score into the Standard & Poor's Rmbs Rating process.

The project has lead to the introduction of the **CDS Mortgage Risk Scale**-developed by CDS and based on the **CRIF Credit Bureau Score**-into the new Standard & Poor's Rmbs Rating model.

The introduction of the CDS Mortgage Risk Scale into the Standard&Poor's Rating Process is an innovative approach for the whole European Rmbs Market and should allow for a more refined and predictive approach to the mortgage default estimation with clear advantages to all participants in the Italian Securitization market.

Standard&Poor's and CRIF Decision Solutions Project

The **CDS Mortgage Risk Scale** has been developed on a large sample of residential mortgages representative of the Italian Market selected from EURISC®. The borrower's payment profile has been observed from the origination on a monthly basis.

Back testing of the **CDS Mortgage Risk Scale** has been performed on Residential Mortgages Backed Securities issued by different Italian originators. The back testing has been finalized to introduce the CRIF Bureau Score, through the CDS Mortgage Risk Scale, into the Standard&Poor's Rmbs Rating Process.

CDS Mortgage Risk Scale

The CDS Mortgage Risk Scale, and the associated matrix, are based on the CRIF Credit Bureau Score computed at the Securitization date classified into 7 buckets:

A,B,C,D,E,F,G

Each Risk Class represents different risk probabilities,

from **A: Highest Risk** to **G: Lowest Risk**

The CDS Mortgage Risk Scale and has been specifically defined to optimize the assessment of the long-term risk of residential mortgage portfolios.

CDS Mortgage Risk Scale

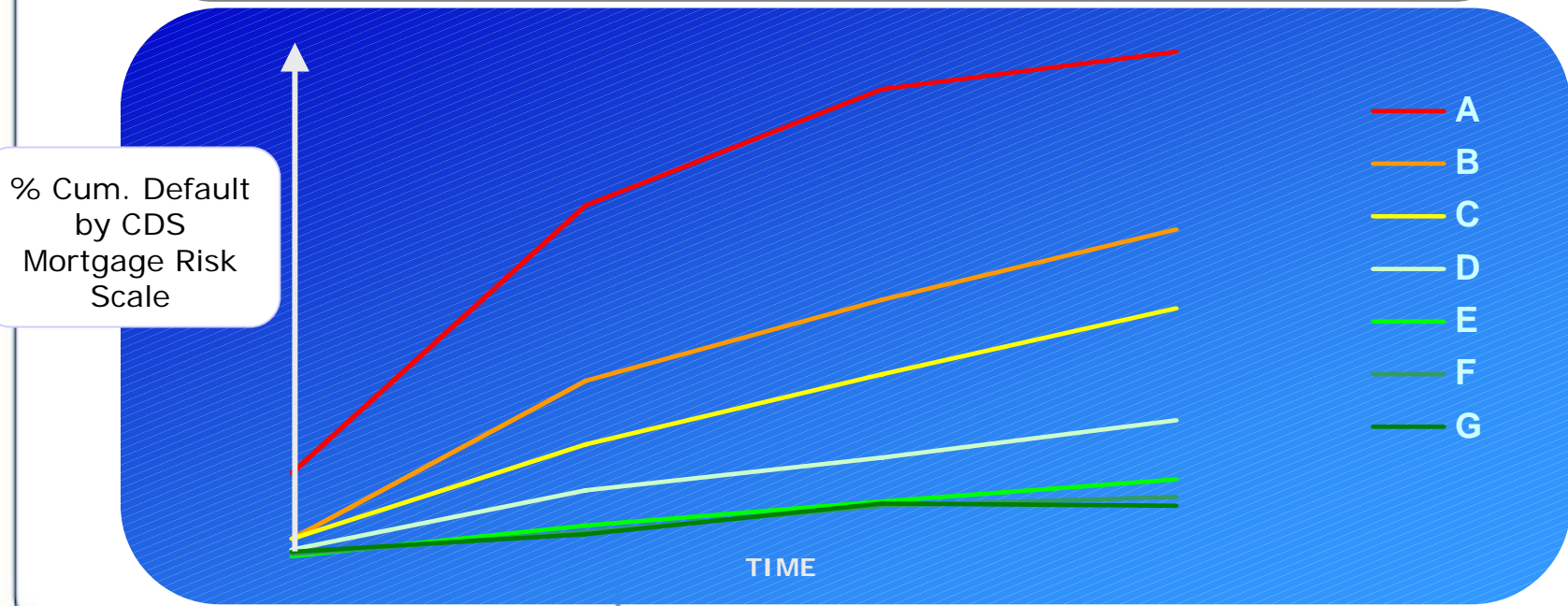
CDS Mortgage Risk Scale Results (1)

Portfolio: Residential Mortgages originated from 1998 to 2000

Mortgage Risk Scale up date: at Origination

Performance Window: 4 years

Default Definition: 180dpd



% Cum. Default
by CDS
Mortgage Risk
Scale

- A
- B
- C
- D
- E
- F
- G

Source: EURISC®

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CDS Mortgage Risk Scale

CDS Mortgage Risk Scale Results (2)

Portfolio: Seasoned Residential Mortgages - Clean (no previous delinquency)

Mortgage Risk Scale up date: at Evaluation Time

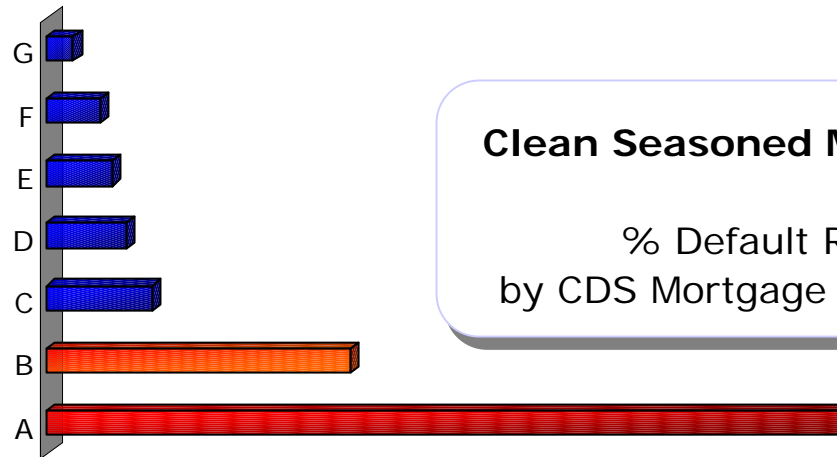
Performance Window: 2 years

Default Definition: 180dpd

G: low risk

The default rate in tranche A is 20 times higher than the default rate in tranche G

A: high risk



Clean Seasoned Mortgages

% Default Rate
by CDS Mortgage Risk Scale

Source: EURISC®

Incorporating the CDS Mortgage Risk Scale in the S&P Analysis

CRIF Decision Solutions have developed a transition matrix that indicates over a certain time period the probability of a mortgage in a state in Time 1 being in a particular state in Time 2 – e.g.,

		Score at Time 2				
		Default	"A"	"B"	"C"	"D"
Score at Time 1	"A"	10%	38%	20%	17%	15%
	"B"	7%	19%	40%	18%	16%
	"C"	4%	15%	19%	41%	21%
	"D"	1%	15%	17%	22%	45%

The matrix can be used to estimate the lifetime probability of default.

Incorporating the CDS Mortgage Risk Scale in the S&P Analysis

- S&P have developed new approach to default modelling that includes the CDS Mortgage Risk Scale.
- Underpinned by estimate of lifetime default from the CDS Mortgage Matrix.
- Lifetime default adjusted according to loan and property characteristics.

Adjust Base Default with Application Variables

The general model is given below:

$$B \text{ default probability} = X * a * b * c * d \dots \text{etc}$$

X = probability of default predicted by CDS Mortgage Risk Scale

a, b, c etc = variable >0 , the value of each determined by the underlying application variables

Hence, mortgage characteristics can reduce ($0 < a < 1$), increase ($a > 1$)

or not influence ($a = 1$) the base default probability.

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