

RiskMinds Conference

Modeling challenges linked to IFRS9 norms

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CHAPTER 01

IFRS9 AT A GLANCE

A. IFRS 9 – FINANCIAL INSTRUMENTS

- **“IFRS 9” accounting rules will replace the existing IAS 39**
 - The final version has been released in July 2014
 - Mandatory effective date **1st January 2018**

- **The IFRS 9 – Financial Instruments includes 3 phases:**
 - Phase 1: “Classification and Measurement “ distinguishes 3 business models and measurement approaches
 - Amortized cost: objective is to collect contractual cash flows,
 - Fair Value through OCI: objective is both collecting contractual cash flows and selling financial assets,
 - Fair Value through Profit and Loss: all others
 - Phase 2: “Impairment” rules
 - Phase 3: “Hedge Accounting” rules

- **IFRS 9 – Phase 2: “Impairment” accounting rules**
 - The IAS 39 “incurred loss approach” for the calculation of impairment provisions will be replaced by an “expected credit loss” loss allowance under IFRS9
 - Attempts to converge between IASB (International Accounting Standards Board) and FASB (US) has been abandoned and 2 different accounting framework will still coexist

B. CREDIT LOSSES MEASUREMENT – NOW

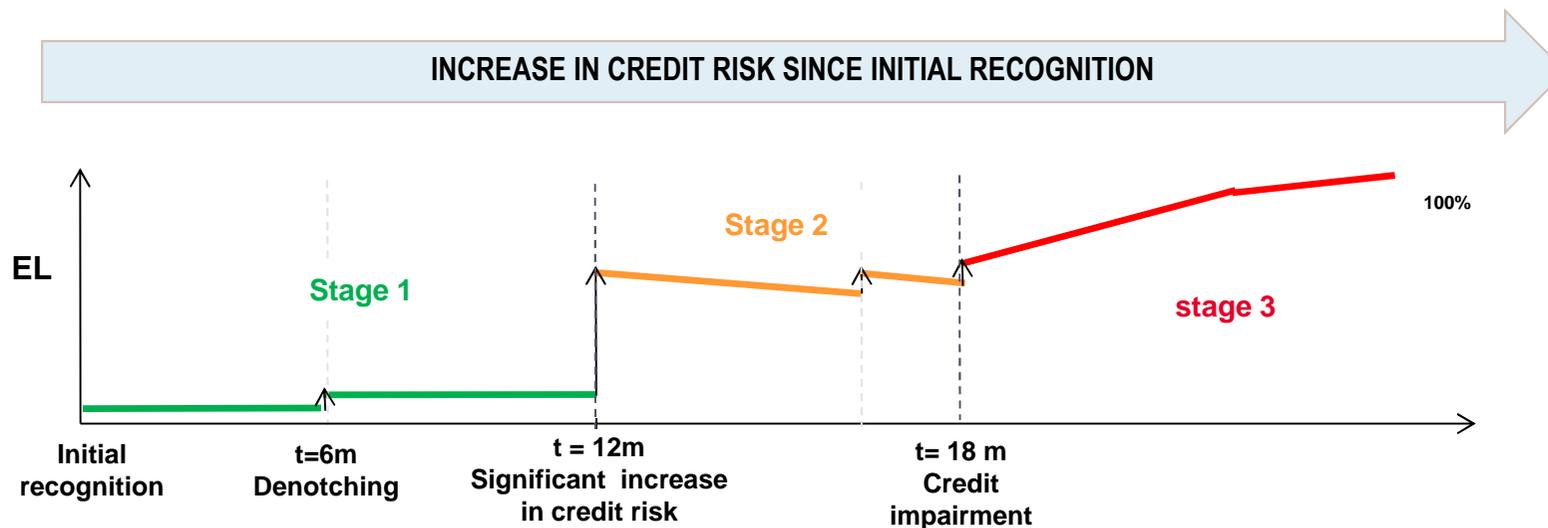
- **Under IAS 39, Impairment is recognized only when there is a objective evidence of impairment:**
 - There must be one or more objective events (“impairment triggers” or “loss event”) that have occurred; and
 - The event is likely to have a negative impact on the estimated future cash flows of the loan asset.
 - The effects of possible future credit losses cannot be considered even if they are expected
- **Some national regulators issued guidelines for implementation of the IAS rules (impairment triggers,...)**
- **Assessment of provisions on impaired assets may be distinguished between provisions:**
 - Individually assessed on impaired assets, typically individually significant exposure
 - Collectively assessed on impaired assets, typically impaired retail exposures
- **Different approach for collective provision on performing assets have also emerged, such as geographic and sectorial provisions, IBNR “Incurred But Not Reported”:**
 - Assumes that a loss event has already occurred but consequences did not come to the attention of the Bank yet (ex.: divorce)
 - Emergence period: period of time between a loss event occurrence and objective evidence of the event
 - A collective assessment of impairment is calculated based on the historical experience and emergence period
- **Models have been developed for collective provision assessment**

C. CREDIT LOSSES MEASUREMENT – NEW REQUIREMENTS

- An “Expected Credit Loss” approach designed to recognize a provision sooner
- It is no longer necessary for a trigger event to have occurred before credit losses are recognized and a provision is recognized at the origination date (day one loss)
- A “low credit risk” exemption and a 30 day past due rebuttable presumption
- Historical, current and forward-looking information such as macro economic factor must be considered
- EL measurement shall be based on “reasonable and supportable information that is available without undue cost or effort”
- The application perimeter includes financial assets classified as amortized costs and fair value through OCI, lease receivables, trade receivables, and commitments to lend money and financial guarantee contracts
- The model is accompanied by new heavy disclosure requirements

D. ALLOCATION IN THREE STAGES

	Stage 1	Stage 2	Stage 3
Stage	<ul style="list-style-type: none"> Assets at initial recognition irrespective of their credit quality Assets without significant increase in credit risk since initial recognition 	<ul style="list-style-type: none"> Assets with significant increase in credit risk since initial recognition 	<ul style="list-style-type: none"> Credit Impaired Assets Definition similar to current "incurred loss" approach
Loss Allowance	<ul style="list-style-type: none"> 12-month expected credit losses 	<ul style="list-style-type: none"> Lifetime expected credit losses 	<ul style="list-style-type: none"> Lifetime expected credit losses
Interest revenue	<ul style="list-style-type: none"> Effective interest on gross carrying amount 	<ul style="list-style-type: none"> Effective interest on gross carrying amount 	<ul style="list-style-type: none"> Effective interest on amortized cost



E. WHY “MODELING CHALLENGES”?

- **We are dealing with P&L of the Bank and price of financial instruments.**
- **IFRS9 Expected credit losses are an estimate of credit losses over the life of the financial instrument with credit losses being the present value of cash shortfalls. When measuring expected credit losses an entity shall consider:**
 - The probability-weighted outcome
 - The time value of money
 - Reasonable and supportable information (past, current and forecast information)
- **IRB Models are only a starting point (lots of differences)**
- **PiT Forward looking & scenario design**
- **Granularity challenge and transfer criteria**
- **Simplicity and auditability**
- **Coherence of internal model framework :**
 - IFRS9 Models
 - IRB Models
 - Stress testing models
 - Incurred loss models
 - Economic capital

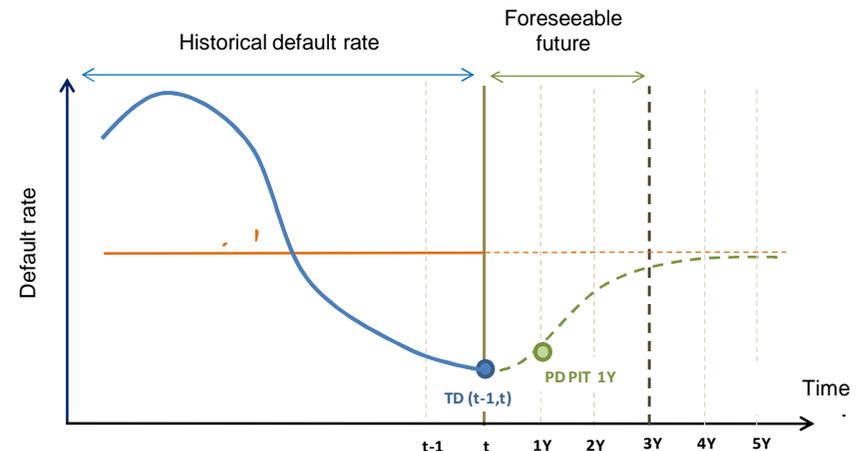


CHAPTER 02

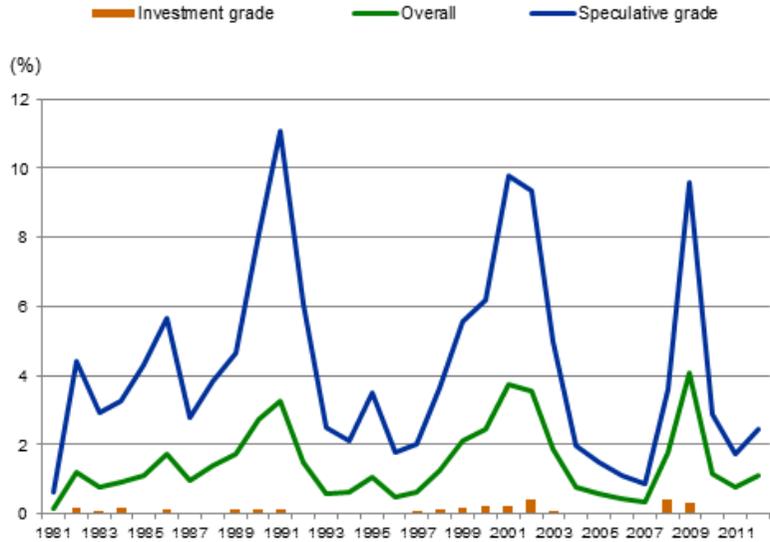
MAIN CHALLENGES FOR CORPORATE EXPOSURES

A. PD MODELING (1/4)

- **Transfer from stage 1 to stage 2**
 - Close to significant deterioration of the client's credit quality since origination
- **Goal**
 - Measure PD per rating category, including "past events", "current conditions" and "reasonable and supportable forecasts" over 1Y for Stage 1 and full lifetime for stage 2
 - Link with the regulatory framework (1Y PD TTC)
 - Link with stress-tests (forecast PIT PDs up to 3Y)
- **Open options**
 - Calibration upon internal vs. external data
 - Statistical method for estimation: cohort vs. duration
 - Forward-looking calibration methodology: multiplicative factor, systemic factor, default rate econometrics
- **IFRS9 PDs shall include**
 - Position in the economic cycle and forecasts
 - Forecast horizon (3 to 5 Y)
 - Beyond the forecast horizon: extrapolation from available data

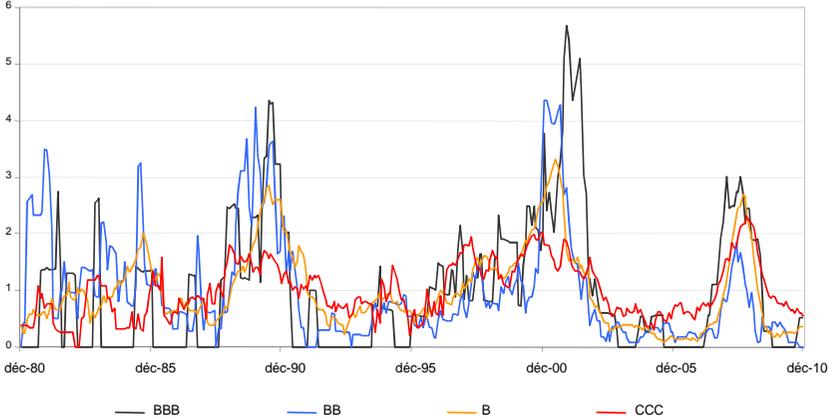


A. PD MODELING (2/4)

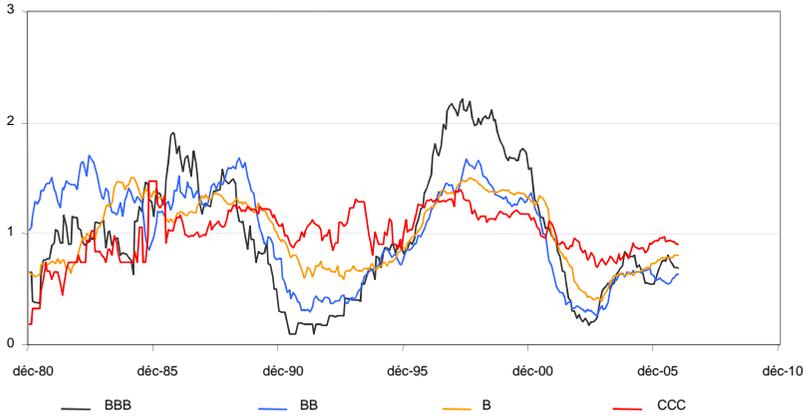


Source : Standard and Poor's Fixed Income Research and Standard and Poor's Credit Pro ®

Ratio between 1Y PIT PDs and TTC PDs

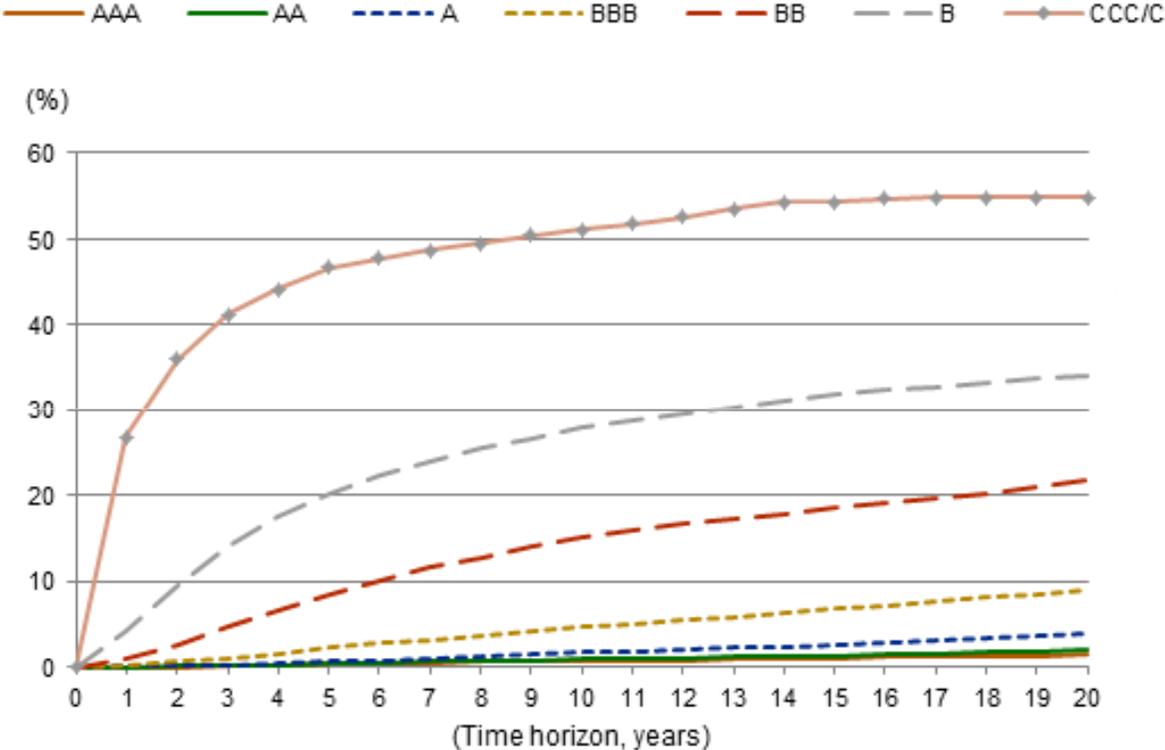


Ratio between 5Y PIT PDs and TTC PDs

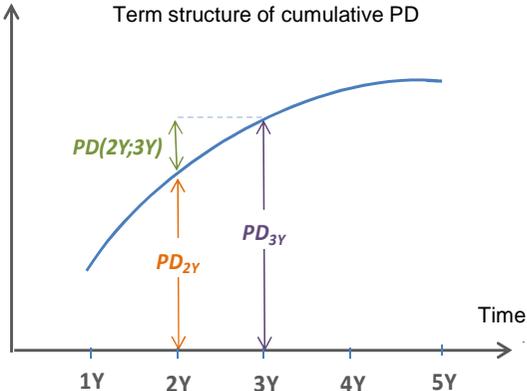


A. PD MODELING (3/4)

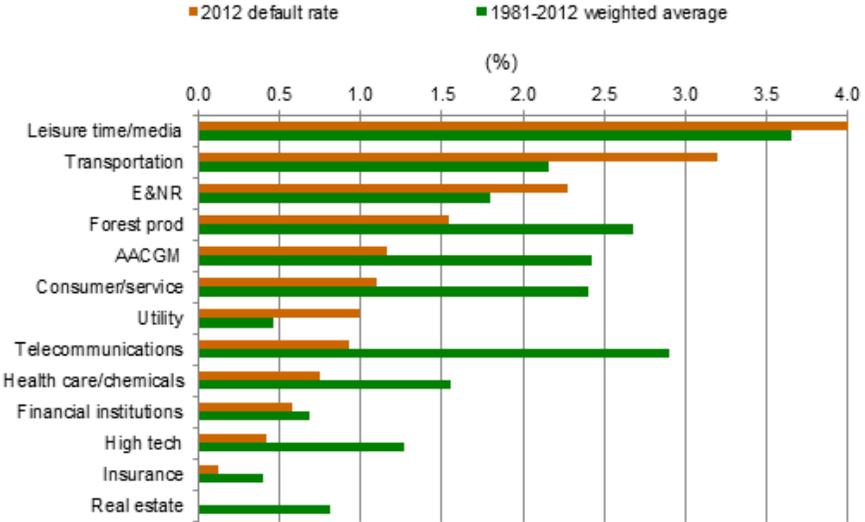
Global Corporate Average Cumulative Default rates by Rating (1981 - 2012)



Source : Standard and Poor's Fixed Income Research and Standard and Poor's Credit Pro ®

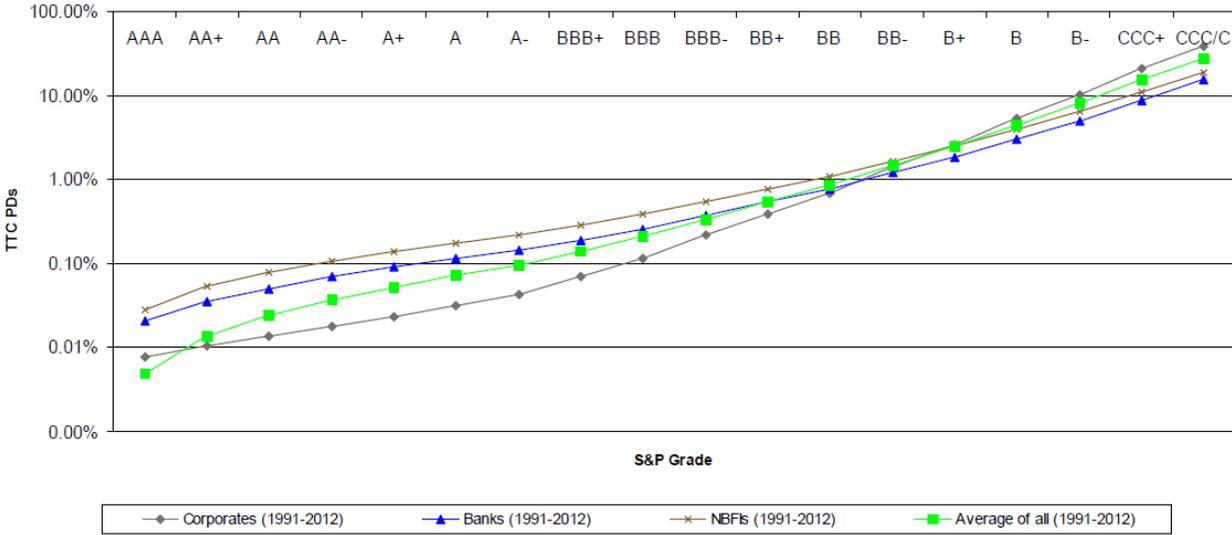


A. PD MODELING (4/4)



Source : Standard and Poor's Fixed Income Research and Standard and Poor's Credit Pro ®

Smoothed Agency TTC PDs by Asset Class



B. LOSS RATE MODELING

- **Challenges**

- Estimate a loss rate at contract level
- Include discounting
- Coherence of loss rates in stages 1 and 2 with those of stage 3
- Coherence between the IFRS loss rate and the LGD

- **Comparison with the regulatory requirements**

	Regulatory LGD	IFRS 9
Margins of prudence	Data quality, downturn, volatility	No specific margin of prudence Robustness required
Recovery costs	Included	Not included
Cycle effects	Downturn	"current condition and supportable and reasonable forecast"
Discount rate	Contract rate	Contract rate

C. EXPOSURE MODELING

- **What's new?**
 - Drawings over full lifetime for in bonis exposures (differs from the regulatory CCF)
 - Real amortization profile, either contractual or behavioral, including prepayments

- **Ideal target**
 - Balance sheet part
 - Real amortization profile including prepayments
 - How to include forward-looking? constant prepayment rate vs. factor (econometric) model
 - Off-balance sheet part
 - Drawings up to maturity / default
 - Consistency with regulatory CCF regarding the last 12 months before default
 - Difficult to embed forward-looking

- **Alternative option**
 - Duration model



CHAPTER 03

ADDITIONAL CHALLENGES FOR RETAIL EXPOSURES

A. TRANSFER CRITERIA

- **Eligible transfer criteria**
 - 30 days past due is considered as a rebuttable presumption of a significant deterioration, but is not enough
 - Other (shorter) arrears: beware technical delays of payment
 - Risk categories
 - Behavioral scores vs. updated granting scores

- **Population of stage 2 exposures**
 - Depends on the transfer criteria
 - Possibly, frequent oscillations between stage 1 and stage 2

- **Path-dependent behavior**
 - For retail exposures PDs are calibrated on homogeneous sub-portfolios.
 - Risk of stage 2 exposures depends on the history of the client behavior (non markovian process)
 - The path-dependant segmentation between stage 1 and stage 2 may be burdensome
 - PD of stage 2 exposures highly depends on the transfer criteria and stage 2 resulting size

- **Risk of systematic and uncontrolled resegmentation when heterogeneous sub-portfolios appear through time**

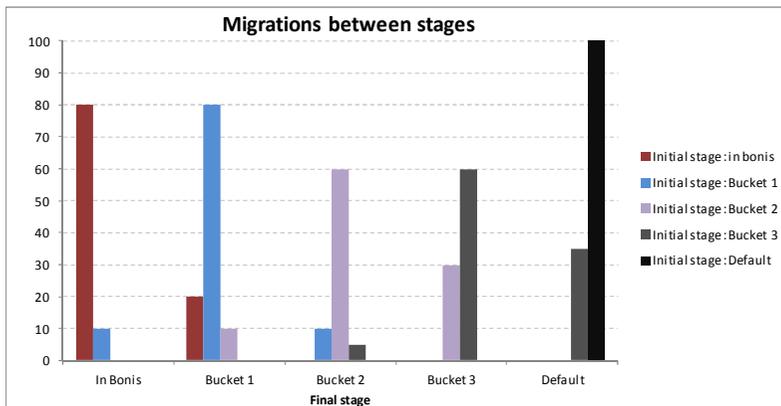
B. PD MODELING (1/4)

Roll rates

- Measure the percentage of financial assets that “roll” from one stage of delinquency time (days past due or unpaid amount) to the next within a given period of time

Example: Roll rate calculation

- Initial portfolio: 500 revolving products equally distributed between 5 stages (performing,]0;30] days past due,]30; 60],]60;90], D)
- Observation period: one month
- Default: 90 days past due or more



Initial stage \ Final stage	In Bonis	Bucket 1]0:30j	Bucket 2]30:60j	Bucket 3]60:90j	Default
In Bonis	80%	20%	0%	0%	0%
Bucket 1]0:30j	10%	80%	10%	0%	0%
Bucket 2]30:60j	0%	10%	60%	30%	0%
Bucket 3]60:90j	0%	0%	5%	60%	35%
Default	0%	0%	0%	0%	100%*

*Default is considered as an absorbing stage

How to read the table:

- At date 0, 100 contracts are in bucket 2 ([30:60 days past due])
- 1 month later, those contracts have migrated:
 - 60 contracts remain in bucket 2: migration rate from bucket 2 to bucket 2 equals to $60/100 = 60\%$
 - 10 contracts go to bucket 1: migration rate from bucket 2 to bucket 1 equals to $10/100 = 10\%$
 - 30 contracts go to bucket 1: migration rate from bucket 2 to bucket 1 equals to $30/100 = 30\%$

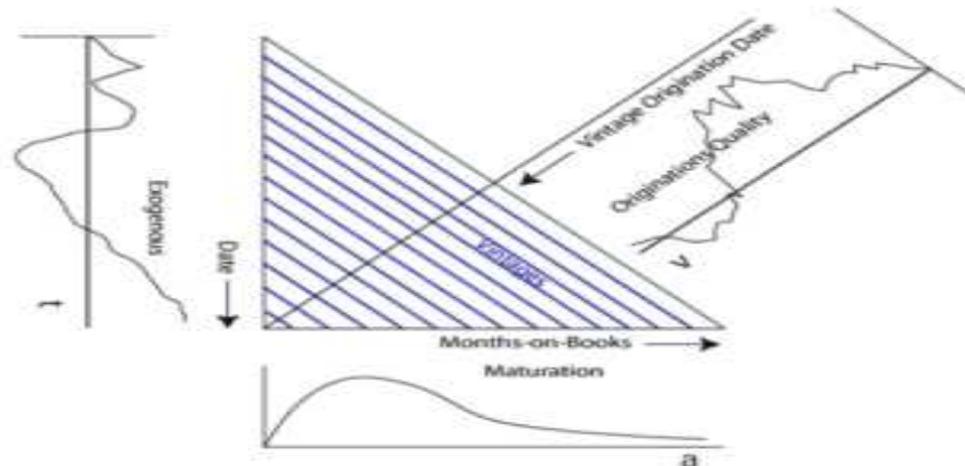
B. PD MODELING (2/4)

▪ Vintage analysis goal

- Based on vintage criteria, the loss performance of the segment is tracked over time.
- Default rates are decomposed
 - Vintage quality
 - Maturation
 - Exogenous factor (macroeconomic?)

▪ Vintage analysis technique

- Annual loss rates are analyzed with exponential smoothing techniques
- Vintage models can account for management strategies and exogenous factors by optimally adjusting parameters within the exponential smoothing algorithm
- Vintage models can be further segmented to reflect more granular levels of risk such as delinquent/non-delinquent and bankrupt / non-bankrupt populations



B. PD MODELING (3/4)

▪ Scorecards

- Scorecards are used as input into some modeling frameworks (matrix models) and for many purposes (granting, risk management), but are not commonly used for loan loss provisions
- Large institutions usually build them internally while smaller institutions rely more heavily on third party providers.
- Scores can be built for several purposes (delinquency, default, bankruptcy, etc.)
- Possible to build scorecards at a segment level
- Scorecard models can capture all factors if properly calibrated (fit real risk factors at segment level) and segmented.
- Macroeconomic information is rarely considered in scorecard modeling

▪ Risk categories (matrix models)

- Constructed at the segment or portfolio level
- Risk categories are difficult to build in a normalized / uniform framework across the bank (product / client specificities, local businesses)
- External risk categories (credit bureau scores such as FICO for instance) don't exist everywhere
- Each cell of the matrix represents the migration rate from a particular risk category to another one
- Same technical framework as for corporates: a 12-month forecast is determined by applying the distribution of one-year historical loss rates to the current distribution of outstanding loans

B. PD MODELING (4/4)

Modeling approach	Pros	Cons
Roll rates	<ul style="list-style-type: none"> • Market standard • Fits the retail credit business model • Use test 	<ul style="list-style-type: none"> • No explicit link with macroeconomic factors
Vintage	<ul style="list-style-type: none"> • Separate effects (vintage quality, maturation, exogeneous) • Easy to include macroeconomic effects and/or forward-looking • Ability to include the quality of future production 	<ul style="list-style-type: none"> • Are vintages the main drivers of losses in stage 2?
Scorecards	<ul style="list-style-type: none"> • Based on real risk/behavioral factors • Use test 	<ul style="list-style-type: none"> • Myopic approach • Difficult to link with the macroeconomic factors
Matrix	<ul style="list-style-type: none"> • Same technical framework as the corporate framework • Easy to estimate lifetime PDs 	<ul style="list-style-type: none"> • No explicit link with macroeconomic factors • Does not cope with path-dependence



CHAPTER 04

CONCLUSION

CONCLUSION

- **IFRS9 is probably one of the most important challenge for banks in the next years, due to major impacts on the bank's performance, organization and communication**
- **Interaction with regulation**
- **Impact on Models and data**
- **Impact on Risk Management**
- **Impact on Bank performance**
- **Impact on business mix**
- **Impact on bank organization and systems**