

RiskMinds 2015 - Amsterdam

Choosing modelling options and transfer criteria for IFRS 9: from theory to practice

Vivien BRUNEL – Benoît SUREAU

December 10th, 2015

Disclaimer: this presentation reflects the opinions of the author and not the one of his employer. Neither Société Générale nor the author may be held responsible for the use which may be made of the information contained therein.



Modelling principles and challenges

MAIN IMPLEMENTATION CHALLENGES – IFRS 9 Phase 2

- **A complex principle-based requirement**
 - New concepts and principles in the accounting framework
 - A larger scope, that includes all exposures evaluated at the amortized cost
 - An accurate evaluation of risks based on modelling

- **Global issues across the bank: processes, IT, reporting**
 - Substantial evolution of accounting and management systems across the Group
 - Data collection since granting on a line by line basis
 - Reporting / Disclosure : new requirements (transfers between buckets, evolution of provisions) and additional disclosures.
 - Production issues (coordination Corep / Finrep)
 - SG is specific because of its diversity (entity sizes, geography, business lines)

- **Modelling options (norm compliance, existing processes, market practices)**
 - Data requirements
 - Modelling and impact studies
 - Calculator and calibration tool design
 - Normative modelling documentation

MAIN PRINCIPLES – IFRS 9 phase 2

- **Risk management based**
 - Build upon the existing frameworks (monitoring, regulatory,...)
 - Accounting should not change the risk management and monitoring practices, but should improve them
 - Manage the interplay between accounting, regulatory and risk management processes

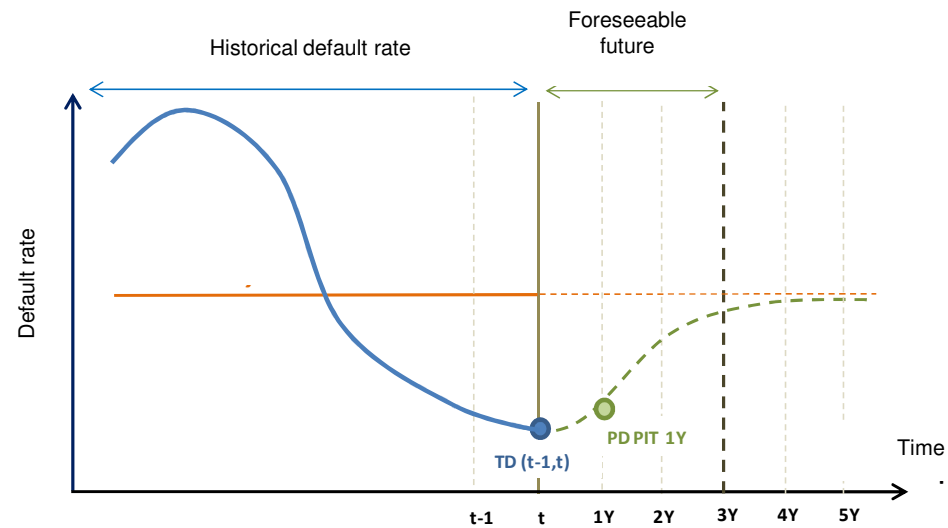
- **Simplicity**
 - Avoid black box effects
 - Leverage business knowledge
 - Avoid full automatic framework, preference for auditability and understanding of the provision variations
 - Make sure that the framework will be displayed and will evolve conveniently

- **Materiality, proportionality**
 - A reference method displayed on the most significant entities in terms of exposure or credit risk
 - A simplified approach for less significant entity which data collection and qualification is not the same level

- **Comparability / benchmarking with peers**
 - Working groups are now structured across borders
 - Audit firms are starting to settle their standards

MODELLING CHALLENGES FOR NON RETAIL EXPOSURES

- **A market standard has emerged**
 - Use of internal ratings for the transfer criteria
 - Methodologies based on the Basel 2 framework
 - PDs calibrated from observed migrations instead of observed defaults only
 - Forward-looking estimations based on the stress testing framework
- **Main modelling challenges / still to be done**
 - Calibration of the transfer criteria
 - Identification of the risk drivers (segmentation and forward looking)
 - Lifetime PDs backtesting



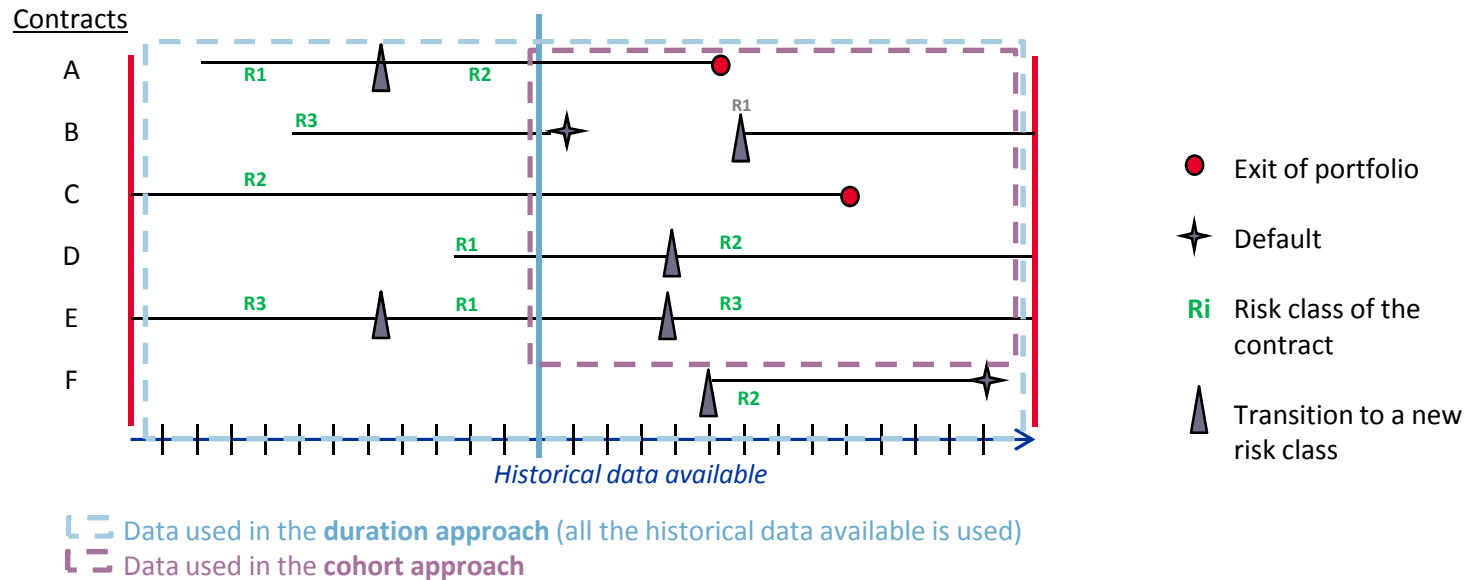
MODELLING CHALLENGES FOR RETAIL EXPOSURES

- **The market standard has not emerged yet**
 - Risk indicator for the transfer criteria (score, risk class, 1Y or lifetime PD, current or past payments in arrear)
 - Tolerance on the initial recognition date (granting vs. first behavioral score)
 - Lifetime PD measurement

- **Lifetime PD measurement**
 - Data sources
 - Observed default
 - Observed risk class migrations
 - Roll rates
 - STEP 1: estimate TTC parameters
 - Either risk class migration matrices or TTC PD curves
 - At a one year horizon, mind the gap with Basel 2 PDs!
 - STEP 2: adjust for current conditions and forward-looking
 - Cycle effects should be included to take macro economics factors into account
 - Additional adjustments for trends or other effects

POSSIBLE APPROACHES FOR RETAIL EXPOSURES (1/2)

	Observed migrations	Observed defaults
Cohort	<ul style="list-style-type: none"> Matrix approach <ul style="list-style-type: none"> Risk class (rating matrix) Days-past-due buckets(roll-rate matrix) 	<ul style="list-style-type: none"> Vintage model Risk class
Duration	<ul style="list-style-type: none"> Matrix approach taking into account time spent within risk segment (risk class, days-past-due bucket, etc.) 	<ul style="list-style-type: none"> Cox model: estimation of the default rate based on time spent within risk segment before default



POSSIBLE APPROACHES FOR RETAIL EXPOSURES (2/2)

	Observed migrations		Observed defaults	
	Pros	Cons	Pros	Cons
Cohort	<ul style="list-style-type: none"> Adapted for low default portfolios (especially the duration approach: use of all historical data available) Same mathematical framework as the mainstream corporate framework Easy to estimate lifetime PDs 	<ul style="list-style-type: none"> Does not cope with path-dependence Complex to include maturation effects Backtests not relevant (significant gaps between historical and calibrated PDs on horizons higher than 1Y) 	<ul style="list-style-type: none"> Simple to estimate/apply Use test No need to estimate transition parameters between 	<ul style="list-style-type: none"> Vintage approaches allow calculations at portfolio level only
Duration		<ul style="list-style-type: none"> A lot of parameters to estimate (non homogeneous matrix model) 	<ul style="list-style-type: none"> Use of all historical data available 	<ul style="list-style-type: none"> Multiple defaults: same contract or not?

- Among the panorama of Retail PD approaches, several are considered not relevant:**
 - Duration models seem unduly complex for retail exposures (very high default portfolios)
 - The structure of observed migrations is highly complex due to path-dependence
- Default rate with a cohort vision seems to be the most appropriate approach to build lifetime PD curves for Retail portfolios**



Assessing the performance of IFRS 9 models

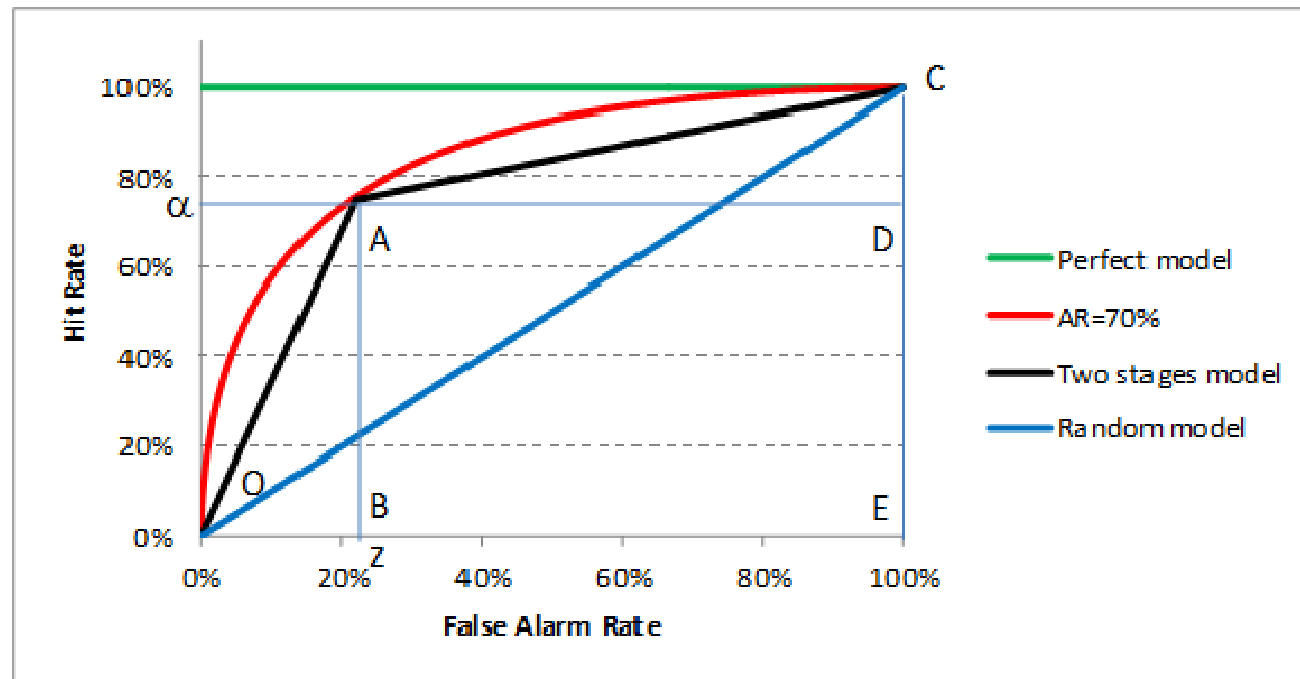
<http://ssrn.com/abstract=2606080>

TRANSFER CRITERIA STAGE 1 – STAGE 2

- **The emerging consensus is that transfer criteria are based on Basel risk measures**
 - Retail: scores or measures derived from the score (risk class, PD)
 - Non retail: internal rating
- **Transfer criteria are still an open field of research for the whole industry**
 - Relative vs. absolute
 - How do we set the thresholds?
 - What is the impact on the provision itself?
- **An optimal transfer criterion leads at setting some targets in terms of thresholds and discriminatory power**
 - Absolute risk criterion is a good proxy whenever the bank originates loans above a given cut-off threshold
 - The discriminatory power of the transfer criterion is assessed for a 1 year period of time
- **The target hit rate associated with the transfer criterion depends on the average risk of the portfolio and on the accuracy ratio**
 - It is a driver of the stage 2 portfolio size
 - It is a driver of the provision

Receiving Operating Characteristic (ROC) curve

- The ROC curve plots the Hit rate as a function of the False Alarm Rate
 - Random model: hit rate = false alarm rate
 - Perfect model: hit rate = 100%
- Statisticians usually fit the ROC curve with regular functions
 - Binormal fit
 - Exponential fit (Van Der Burgt's fit of the CAP curve)

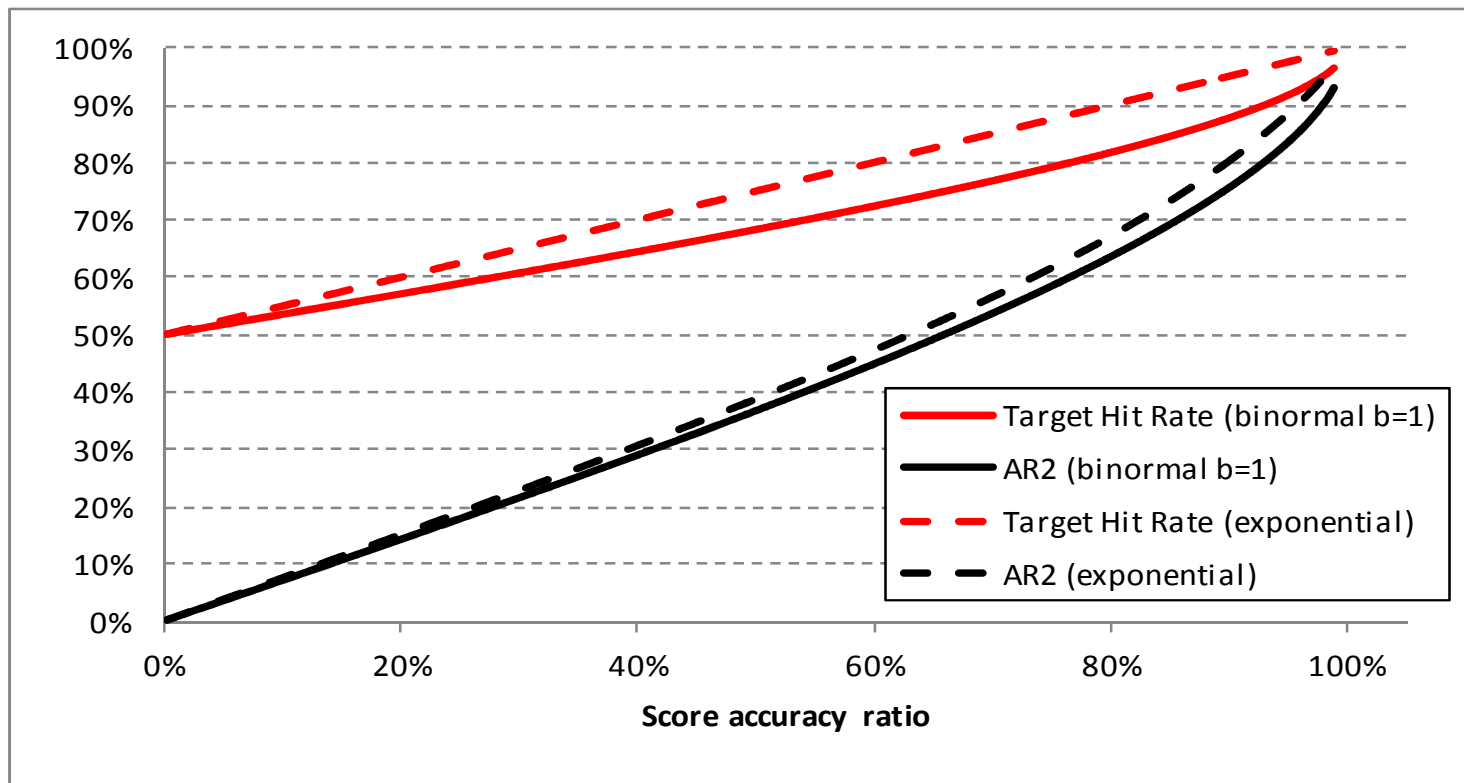


$$AR_2 = \alpha - R^{-1}(\alpha)$$

OPTIMAL TRANSFER CRITERION

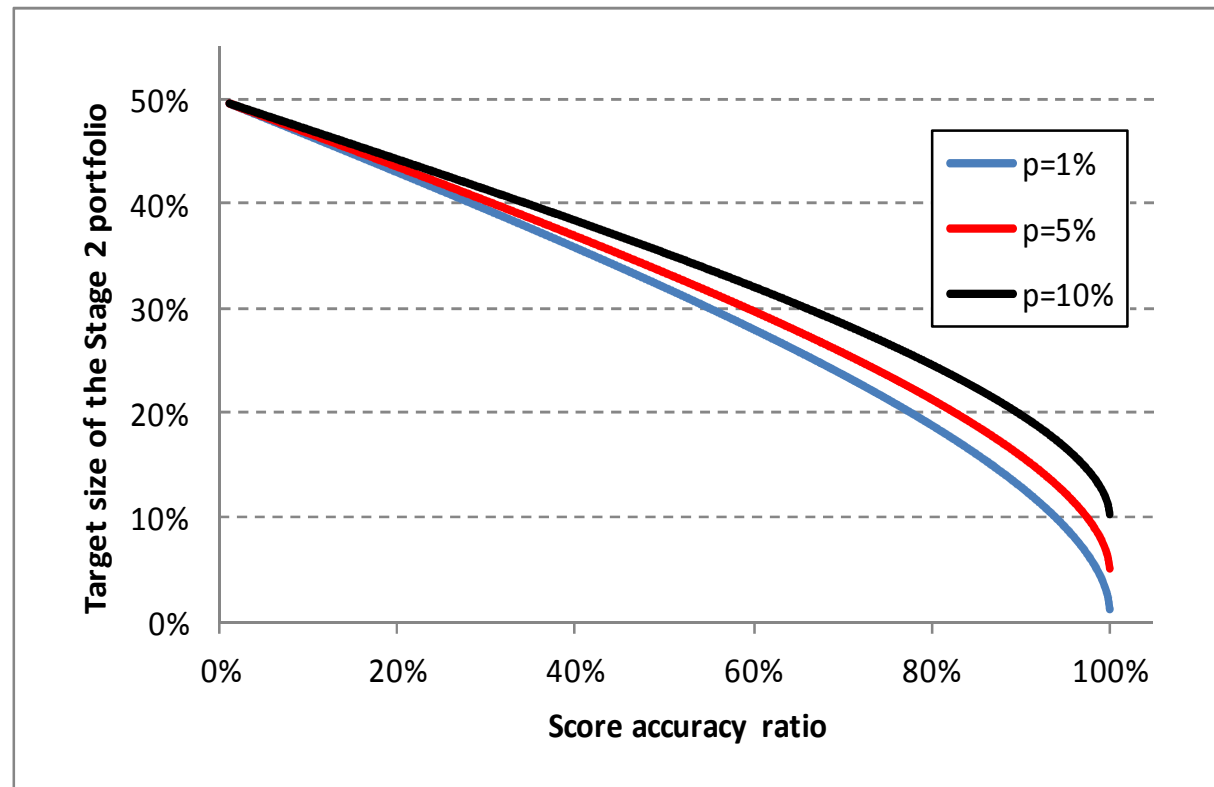
- The optimal transfer criterion maximizes the area under the 2 stages ROC curve

$$R'(R^{-1}(\alpha^*)) = 1$$



STAGE 2 PORTFOLIO SIZE

$$AR_2(1-p) = \alpha - B_2$$



PROXY FORMULA FOR THE PROVISION

- **The hit rate is the driver of the stage 2 portfolio size and of the total provision as a consequence**

$$P = p.LGD.[(1 - \alpha)D_1 + \alpha D_2]$$

- The stage 2 portfolio size depends on both the risk parameters and discriminatory power of the transfer criterion
 - The provision proxy formula is helpful as a benchmark formula for advanced methodologies and could be used as a simplified approach for less advanced banks or entities
- **Risk sensitivity is a requirement of the IFRS 9 framework. We see that the provision is sensitive to the quality of the models as well**
- **It is not certain that the provision decreases when we increase the quality of the classification between stage 1 and stage 2 (likely to generate negative misclassification costs)**

CONCLUSION

- **Complexity is a threat for IFRS 9 frameworks, on models and on other aspects as well.**
- **The goal in designing the framework is to set norms**
- **The framework must deliver the correct information to the market**
 - **For instance: the description of anticipated defaults should not be biased: stage 2 portfolios should catch a significant proportion of defaults and should not generate too high false alarm rates)**
- **Not sure that we need a consensus on method details on any segment of business or portfolio**
- **However, trade-offs are necessary for fitting practice to theory**
 - **Coherent frameworks**
 - **Set targets**