



CREDIT RISK ESTIMATES
POWERED BY BUREAU DATA



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Agenda

1. Introduction
2. Credit Risk Estimates
3. Equifax Bureau Data
4. Case Studies

Lenders need **accurate and forward looking credit risk estimates**. Depending on their purpose these estimates may need to be point-in-time, long-run averages, or conditional to expected or hypothesized economic conditions.

The **importance and sophistication of internal credit risk models** are undoubtedly increasing and regulatory expectations continue to be a key driver.

Expectations related to **Stress-Testing** have been raised significantly since 2007 and Banks are generally expected to be able to **link their credit risk estimates to economic conditions**.

A decade of **IRB** models in Europe has increased the collective experience of banks and regulators with significant **learnings regarding the use of internal models**. Unintended variations in RWAs, non-risk driven, and a perceived lack of **comparability** have led to EBA's 'Future of IRB' initiatives aiming for a more uniform application of IRB and a framework for regular **benchmarking**.

The implementation of **IFRS9** has introduced a wider audience to more complex approaches for estimating credit risk and at the same time affecting directly one of the most straightforward metrics – profit and loss.

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Credit Risk Estimates: Point-In-Time, Through-the-Cycle and Back

(1) IRB Capital : Financial Institutions approved for the Internal Ratings Based approach are allowed to calculate their minimum capital requirements based on their own **long run PD** and **downturn LGD**, EAD estimates. To achieve and maintain this approval in the UK, internal credit risk estimates and rating models need to be developed and validated in accordance to PRA guidelines, subject to European regulations (CRR/CRD) and EBA technical standards.

(2) Basel Pillar II: Financial institutions, under both Basel Internal Ratings Based Approach and the standardised approach to credit risk, need to internally assess their risks and independently evaluate their capital needs for ICAAP.

(3) Stress Testing : Financial institutions **need to link their portfolio's risk estimates to different stressed and normal economic scenarios**, in a process that follows the calculation restrictions set by the regulators and directly impacts capital planning.

(4) IFRS9 Provisions: Financial institutions aim to estimate **Lifetime PDs**, migrations between states and **loss estimates** in a forward looking manner that considers different economic scenarios.

(5) Credit Strategies: Lenders need credit risk rating systems, application scores and credit risk estimates to inform their accept/reject decisions and achieve sustainable growth.

Credit Risk Estimates: Data Limitations

Regardless of the increasing level of sophistication required, the main business goals for Banks remain the same : Sustainable Growth and Profitability, Capital adequacy and Compliance to the regulations. Credit Risk Estimates, even when produced for specific purposes, should still be compatible and make sense across the business.

Portfolio-specific problems for estimating credit risk estimates haven't disappeared either:

- Portfolios with **limited recorded defaults**
- **Young Portfolios** with limited overall historical information
- Portfolios with a long **maturity** periods

In these situations **external data**, and to the extent allowed by regulations **anonymized pooled data and Credit Bureau data**, can be a powerful addition permitting the application of credit risk estimation methods for customer management that would not be otherwise possible.

Complex modelling solutions based on thin data could potentially be an issue raised in the future when IFRS9 provisions become the reporting norm for most lenders.

What if along the new data sources becoming available to lenders we also attempted to look into existing ones under a new light?

PRA has already included in the recently updated (June 2017) Supervisory Statement for IRB implementation (SS11/13) the results from the consultation CP29/16 “Residential mortgage risk weights”, including PRA expectations on:

- The **cyclical behaviour** of PD IRB models for mortgages (**PIT vs TTC**)
- PD quantification of internal models using **extended time series of external data** including periods since the **early 90s**.

PRA’s consultation CP5/17 “Internal Ratings Based (IRB) approach: clarifying PRA expectations” discusses **the use of external data for PD and LGD estimation** for mortgage portfolios with **limited internal defaults**.

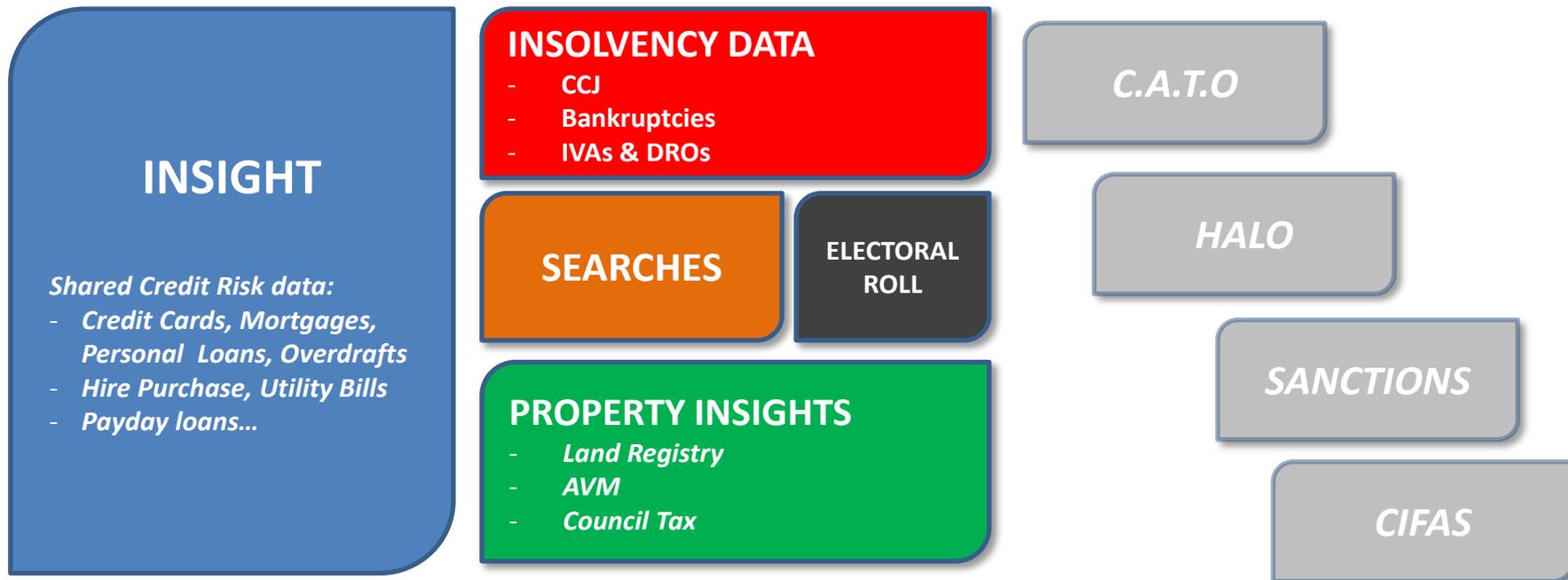
If these changes are incorporated in SS11/13, Banks with mortgage portfolios would be allowed, when meeting certain conditions and applying the appropriate level of conservatism, use **External Data** together with Internal Data to:

- Meet the **5 years IRB data** requirement
- Develop **highly predictive and IRB compliant models**

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Equifax Data combine information from closed group shared databases and public data, provided to subscribers either live or via historical retrospective analysis.



The use of Equifax Characteristics and Generic Bureau Scores in modelling solutions for credit risk has been traditionally (and successfully) focused on higher **discriminatory power** and more **informed credit decisions**

INSIGHT is a closed-group shared database with positive and negative credit information, governed by the '**Principles of Reciprocity**' in terms of the access limitations and permitted uses of the data.

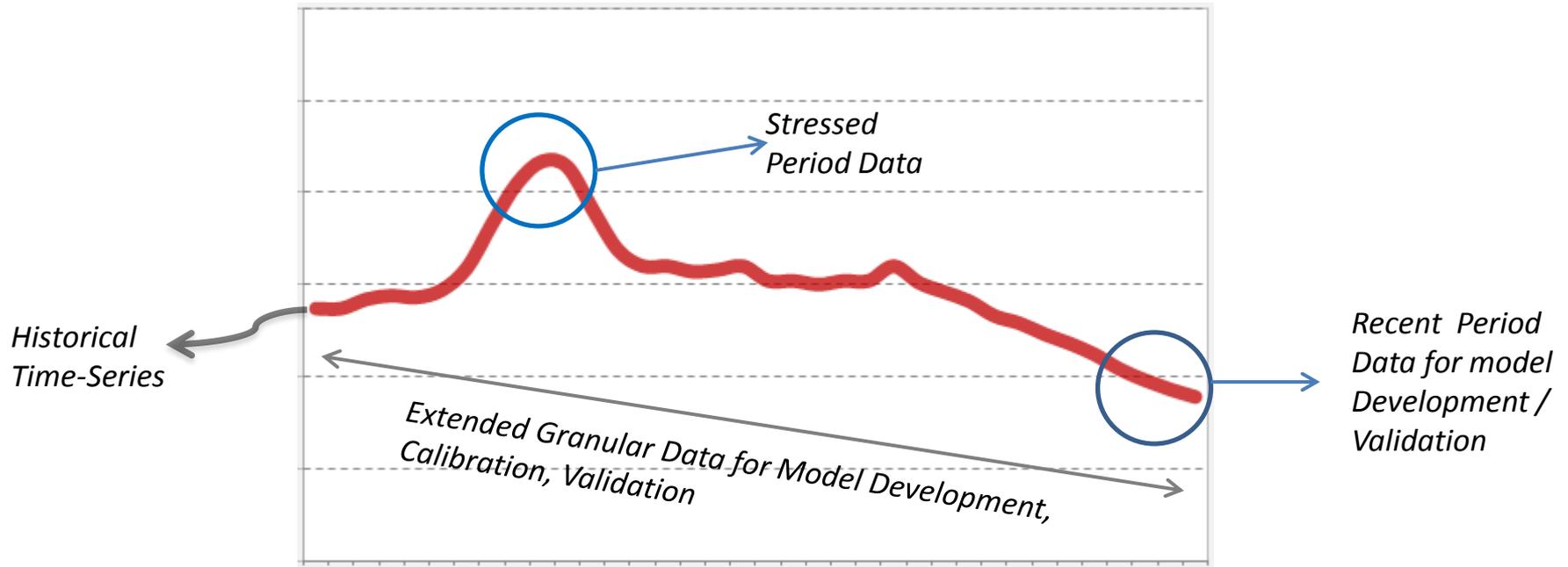
Among the permitted uses and with the constraints described in these regulations, CRA data can also be used for:

- Statistical analysis (not to be shared outside the closed group)
- Benchmarking against selected set of peers
- Scorecard Development on pooled data

The information related to arrears is reported directly from the Insight Subscribers as described by the industry document 'Principles for the Reporting of Arrears, Arrangements and Defaults at CRAs'.

Equifax Credit Bureau Data

Credit risk estimates and custom scores can be developed using anonymized pooled samples of Credit Bureau Data, designed to represent the overall Industry or profiled to match the lender's through the door population.



Anonymized pooled samples can be powerful solutions for portfolios with low defaults or historical data limitations. Providing extended historical data can be especially helpful for accuracy and perhaps less so when the only goal is discriminatory power.¹¹

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Business Cases: CRA Data & Custom Risk Estimates

As already mentioned statistical analysis with CRA data is permitted but cannot be shared outside the closed group.

We will instead discuss two illustrative cases, capturing how combining internal and Credit Bureau data can add value when estimating custom credit risk estimates.

Example 1: Developing a custom PD Application Scorecard using CRA data to address own-default and historical data limitations.

Example 2: Calibration of a generic bureau score to produce custom PD estimates for customer management and credit risk provisioning purposes.

Business Case (1) : Application Scorecard with CRA Data

Business Case: Application Scorecard with CRA Data

A lender decided that its credit process would benefit from a **bespoke scorecard**, developed and tested to work for **all segments of its client base**.

The solution needed to be **transparent** and scores to provide **meaningful PD estimates**, even though internal data were limited and considered less representative of the future through-the-door population.

Swift deployment with minimum burden to internal IT resources was also a concern, characteristics to be provided already calculated via existing CRA infrastructure was an additional element to be considered.

Analysis produced was also seen as a limited benchmarking exercise, providing additional insight to the lender.

Business Case (1) : Application Scorecard with CRA Data

1. Internal Data

The first step was to analyse the lender's own-data available and decide their role in the overall project – for profiling, model development, validation and cut-off analysis.

2. CRA Data Preparation

An extensive data sample, representative of the UK market and compliant to POR limitations, was extracted and prepared for further analysis.

3. Profiling Analysis

The internal population was compared to the UK sample in terms of key variables including region, product, thin/thick file, risk scores, derogatory information and other characteristics available to the CRA.

4. Samples Specification

The final development samples were compiled using oversampling and weights in a way that maintains the population prior probabilities while ensuring that a more balanced sample is used to fit the model to the data.

Business Case (1) : Application Scorecard with CRA Data

5. Segmentation & Scorecard Development

A business driven segmentation analysis was followed to evaluate the uplift a set of new scorecards could achieve, in the population overall and within each of the segments of special business interest.

6. Policy Rules & Cut-Off Analysis

Analysis to support policy rules review and cut-off selection was completed based on all samples available, internal applications and pooled development/hold out and out-of-time samples.

- ✓ Straight-forward approach, dealing directly with the data issues faced by the lender
- ✓ Transparent approach to sampling CRA data
- ✓ Internal data remain a significant element of the solution
- ✓ Significant uplift (Gini, KS, Approval Rates)
- ✓ Scorecard linked to meaningful risk estimates

Business Case (2) : Custom PD estimates for a Bureau Credit Score

Business Case: Custom PD estimates for a Credit Bureau Score

A lender launching a new mortgages product requested a statistical solution / calibration that would allow the use of one of Equifax application bureau scores for customer management and specifically related to IFRS9 credit risk provisioning purposes.

Consumer Bureau Scores can be very powerful in terms of discriminatory power, they are built to work well within many subpopulations, but for many reasons these scores usually are not directly translated to specific default rates.

A custom solution, calibrating the model to a representative sample compiled using CRA data, was selected as the best way to approach this request.

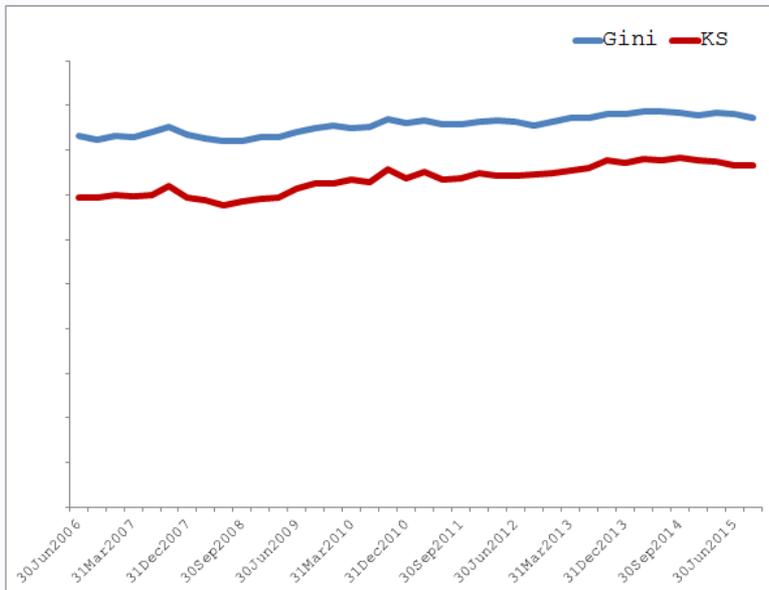
The lack of internal data combined with the long maturation process expected from Mortgages and low interest rates / low default rates economic environment, meant that any solution would not be possible to be validated with lender own-data in the near future.

Business Case (2) : Custom PD estimates for a Bureau Credit Score

1. Score Historical Performance

The first step to this project was to verify the underlying score has a strong **ranking** performance and remains **stable across historical periods** when used as a customer management tool for Mortgages.

- ✓ Consistently strong ranking performance across periods (Gini, KS)
- ✓ Stable across periods (PSI)

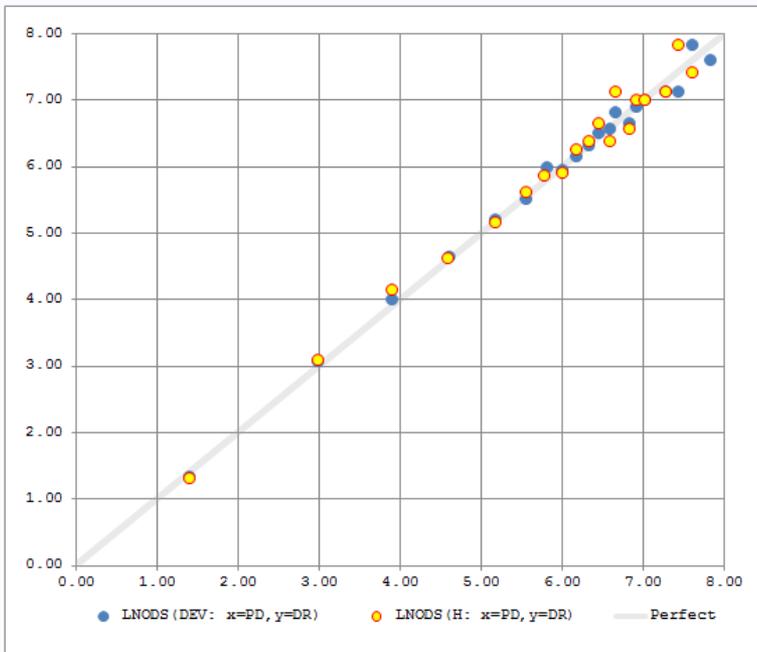


Business Case (2) : Custom PD estimates for a Bureau Credit Score

2. Calibration

Different calibration approaches were tested for the initial requested score and alternative ones.

Statistical models were preferred to simpler functional calibrations



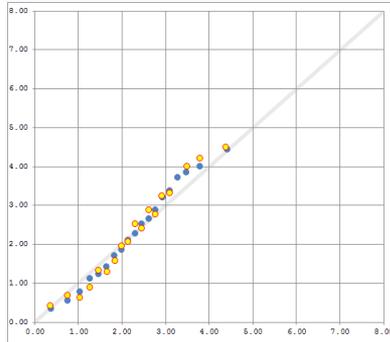
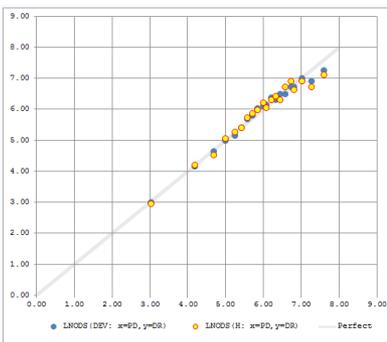
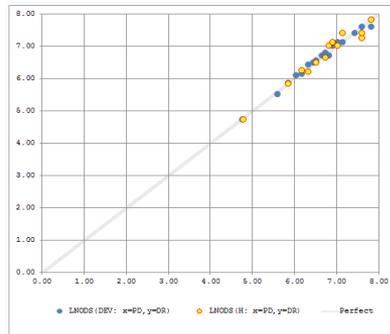
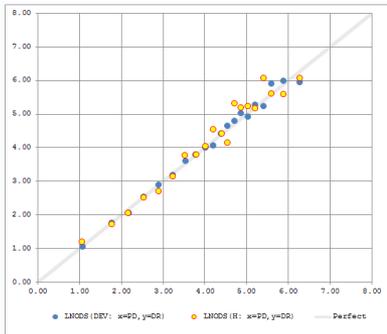
- ✓ An Industry representative sample was created covering a 10 year period (>500K records)
- ✓ Calibration functions were compared in terms of how well they fitted the data (MSE, RMSE, MAE, MAPE, MSEadj)
- ✓ A draft statistical model was selected for further subpopulation and out of time validation.

Business Case (2) : Custom PD estimates for a Bureau Credit Score

3. Subpopulation Analysis

The accuracy of the draft calibration function was further tested within key subpopulations.

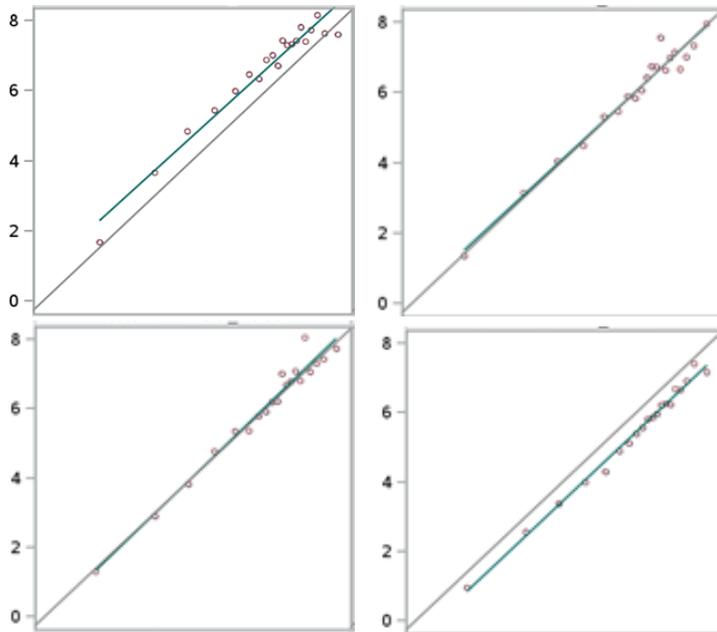
- ✓ Selected calibration had acceptable fit across subpopulations (MSE, RMSE, MAE, MAPE, MSEadj), with some room for further improvement.



Business Case (2) : Custom PD estimates for a Bureau Credit Score

4. Testing across historical periods

Finally the PDs estimated by the selected calibration function were tested across historical periods.



- ✓ Assessing LNODS actual vs. predicted (calibration), the relationship remains linear across periods and without significant drift.
- ✓ There was shift in LNODS chart for periods with significant reduction / increase in PDs
- ✓ The feasibility study confirmed the suitability of the calibration approach and the selection of the underlying score for the next steps of the project.



**THANK YOU
FOR YOUR ATTENTION**

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