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U.K. Residential Mortgages Risk Weights PRA Consultation Paper CP29/16

Prepared by

Dr. Juan M. Licari
Juan.Licari@moodys.com
Managing Director

Dr. Dimitrios Papanastasiou
Dimitrios.Papanastasiou@moodys.com
Director-Solutions Specialist

Maria Valle del Olmo
Maria.ValleDelOlmo@moodys.com
Senior Economist

Contact Us

Email
help@economy.com

U.S./Canada
+1.866.275.3266

EMEA
+44.20.7772.5454 (London)
+420.224.222.929 (Prague)

Asia/Pacific
+852.3551.3077

All Others
+1.610.235.5299

Web
www.economy.com
www.moodysanalytics.com

Introduction

The PRA has proposed a number of changes to the SS11/13 regulation in response to the high level of variability and heterogeneity identified in the risk weights of U.K. residential mortgage portfolios under the internal ratings-based approach. The proposed changes incorporate revised expectations in the way the firms/banks should model and calibrate probability of default and loss given default parameters for U.K. residential mortgages.

The PRA proposes that the new policy be effective by 31 March 2019, with firms being able to submit adjustments to their residential mortgages models for approval until 31 May 2018.

Executive Summary

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Main Findings and Regulatory Expectations

PD models: Existing approach

IRB PD model-building for residential mortgages in the U.K. follows a two-step approach:

- **Build scoring/rating model:** Using traditional credit scoring techniques applied on past default information, the final statistical model aims at maximizing the rank ordering properties of the rating system. Depending on the type of input factors used, scoring models are typically classified as:
  - **Application models:** Associate obligor and contract characteristics at the point of the application with the likelihood to default.
  - **Behavioural models:** In addition to underwriting quality (application variables), these models include performance information for a particular obligor (missed payments, days past due).
- **Calibrate rating grades to PD levels:** A second step involves the association of scores/ratings to PD levels. Examples of this task are:
  - **Point-in-time calibration:** Dynamically recalibrate rating systems to the previous year's default experience. This approach produces volatile PDs/ratings but does not require extensive historical data for calibration purposes.
  - **Through-the-cycle calibration (variable scalar):** Convert the outputs from (partially) PIT rating systems into TTC PDs by using a time-varying multiplier applied on the appropriate portfolio segmentation level.
  - **Hybrid calibration:** Use the cyclicality of the underlying rating model to dictate the PIT-ness of the resulting PDs.

At the end of this process, the PD level for each grade is rescaled to correspond to the long-run average default rate for that grade.

Depending on the cyclicality of the input factors, the scoring/rating models can be close to PIT or TTC. For example, a behavioural scoring model is, by construction, more cyclical than an application scorecard, since the former includes performance variables. Depending on the calibration, the resulting PD model (irrespective of the underlying scoring model) can be anywhere in the PIT-TTC spectrum.

Findings and motivation for the proposed changes

The PRA observed that residential mortgages IRB PD models in the U.K. typically lie in one of the ends of the PIT and TTC spectrum. This disparity in PD modelling approaches has highlighted some key concerns around the existing implementation of the IRB approach for mortgage portfolios, including:

- **Deficiencies in capturing risk:** The cyclicality of the PD models is not properly assessed, leading to misalignments between capital levels and the underlying risk across the credit cycle.

1 New IRB submissions or material model changes submitted before 31 May 2018 would be allowed to be based on the unamended version of the SS11/13, provided that the institutions have a credible plan to implement these changes by 31 March 2019.

- **Excessive pro-cyclicality of capital levels:** Going through a more benign state of the credit cycle, an increasing number of banks are implicitly incentivized to use more PIT PD approaches. This leads to highly volatile capital levels for the banking industry that can be too low (high) during good (bad) credit times.
- **Lack of comparability of risk weights across banks:** The heterogeneity in the underlying PD models causes risk-weighted assets to behave very differently across different states of the credit cycle, making the comparison of Pillar I and Pillar II (stress-testing) RWAs very difficult across the banking industry.

More specifically, the observed approaches have a number of limitations.

PIT PD models:

- Calibration uses only very recent experience, which causes the **PDs for what is otherwise long-term lending** to be primarily driven by short-term fluctuations in default rates. This results in long-term risk drivers not being appropriately captured.
- Lead to (1) excessive pro-cyclicality in capital requirements (encourages credit exuberance in a boom and deleveraging in a downturn) and (2) high variability of outcomes (volatility in capital ratios—too high in upturn, too low in downturn).

TTC PD models, including the so-called variable scalar approaches:

- Consider only a small number of drivers that do not change with time. These drivers are **not typically able to segment consistently across the credit cycle** the outputs of the underlying scoring models.
- Are often **unable to discriminate between cyclical and noncyclical changes in risk**, which leads to risk not being sufficiently captured. For instance, if a portfolio deteriorates because of poor underwriting (rather than because of poor economic conditions), the capital requirements calculated using variable scalar approaches may not increase as they should.

Expectations

The PRA expects banks to move away from both ends of the spectrum described above and adopt a hybrid approach. That would ensure consistency/homogeneity across the banking industry and better align the capital levels to the state of the credit cycle.

Loss given default models

Existing approach

Banks are expected to calculate downturn LGDs for capital calculation purposes assuming a **minimum of a 40% drop in property sale prices.** The overall property sale price is a **combination of house price movements and forced sale discount assumptions.** The relative weights of house price movements and forced sale discount assumptions is currently left at the discretion of the banks.

Findings and motivation for the proposed changes

The assumption around house price declines during economic downturns is a key input to the LGD estimates used for capital calculation purposes. During the 2014 stress-testing exercise, the PRA observed significant discrepancies when assessing the impact of the stress scenario assumptions around house price movements on risk weights. This is the result of **house price assumptions varying significantly among institutions, and this does not seem to be justified.**

Expectations

Achieve consistency in the house price fall assumptions across banks so that LGDs reflect downturn market conditions.

PRA Proposed Changes – Implication for Banks

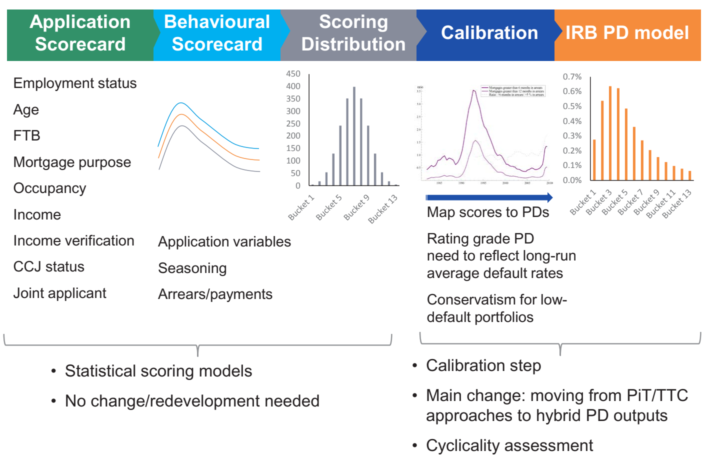
The proposed amendments to the supervisory statements will have implications for U.K. banks. Here is a summary of expected effects across PD and LGD parameters.

PD models

The main change under the CP29/16 consultation paper is the **mandatory use of hybrid PD models** for internal ratings-based purposes combined with a **continuous assessment of the cyclicality** of the underlying rating systems. Figure 1 shows the key modelling steps for getting IRB PDs for residential mortgage portfolios and highlights the parts of the process that the consultation paper affects.

Figure 1: Key Changes in PD Modelling Steps

The proposed changes in more detail include:



<u>Changes in the calibration approach</u>

- Mandatory use of **hybrid PD models** for capital calculations. The following methodologies are no longer seen as acceptable:
  - Variable scalar approaches
  - Dynamic recalibration to achieve artificially high PIT PD outputs
- Compliance with the revised regulation should be addressed through **recalibration (**rather than through redevelopment).
- Banks should calibrate their PD models using a **consistent and appropriate assumption on the level of model cyclicality.**
- Banks should always determine the **cyclicality** of their PD model to enable them to calibrate, monitor, and stress their systems. Two closed-form **formulas** are suggested to determine cyclicality:

$$cyclicality\% = \left(\frac{PD_t - CT}{DR_t - CT}\right) * 100 \quad \text{or} \quad cyclicality\% = \left(\frac{PD_t - PD_{t-1}}{DR_t - DR_{t-1}}\right) * 100$$

where PD_t refers to long-run average PD at time "t", CT stands for the central tendency or portfolio average default rate over a cycle, and DR_t represents the observed default rate at time "t".

- It is important to note that a **prudential floor of 30%** to the cyclicality of the PD model is introduced. For firms that calibrate or recalibrate their rating systems using internal data taken predominately from a downturn period, the 30% floor would not apply.

Implications for data requirements

- Firms must comply with the specific requirement of **incorporating economic conditions equivalent to those observed in the U.K. during the 1990s** when defining the long-run average PD for calibration purposes.
- Firms will need to comply also with specific calibration requirements which are introduced for portfolios with "low historical data" (that is, where there is an absence of or insufficient relevance of internal or external data over a representative economic cycle). For this type of portfolio, banks will have to "model how book-level default rates in a given low historical data portfolio would have performed under the economic conditions that would be experienced in an economic cycle containing a representative mix of good and bad periods." This model should then be used to calibrate long-run average PDs for each rating grade.

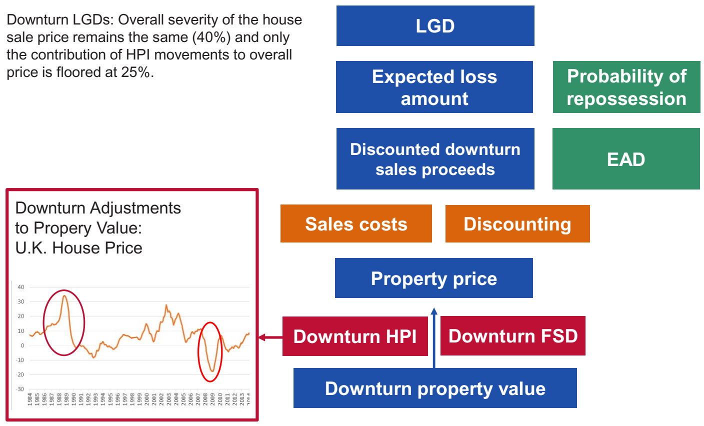
Additional requirements for ongoing maintenance

- Under the assumption of setting the cyclicality of the rating model at the correct level, recalibrations should be infrequent. Therefore, any **recalibration to the model should include:**
  - A robust assessment of the cyclicality of the rating system.
  - A robust assessment and explanation of the cause for the need to recalibrate, including whether it is due to changes in default risk that are not purely related to changes in the cycle.
  - A review of the appropriateness of undertaking a recalibration by an independent validation function.
- **Changes in monitoring,** which should include at least an assessment of:
  - Appropriateness of the long-run average PDs, taking into consideration whether movements in default rates are due to external factors or changes in underlying credit quality.
  - The cyclicality of the model.
  - The underlying rank ordering mechanism.

LGD models

While the expectation to assume at least a 40% reduction in property sale prices from the peak still holds, banks should now incorporate a house price fall assumption of at least 25% when calculating downturn LGD. Figure 2 depicts the LGD calculation steps for residential mortgage portfolios and highlights the key change around the assumptions for house price fall during economic downturns.

Figure 2: Change in LGD Calculation Steps



Implications

Given the current point in the credit cycle, banks moving away from a PIT approach would see an increase in their Pillar I capital requirements and a decrease in their stress (Pillar II) capital requirements, while the opposite would be true for banks that have adopted the variable scalar approach.

The proposed changes would also come at a cost to the banking industry. We expect an increase in the demand for external data, especially for new products or newly originated portfolios. Furthermore, the additional requirements for modelling and ongoing maintenance would increase the reliance on third parties to provide support around IRB submissions, particularly among the smaller institutions. In more detail, we see the proposed changes would affect banks differently:

- **Banks with existing IRB approved models:** For already approved models, the changes would be limited to a recalibration exercise, and redevelopment of the underlying scoring models would not be needed. Nevertheless, the cyclicality of the scoring models would need to be assessed as part of the calibration exercise and new validation processes to be introduced in order to monitor the performance of the model on an ongoing basis. For the recalibration requirements, the implication for banks would be different based on whether:
  - Banks have enough internal data to support long-run average PD calibration. Banks using the variable scalar approach would typically have the necessary data to migrate to the proposed hybrid paradigm. Nevertheless, there could be a need for external data sources for validation/monitoring purposes.
  - Banks lack the historical data to support long-run average PD calibration. The current fully PIT approach relies on dynamic recalibration using recent default data. Firms currently following this approach might be required to use external, and potentially multiple, data sources to comply with the new requirements.
- Banks that seek IRB approval: For new IRB submissions, the consultation paper increases the modelling effort during the development phase and the additional PRA requirements might prolong the IRB submission process. Again, the impact of the new requirements would be different depending on the internal data availability:
  - **Banks have enough internal data to support long-run average PD calibration.** Banks having mortgage data going back to early 1990s should be able to build scoring models and assess the cyclicality of their models using only their internal data.
  - **Banks lack the historical data to support long-run average PD calibration.** Banks with limited internal data would need to use external sources for calibration and potentially scoring model building.

Table 1 provides a high-level summary of the impact for both the modelling effort and capital requirements.

Table 1: Impact of Proposed Changes on Modelling Effort and Capital Requirements

Existing IRB Model	Availability of Internal Data	Current PD Approach	Impact on Modeling	Expected Impact on Capital Requirements
Yes	High	PIT	✓ Recalibration using internal data ✓ Measure and monitor cyclicality ? External data sources for validation	• Increase of Pillar I capital • Decrease in Pillar II capital
Yes	High	TTC	✓ Recalibration using internal data ✓ Measure and monitor cyclicality ? External data sources for validation	• Decrease of Pillar I capital • Increase in Pillar II requirements
Yes	Low	PIT	✓ Recalibration by supplementing internal data with external data sources ✓ Measure and monitor cyclicality ✓ External data sources for validation	• Increase of Pillar I capital • Decrease in Pillar II requirements
Yes	Low	TTC	✓ Recalibration using internal data ✓ Measure and monitor cyclicality ✓ External data sources for validation	• Decrease of Pillar I capital • Increase in Pillar II requirements
No	High	-	✓ Model development using internal data ✓ Measure and monitor cyclicality ✓ External data sources for validation	• Decrease of Pillar I capital • Increase in Pillar II requirements
No	Low	-	✓ Model development using internal and external data sources ✓ Measure and monitor cyclicality ✓ External data sources for validation	• Decrease of Pillar I capital • Increase in Pillar II requirements

Conclusion

Although some questions arise around the appropriateness of the 30% cap on cyclicality, we believe that the proposed changes by the PRA are a step in the right direction:

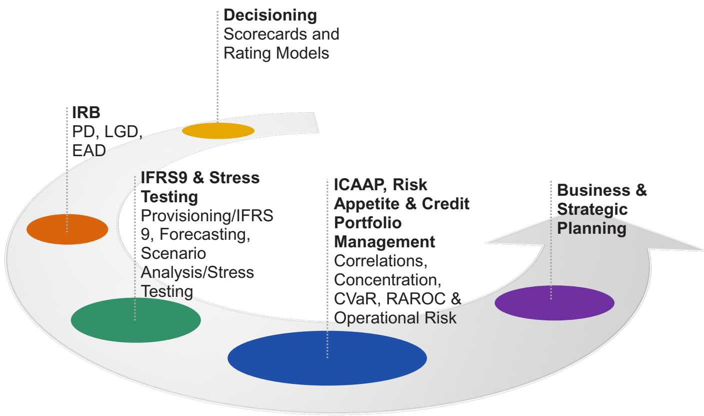
- » Unifying the approach to PD calibration, the changes enhance the comparability of capital requirements across the banking industry.
- » Enabling the alignment of IRB models with the forward-looking and scenario-based aspects of credit risk assessment such as stress-testing and the impairment calculations for IFRS 9.
- » Enhancing the monitoring processes and motivates banks to improve the collection of granular historical data.

The role of IRB models in the overall credit risk management process is vital. It sets the starting foundation to rank-order and quantify the risk of a credit portfolio. Ideally, the outputs of the IRB models should serve as inputs into forward-looking projections such as the ones used in stress-testing and IFRS 9 credit impairment models. These should also link to ICAAP, risk appetite, and active credit portfolio management. Key features to consider for this desired model landscape are:

- » Stress-testing and IFRS 9 models typically use as the basis the underlying IRB models. To have consistent translation of IRB to stressed expected losses or IFRS 9 expected lifetime losses.
- » Pillar I and Pillar II capital requirements need to be consistent. If Pillar I models cannot differentiate between cyclical/noncyclical and short-term/long-term risk drivers, then the Pillar II models might over- or understate the capital requirements.
- » Align capital and P&L: Capturing the long-term risk of mortgages is key for lifetime PD calculations under IFRS 9. The cyclicality measurement and the hybrid calibration are based on the long-run behaviour of the scoring models, hence they need to be aligned with the IFRS 9 adjustments.

Figure 3 illustrates this process, highlighting the importance of building consistent risk models and modules. IRB models are a pivotal ingredient in this desired credit model landscape.

Chart 3: Credit Risk Model Flow



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