



Loss given default

**Renewed interest in defining
'downturn' – a UK mortgage focus**

November 2019



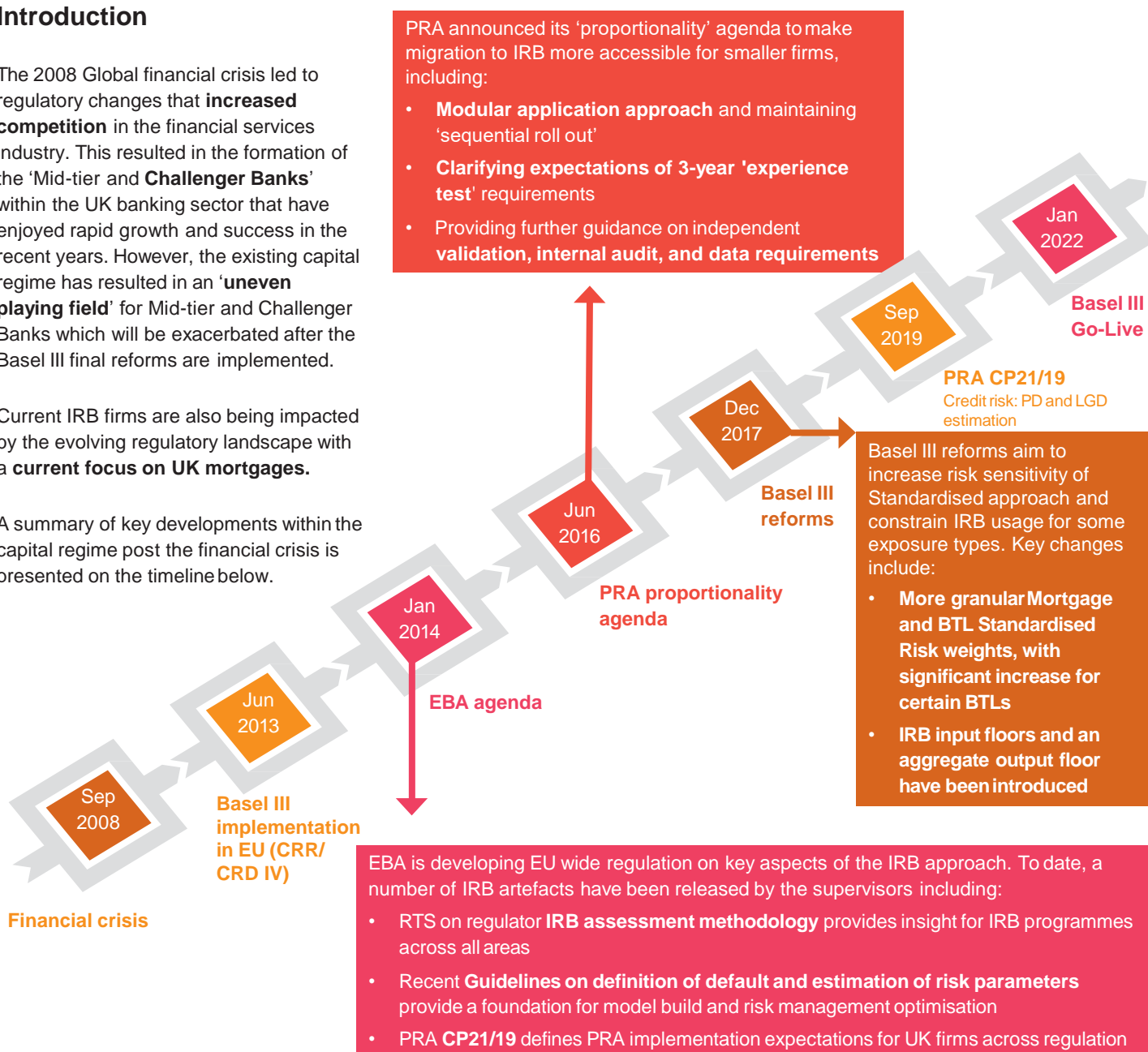
The 'IRB journey' in an evolving regulatory landscape

Introduction

The 2008 Global financial crisis led to regulatory changes that **increased competition** in the financial services industry. This resulted in the formation of the 'Mid-tier and **Challenger Banks**' within the UK banking sector that have enjoyed rapid growth and success in the recent years. However, the existing capital regime has resulted in an '**uneven playing field**' for Mid-tier and Challenger Banks which will be exacerbated after the Basel III final reforms are implemented.

Current IRB firms are also being impacted by the evolving regulatory landscape with a **current focus on UK mortgages**.

A summary of key developments within the capital regime post the financial crisis is presented on the timeline below.



Because of this, there are a significant number of firms across the Mid-Tier (or 'Challenger') Banks and Building Societies market that are looking to take the journey to IRB accreditation. Further there are some key considerations for firms 'Going IRB' and current IRB Banks and Building Societies in this evolving regulatory landscape:

Typical features of Banks and Building Societies 'Going IRB'

Total Credit exposures

£1 bn – £30 bn

Total Credit Risk Weighted assets (RWAs)

£1 bn – £30 bn

Proportion of Immovable Property RWAs

35% – 100%

Considerations for Banks and Building Societies 'Going IRB'

Compliance

Expectation for full compliance prior to accreditation, and therefore, at the time of Module 1 submission

Timing

Delays to IRB programmes. Knock-on impact on timings given 'experience test' expectations

Financial

Additional validation, model monitoring and internal audit activities need to be planned prior to submission, resulting in increased programme costs

Considerations for current IRB Banks and Building Societies

Compliance

Temporary non-compliance permitted, but for limited timeframes

Timing

Most current IRB firms had plans to implement EBA Roadmap changes in 2 phases – *this is no longer possible*

Financial

Significant pressures on internal resourcing to complete all modelling activities for UK mortgages by 2020 – *most firms are using external support*



Defining 'economic downturn' for LGD modelling

Nature, severity and duration of an economic downturn

Introduction

The Basel II framework requires firms to estimate and use Loss Given Default (LGD) and conversion factors reflecting 'downturn' conditions if these are more conservative than the long-run average. The EBA has performed two notable studies¹ and found that different practices exist in defining and applying downturn conditions for LGD across firms. This is deemed a key driver of divergence in RWAs across EU firms.

As part of the wider EBA agenda to reduce RWA variability, the CRR mandated the EBA to develop regulatory technical standards (RTS) to specify the nature, severity and duration of a 'downturn period' to promote consistent application (EBA/RTS/2018/04).

Downturn periods are then used to calibrate the LGD to economic downturn conditions. The methodology for estimating LGD reflecting these downturn conditions is captured as part of separate EBA Guidelines (GL) (EBA/GL/2019/03, see next page for details).

PRA perspective under CP21/19 (September 2019)

The EBA 'IRB Roadmap' Progress Report² published in July 2019 extended implementation timelines for firms to gain approval for PD and LGD updates (including 'economic downturn') to 1 January 2022.

However, PRA CP21/19 proposes that for UK mortgage portfolios specifically, all EBA IRB Roadmap artefacts should be implemented from **31 December 2020**.

This is aligned with wider PRA requirements for UK mortgage hybrid PD implementation. This will be a significant challenge for UK firms with large mortgage portfolios in 2020.

Defining nature, severity and duration

When calibrating economic downturn conditions for regulatory LGD measures, the RTS requires firms to first specify the nature, severity and duration of an 'economic downturn'. This step is independent of the firm's loss experience and relies entirely on external economic information:

- The **nature** of an economic downturn is specified through the economic factors (e.g. GDP) that are explanatory variables or indicators of the business cycle for an exposure type.
- The **severity** of an economic downturn is specified as the most severe values observed for the relevant economic variable over a given historical period.
- The **duration** of an economic downturn is captured in the concept of 'downturn period'. This is a period of at least 12 months which captures the peaks or troughs of one or more economic variables linked to the same economic event.

The EBA provides a set of mandatory variables to consider when defining '**nature**' for all exposures and includes a number of specific factors. A key challenge for firms is to find appropriate sources for economic factors and apply appropriate factors.

When defining the **severity** of an economic variable, firms are required to select the most severe value for each relevant variable based on historical values observed over the last 20 years as a minimum. UK firms with UK mortgage portfolios are extending the economic analysis to early 1990s to align with the PRA SS11/13 requirements for back-casting long-run average hybrid PDs.

A further challenge observed relates to defining the **duration** of one or more 'downturn periods'. Analysis is required to show linkage of macro variables to a particular economic event which can extend the duration to well beyond 12 months.

PwC has developed an **LGD downturn framework** in line with these requirements.

¹ [2013 EBA study](#) on RWA comparability; and [2014 EBA study](#) on low default portfolios

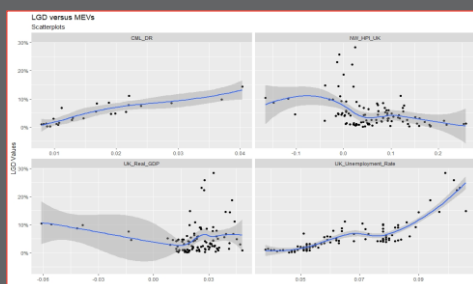
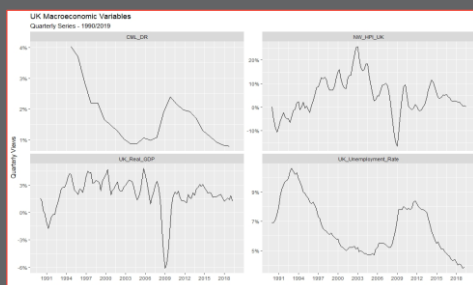
² [2019 EBA report](#) on progress made on its IRB Roadmap

Defining a 'downturn period' – our framework for UK mortgages

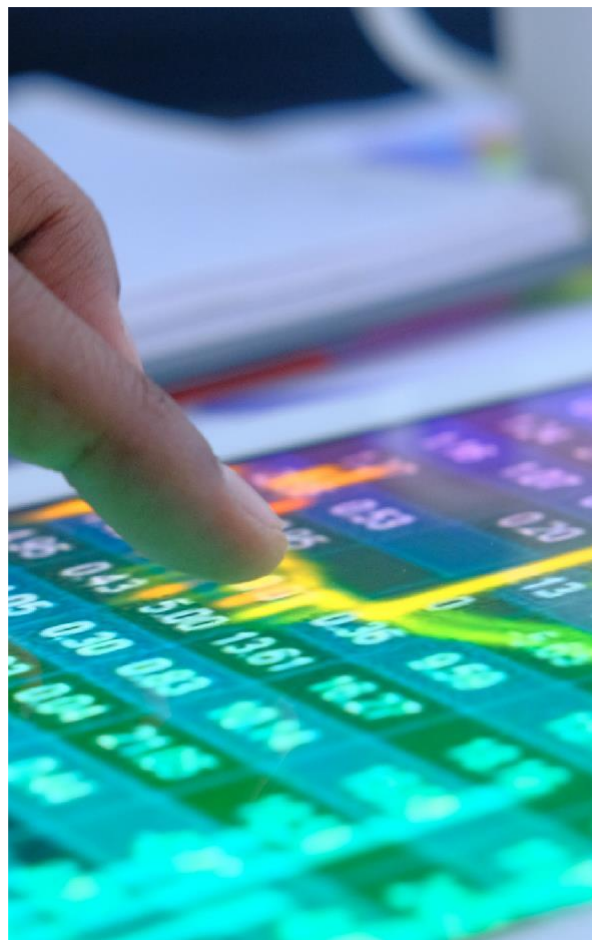
Step 1 – defining 'nature'

Our LGD framework uses publically available economic variables (e.g. from ONS) **covering all EBA mandatory variables** in addition to wider commonly used factors.

Our time series extends to the early 1990s to fully comply with SS11/13.



PwC insight: We find many variables show weak, non-linear, and often counterintuitive relationships with our 'generated' loss data. A key challenge is to define the most appropriate variables to use for your portfolio. Our **analytics tool** can help you navigate this to identify the most appropriate variables for your portfolio and associated loss rates.



Step 2 – defining 'severity'

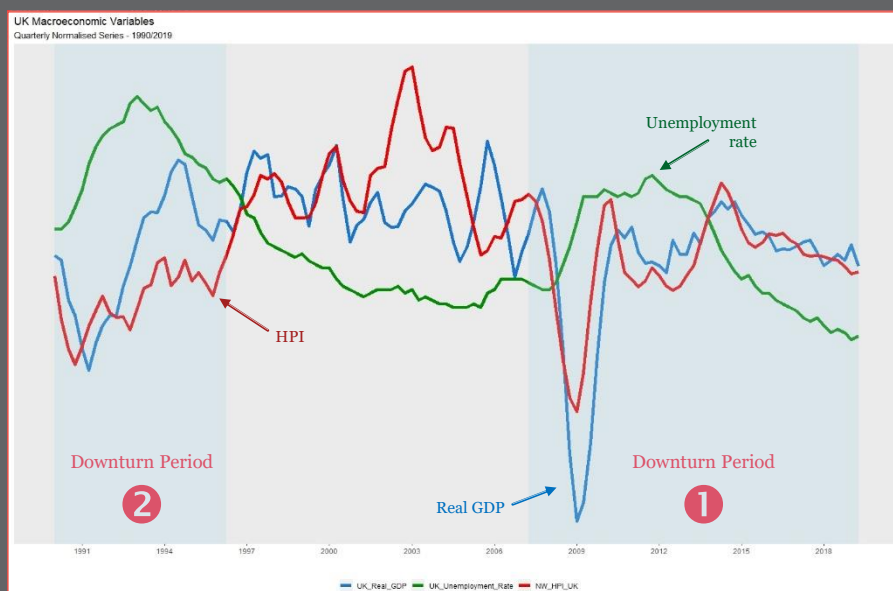
Once appropriate economic variables have been defined, our framework can: **estimate 'severity' values**; isolate downturn periods; and estimate 'duration' of those downturn periods for each variable using our analytics tool. We show outputs for **UK real GDP growth and UK HPI** highlighting the most severe values.



Step 3 – defining 'duration'

The statistical logic within our LGD analytics tool can be optimised for your key variables to isolate multiple portfolio level 'downturn periods' which incorporate all your relevant variables. These downturn periods will then form the basis of **estimating your downturn calibration** as shown on the next page.

Our approach will generate downturn periods based on normalised macro variables that have **strong and intuitive correlations**. In this example, we show two downturn periods based on correlations of three economic variables for illustration.



Estimating downturn ‘calibration’ for LGD modelling

Firms without observed data can use extrapolation or haircut methodologies

Introduction

The RTS on economic downturn defined on the previous page, sets out the requirements for identifying a ‘downturn period(s)’ by exposure class. The EBA published separate GLs specifying how LGD appropriate for an economic downturn should be quantified (EBA/GL/2019/03).

This GL supplements the wider GL on PD estimation, LGD estimation and the treatment of defaulted assets (EBA/GL/2018/16), which forms part of the EBA IRB Roadmap to reduce unwarranted RWA variability.

As for wider EBA IRB Roadmap artefacts, the requirements from the GLs should be fully implemented from 1 January 2022.

PRA perspective under CP21/19

The PRA proposes to update SS11/13 in a number of areas to implement the EBA requirements on LGD estimation:

- **LGD approach:** PRA expects firms to use a ‘component-based’ approach for UK residential mortgages rather than ‘direct estimate’ approaches.
- **Downturn period:** PRA expects firms using component-based approaches to ensure that all components reflect a downturn and that each component reflects the same downturn. A time lag may be necessary so that the peak value within the same downturn is used for each component.
- **Type 3 estimation approach:** PRA does not expect firms to use type 3 approach as it does not expect firms will be able to demonstrate that they cannot apply type 1 or 2 approaches.
- **Discount rate:** For long-run average LGD, firms should use a discount rate of Sterling Overnight Index Average (SONIA) at the moment of default plus 5%. The PRA continues with a minimum 9% to be applied for downturn LGD.
- **Exposure floor:** Exposure level LGD floor should not be less than 5% for residential mortgages.

Downturn estimation approaches

The downturn estimation GL differentiates three types of estimation approaches for calibrating downturn LGD:

- **Type 1:** calibration based on the observed impact of losses seen across a particular downturn period.
- **Type 2:** where such observed impacts on losses has not been observed (e.g. downturn period occurred too long ago), the impact can be estimated using two defined methodologies.
- **Type 3:** where neither type 1 or 2 approaches can be applied, firms can apply their preferred modelling approach but must apply a minimum margin of conservatism (MoC).

The EBA make it clear that the optimal approach is **type 1** but this is only permitted where relevant and sufficient loss data exists to analyse the observed impact of the downturn under consideration. The EBA defines four standardised impact assessment tests that need to be performed to select the most appropriate calibration.

A key challenge observed by firms is the lack of internal observed loss data covering all identified downturn periods. For downturn periods where no loss data is available, **type 2** estimation allows two prescriptive approaches namely **extrapolation** and **haircut**.

Firms using component-based LGD modelling, the EBA allows a combination of extrapolation and haircut approaches depending on the macro impact of each LGD component. A challenge faced is how to apply these methodologies when estimating downturn LGD across the various components. A further complexity is that under both methodologies an appropriate **MoC** to cover for lack of data must be estimated and applied.

Where firms can demonstrate that type 1 or 2 approaches cannot be applied, a **type 3** approach may be used. In this case, firms can use their preferred modelling approach but must add MoC to cover for methodological and data deficiencies. Downturn LGD including MoC must be equal to or higher than the long-run average LGD plus 15%, capped at an LGD of 105%.

A further operational burden is that firms must estimate a non-binding **reference value** to challenge their final downturn LGD irrespective of the approach adopted.



Estimating 'downturn' LGD – a worked example

Setting the scene

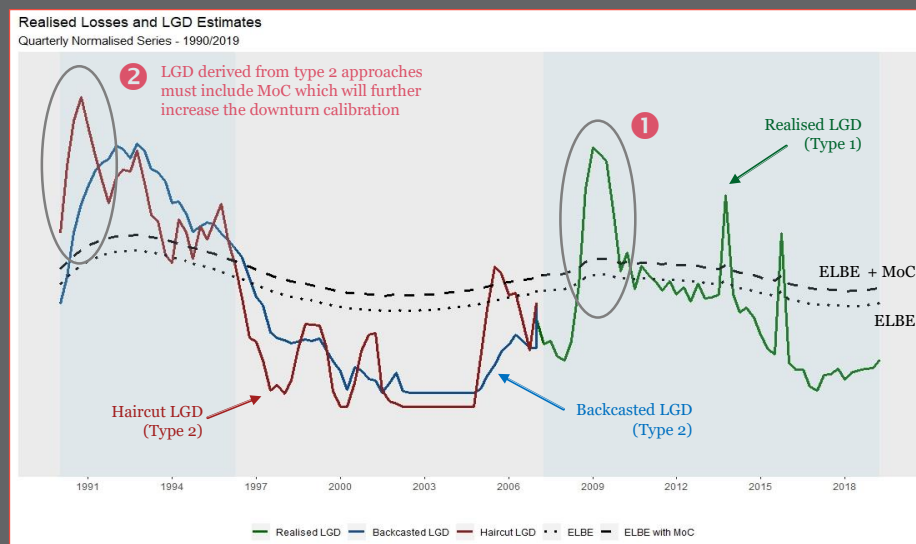
We have assumed realised observed LGD data exists for the period between Jan 2007 and 2019 as this is a typical timeframe observed in the industry. This period would cover the first downturn period and the downturn calibration can be estimated using a **type 1** approach.

So that the impact of the second downturn period (Jan 1990 and 1996) is captured, our framework can 'back-cast' the realised observed LGD values to Jan 1990. This would fall under the **type 2** approach. We have displayed impacts from both an extrapolation and haircut approach.

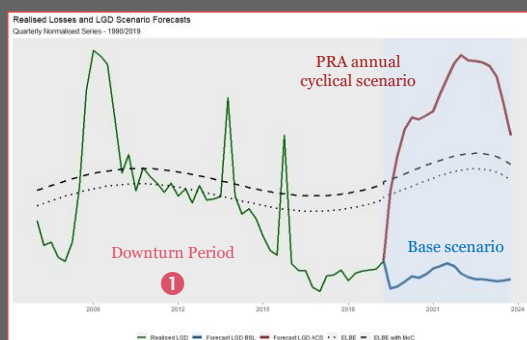
Using type 2 approaches

If an **extrapolation approach** is used, our framework can: (1) define significant relationships between realised observed LGD data and a range of macro variables; (2) based on these relationships back-cast realised observed LGD data to 1990; and (3) work with you to define relevant **MoCs** to estimate downturn calibration.

When performing the **haircut approach**, a similar logic is applied but we flex the key macro drivers in your component LGD model.



To confirm that the current downturn periods contain macro impacts that are representative of future severities, our framework can also generate **forecasts** of macro variables and estimated realised LGDs.



PwC insights

Our worked example leveraged re-baselined BoE realised observed LGD data. Using a wide range of macro variables we observe the following:

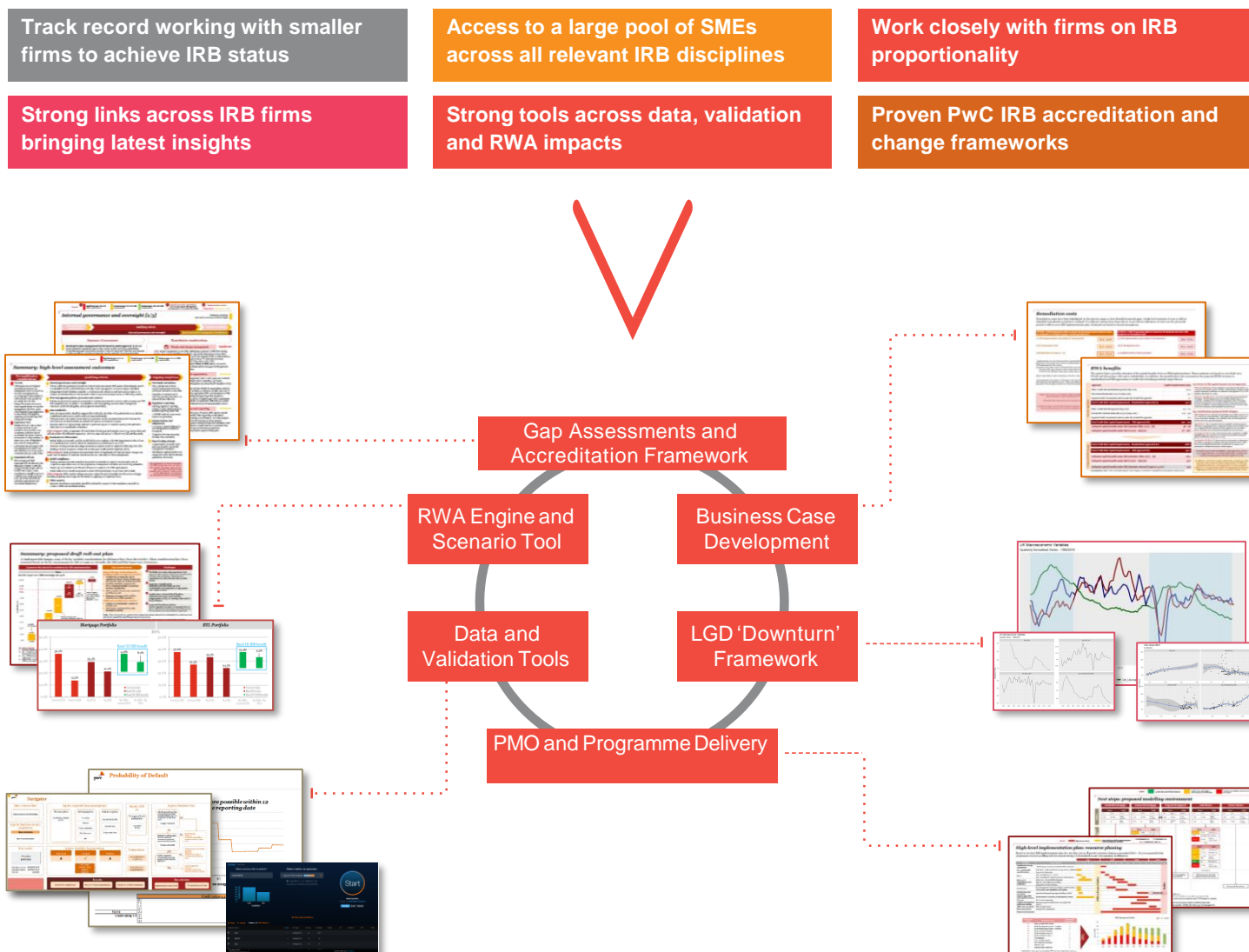
- Firms must look at the impact of **multiple downturn periods**. Type 2 approaches must include MoCs and in our worked example both extrapolation and haircut approaches are likely to yield higher downturn calibrations for the early 1990's downturn than the 2007-2009 downturn.
- Final downturn calibration will be dependent on the **ELBE** (or expected loss best estimate) and **MoC** frameworks of the firm and these should be optimised.
- Firms must consider **forward looking information** to confirm that current downturn periods and calibration are appropriately severe.

UK firms have until 1 January 2022 to implement downturn LGD for all other 'non-UK residential mortgage' asset classes. Our LGD downturn framework can be applied to all asset classes

PwC enablers and tools to support you

How we can help – enablers and tools

PwC has developed a suite of enablers and tools that can be used to support you in the end to end implementation of regulatory products (including defining LGD downturn periods and estimating downturn calibrations), ensuring compliance with the expected regulatory requirements.



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