Estimating losses for Guarantees and Indemnities

To be used in conjunction with the HMT Contingent Liability Checklist

The Contingent Liability Central Capability (CLCC)

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The Contingent Liability Central Capability (CLCC) is an analytical and advisory unit within UK Government Investments (UKGI). The CLCC has been established to strengthen contingent liability expertise across government by improving the overall ability to manage the government's portfolio of risk from contingent liabilities.

This document is part of a series to provide guidance to departments regarding the establishment and management of contingent liabilities. The guidance is not exhaustive and each case may have specific and/or additional considerations that need to be addressed.

For more information on this document or the others in the series contact CLCC@ukgi.org.uk. CLCC may also be able to provide some insights that help refine your expected loss analysis - please reach out to us if you feel you would benefit from CLCC's input.

PURPOSE AND SCOPE

What is this guide about?

This guide is designed to help government departments in estimating losses for financial guarantees and indemnities, principally when completing the HMT checklist for contingent liabilities, but also outside of the checklist process when a department would like to better understand a particular risk exposure(s). This guide should be read in conjunction with the high level guidance for filling in the checklist in the Contingent Liability Approval Framework and Managing Public Money Annex 5.4

The checklist asks some questions with the aim of providing a full picture of the risks being incurred. This note aims to assist in answering the following three questions on loss estimation. The appendix contains more detailed examples of expected credit loss analysis.

HMT Contingent Liability Checklist – Loss Estimation Questions

1) What is the likelihood of crystallisation? Can the risk be quantified over a timeframe? For example, year 1 = X%, year 2 = Y%, year 3 = Z%. Please distinguish between partial and complete crystallisation

2) What is the estimated cost of the contingent liability if it were to crystallise? For example, year 1= £X, year 2= £Y, year 3= £Z, and so on. What is the distribution of possible losses? How does the distribution of possible losses change over the lifespan of the contingent liability?

3) What is the expected loss associated with the contingent liability?

Limitations and compliance

This note is intended to provide some helpful pointers on approaches and data sources but does not cover all possible approaches and considerations. The CLCC has no liability to any person or third party for any action taken or for any failure to act, either in whole or part, based on this paper. It is strongly recommended that you obtain further specialist credit or insurance expertise to help support you in your calculations. The CLCC will be pleased to discuss how we can support you in this regard.

You can approach CLCC with all issues related to contingent liabilities (including those outside the scope of the HMT contingent liability checklist process), particularly in the case of large risks (e.g. with a maximum size larger than £1bn) that require more thorough analysis or for complex risks (e.g. pension fund guarantees). Where a department can adequately estimate risks without specialist assistance, the CLCC is still interested to review its analysis and learn from it, as this may be beneficial to other departments with similar issues. You can contact CLCC by email at clcc@ukgi.org.uk.

INTRODUCTION TO THE CLCC

What is the role of the CLCC?

The Contingent Liability Central Capability (CLCC) is an analytical and advisory unit formed within UK Government Investments (UKGI) - the government's centre of excellence for corporate finance and corporate governance - to strengthen contingent liability expertise across government.

The CLCC assists departments and arms-length bodies with assessing, quantifying, and pricing risk from contingent liabilities, allowing departments and government to better understand the scale and distribution of their risk exposure from contingent liabilities. Working closely with departments, the CLCC aims to provide guidance, promote best practice, and build capability across government.

When should I approach the CLCC?

Departments are encouraged to come to CLCC with all issues related to contingent liabilities, with early engagement particularly helpful. In addition to providing advice on checklists completed as part of the Contingent Liability Approval Framework, the CLCC can provide insights which support the policy making process, including when departments are:

- extending contingent liabilities associated with large fiscal risk, but which are not necessarily novel, contentious, or repercussive
- developing risk frameworks to delegate authority to take on risk, e.g. to their arm's length bodies (ALBs)
- conducting early-stage policy thinking, for example, into fee charging regimes to transform implicit liabilities into explicit contingent liabilities
- considering the impacts of policy changes on existing contingent liabilities

CLCC will either be able to provide advice and support ourselves or we will signpost you to other experts (such as the Government Actuary's Department (GAD)) if specific policy support or more detailed analysis is required.

Which contingent liabilities are the CLCC focusing on?

The CLCC can assist departments with the following contingent liabilities:

- **Financial guarantees** - where government agrees to pay the debts of a third party if they default, such as the Green Clean Initiative launched by the UK during COP26.
- **Indemnities** - protection similar to insurance where government agrees to cover costs if a certain event occurs, such as the indemnity, for economic charge, provided to operators for nuclear related incidents following the 2004 Protocols, which entered into force on 1st January 2022

Not in scope of CLCC's responsibilities

The following contingent liabilities are outside of the CLCC's remit:

- Legal cases and purchaser protections for HMT.
- Risks associated with implicit liabilities that sit with government as part of its insurer of last resort function (e.g. risk of extreme natural disasters) although in practice, some early stage policy support to HMT and departments from the CLCC is within scope of the CLCC's remit – for example transforming implicit liabilities into explicit liabilities.

WHAT IS THE ESTIMATED COST OF THE CONTINGENT LIABILITY IF IT WERE TO CRYSTALLISE?

Before calculating expected losses, you should begin by calculating the maximum exposure of the Contingent Liability (CL) in question. You may be able to work this out directly from the nature of the indemnity or guarantee offered. For example, if a guarantee or indemnity is limited to £10m and there is the potential for it to be fully payable then the maximum single loss is £10m. However, particularly if there is an unlimited indemnity for a liability, such as damage to third parties, it will often be necessary to estimate the maximum size by working out a probable worst case. Although theoretically unlimited, having some idea of the maximum scale may help to prioritise and manage them more effectively.

Indemnities

Methods that can be used to consider probable worst cases for unlimited indemnities:

- **Consider previous risk assessments** for the activity being undertaken. If large CLs are involved these should already have been analysed.
- **Consider worst case scenarios** based on knowledge of the risks. These are sometimes called realistic disaster scenarios (see Lloyd's Realistic Disaster Scenarios 2020).
- **Look up historic precedents** e.g. large losses in relevant economic sectors.
- **Look up commercial insurance terms.** For example, directors' & officers' insurance for small firms normally offers up to £10m of cover, which could indicate a probable maximum CL of £10m for negligence of the directors of a standard ALB. However, if the ALB directors are exposed to additional large risks, then you would need to increase the estimate.
- **Consult experts.** CLCC can advise whom to consult.

It is acceptable and, in some cases, advisable to give a range, such as £500m to £1bn. For example, this range might be based at the lower end on long term historic experience and at the upper end on a disaster scenario.

Other points to consider:

- **Inflation:** If the CL is likely to be present for more than a year, inflation will need to be considered. The rate of inflation in liability claims might be higher than general price inflation (calculated using the Consumer Prices Index). Healthcare costs typically rise faster than general price inflation. If you are using historic claims to estimate future claims, you will also need to allow for past inflation.
- **Maximum Annual Loss:** We are interested in the maximum total loss over the whole period of risk exposure (although loss mitigation strategies and their impact should also be considered). It can also be helpful to give the maximum annual loss. Both estimates might be higher than the maximum single loss because there could be additional smaller losses on top of the largest one. Even if an indemnity has a limit, it might be reinstated after a claim so the maximum annual loss might be higher than the maximum single loss for this reason.

- **Limitation:** HMG's [Sourcing Playbook](#) states that suppliers should not be required to take on unlimited liabilities. However, you should allow for any limited liability that they may cover, by deducting it from the total loss.

Loan Guarantees

For loan guarantees the maximum loss is the guaranteed share of the amount of the loan if there is a practical possibility of a full write-off of the loan requiring the full value of the guarantee to be paid out. More commonly, the maximum loss given default (LGD) is less than the amount of the loan because the borrower retains an ability to partially repay, or the government may hold collateral that can be used to offset the loss. However, you should be realistic about the extent to which recoveries can be made in the worst-case scenario.

LGD statistics can give guidance on the average LGD for the type of loan under consideration, particularly if the counterparty has an external credit rating, such as say 'BB+' (see the tables in the appendix). However, using a range may be more appropriate given the potential for wide distributions of LGDs within a single probability of default (PD) range. The maximum LGD will be larger than the average so an allowance will need to be made for a worst-case scenario. This could be derived from historic precedents or general reasoning.

WHAT IS THE LIKELIHOOD OF CRYSTALLISATION AND THE EXPECTED LOSS ASSOCIATED WITH THE CL?

Indemnities

This can be a straightforward calculation if you know the average frequency of the loss and the average loss. You simply multiply them together. For example, an average loss of £3m occurring once every ten years implies an expected loss of £0.3m per year. If the exposure of the CL lasts 20 years, the expected loss will be £6m in total plus any allowance for inflation. If the risk varies over time you will need to do separate calculations for each different period.

You may need to do a more detailed calculation which splits the losses by category if different categories have different risks. If there is potential for catastrophic losses, such as say from a nuclear accident or railway disaster, then you will need to do separate additional calculations for the frequency and severity of the catastrophes. There may well be a lot of uncertainty over the frequency and the average loss. If so, it would be helpful for risk appraisal to give ranges of reasonable values for both.

If a charge is made for the indemnity, expected losses should be shown gross and net of charges. Normally, charges will be set to at least equal expected losses before charges. If a commercial premium is being charged in line with insurance market rates there could be expected profits rather than losses and although the government doesn't generally target profit, it may occur.

Frequency calculations

If you don't know the frequency, perhaps because there is no past loss data, you could consider estimating using any risk analysis already performed. If there is a history of no losses

for 10 or more years, you can roughly estimate a loss frequency as lying within the interval (0,3/n) where n is the number of years without losses. For example, if there have been 15 years without loss the future frequency would be within the range nil to 0.2 per year, in other words once every five years at most. However, if you have reason to believe the future risk is very remote, such as once in a hundred years, you should use that information to judge the likely frequency. Data may be available from other similar, but not identical, exposures.

Insurance premium data may also be helpful. For example, if directors' & officers' cover from an insurer typically costs £80,000 then you could reasonably conclude that the expected loss would be of the order of £80,000 less an allowance for insurance company profit margins, plus or minus any allowance for the specific risks of the ALB. An advantage of using insurance data is that it is not necessary to calculate the average loss or the frequency directly. A disadvantage is that it may be difficult to find an appropriate premium for the particular risk being considered.

Severity (average loss) calculations

If there have been many losses already, then you can use that information in calculating the average, adjusting for claims inflation. More commonly, loss data is sparse. In these cases, the methods used in estimating the maximum loss can also be adapted to estimate average losses. You may be able to find information online such as this data from the Health and Safety Executive (HSE) on employer's liability.

Bear in mind that small losses are usually more common than large losses. Hence the mean (average) loss may be higher than the mode (most frequent loss size). There may be excesses or caps on liability that also affect the calculation.

Loan Guarantees

The approach for loan guarantees uses the same frequency-severity principles as indemnities (see above), adapted to loan defaults. For example, a guarantee of a £1bn loan with a PD of 1% per year and an average LGD of 25% will have an expected loss of £2.5m per year.

Expected Loss = Exposure at Default (EAD)$_1$ x Probability of Default (PD)$_2$ x Loss Given Default (LGD)$_3$

$_1$ **EAD**: The total amount that the government is exposed to at the point of default if the CL is triggered.

$_2$ **PD:** % likelihood that a borrower will default over a particular time horizon (e.g. 12 months or the lifetime of the underlying loan).

$_3$ **LGD**: The amount of the exposure that is not expected to be recovered in the event of distress. This can also be thought of in terms of the share of the exposure that the government recovers after making a payment to a creditor on behalf of a distressed borrower (1 minus the recovery rate). The LGD can be influenced by several factors, including the seniority of the claim (the more senior a claim, the lower the LGD) and the availability and quality of collateral (the better the collateral, the lower the LGD) and may involve some analytical judgement.

If the loan/obligor has a credit rating, a typical PD and LGD for that rating can be looked up from various sources (see appendix). If there is no credit rating, it may be possible to work out PD and LGD from the characteristics of the loan, or to assign a credit rating based on similar loans which are rated.

If a fee is being charged for the loan, then this could equal or exceed the expected losses. As with indemnities, it is best to show expected losses both before and after fees.

WHAT IS THE DISTRIBUTION OF POSSIBLE LOSSES OVER THE LIFE OF THE CL?

i.e. loss of A with likelihood of B, loss of C with likelihood of D etc. This is intended to assess losses if there is only partial crystallisation.

Indemnities

This question aims to elicit information not contained in the previous answers, such as uncertainty over losses and how expected losses could develop over time. For example, the losses might develop in a non-uniform way over the lifetime of the CL. A construction project might go through several different phases, or liability litigation might take several years to be resolved so losses might be skewed towards the end of the risk period or even many years after the government activity has finished. In addition, claims inflation might result in heavier losses in the future.

Risk modelling already carried out, if available, should assist in answering this question. Even if there is no formal analysis it should be possible to describe how the risks are expected to arise and crystallise. For smaller and simpler CLs, a short description of the expected trend and any key scenarios or stresses might be sufficient.

In some cases, there may simply be fundamental uncertainty over the outcome, because of lack of data or experience. Giving the full potential range of outcomes and any relevant narrative would be helpful.

Loan Guarantees

Given the potential for changes in creditworthiness, CLCC recommends that expected loss calculations should be monitored regularly to consider any changes in the creditworthiness of a loan/counterparty. This could be done either through an annual review or more frequently in the case of a material unexpected credit-related event.

There should also be a discussion of expected actions if a default looks likely or does occur. For example, if creditworthiness deteriorates would loan terms be adjusted? In the event of default, how aggressively would partial repayment be sought?

Best Practice / Top Tips

- **Always try and estimate a maximum size**: In cases of unlimited liability, you should always try and estimate a maximum size by working out a probable worst case. Do not be afraid to provide a range.

- **Use available third-party data sources:** Where possible, try and source third-party data to support expected loss calculations (bank regulatory disclosures, rating agency default studies, realistic disaster scenarios etc) and supplement internal data.

- **Regular monitoring**: Expected loss calculations should be regularly monitored and updated - if required - to ensure that changes in creditworthiness and/or underlying assumptions are factored in.

- **Reach out to CLCC:** You should approach CLCC with all issues related to contingent liabilities (including those outside the scope of the HMT contingent liability checklist process), particularly in the case of large risks that require more thorough analysis or for complex risks (e.g. pension fund guarantees). You can contact CLCC by email at clcc@ukgi.org.uk

APPENDIX: FINANCIAL GUARANTEE LOSS ESTIMATION

The expected loss calculation incorporates the probability that the recipient of the CL will not be able to service the underlying liability, which will likely result in a credit loss for the government.

In calculating the expected loss we suggest recognising a lifetime expected loss by adding all annual losses that result from all possible default events over the expected life of the guarantee. Given the uncertain nature of predicting when and if a borrower will default, some high-level assumptions are likely to be required.

Assuming the underlying obligation is regularly paid down during the life of the guarantee, risk of default is likely to be highest in the earlier years (given the higher debt burden) with a falling risk of default as it is paid down. We suggest regularly monitoring and updating expected loss calculations (once the guarantee has been approved) to make sure that changes in borrower creditworthiness (e.g. triggered by a downgrade of a credit rating or due to a economic downturn) or loss given default assumptions are reflected.

If collateral is posted, the choice and valuation of the collateral needs to be considered. Ideally, the collateral should be relatively stable in value and easy to liquidate, such as highly rated corporate/government bonds. Good collateral can greatly reduce the government's overall risk, but some of the borrowers that benefit from government guarantees may have little in the way of low-risk liquid financial assets.

Data Sources for Calculating Expected Loss

- Corporate default rate studies available through the major credit rating agencies (S&P, Moody's, Fitch Ratings) and, assuming the CL recipient is UK-domiciled, regulatory (Pillar 3) reports from the major UK banks (e.g. NatWest, Lloyds Banking Group, Santander UK) provide useful data on the probability of default and recovery rates across different asset classes (including SMEs, corporates, retail).
- If your department is having difficulty sourcing the relevant data, feel free to reach out to the CLCC. We are in the process of building a database - comprising third-party data - to support CLCC and departments in estimating expected losses. The database includes information on historical and expected default rates and LGDs across a range of asset classes.

Examples of Third-Party Data Sources

One-Year Historical and Expected Default Rates (S&P/Moody's)

Global Corporate Annual Default Rates by Rating						
Year	AAA	AA	A	BBB	BB	B	CCC/C
2006	0.00%	0.00%	0.00%	0.00%	0.30%	0.82%	13.33%
2007	0.00%	0.00%	0.00%	0.00%	0.20%	0.25%	15.24%
2008	0.00%	0.38%	0.39%	0.49%	0.81%	4.11%	27.27%
2009	0.00%	0.00%	0.22%	0.55%	0.75%	10.93%	49.46%
2010	0.00%	0.00%	0.00%	0.00%	0.58%	0.87%	22.83%
2011	0.00%	0.00%	0.00%	0.07%	0.00%	1.68%	16.42%
2012	0.00%	0.00%	0.00%	0.00%	0.30%	1.58%	27.52%
2013	0.00%	0.00%	0.00%	0.00%	0.10%	1.52%	24.67%
2014	0.00%	0.00%	0.00%	0.00%	0.00%	0.79%	17.51%
2015	0.00%	0.00%	0.00%	0.00%	0.16%	2.42%	26.67%
2016	0.00%	0.00%	0.00%	0.06%	0.47%	3.76%	33.17%
2017	0.00%	0.00%	0.00%	0.00%	0.08%	1.00%	26.67%
2018	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	27.18%
2019	0.00%	0.00%	0.00%	0.11%	0.00%	1.49%	29.76%
2020	0.00%	0.00%	0.00%	0.00%	0.94%	3.53%	47.68%
2021	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	10.99%

Sources: S&P Global Ratings Research and S&P Global Market Intelligence's CreditPro®.

As part of its annual default study, S&P publishes default data on sub-investment grade corporates (i.e. rated 'BB+' and below) by geography

Global Corporate Annual Default Rates by Region (Speculative-Grade 'bb+' and below)
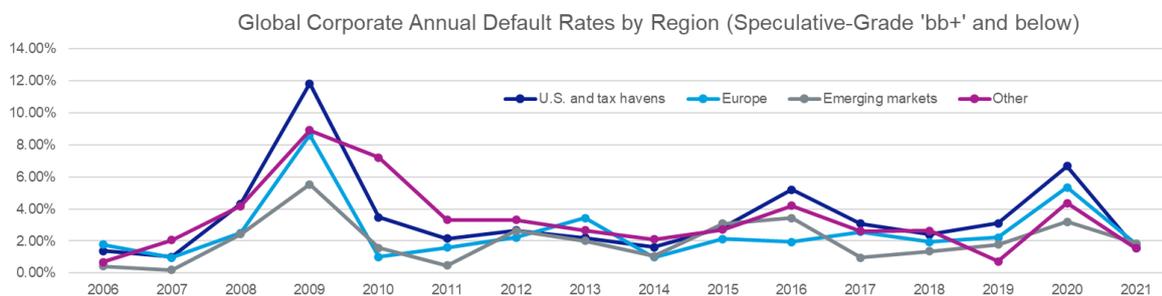
Source: S&P Global Ratings Research and S&P Global Market Intelligence's CreditPro®.

Ad-hoc reports published by the major rating agencies can also be a useful source of data. The data included below was sourced from a Moody's report evaluating the impact of Covid-19 on the UK corporate sector

UK Corporates - Macroeconomic forecast probability of default by sector
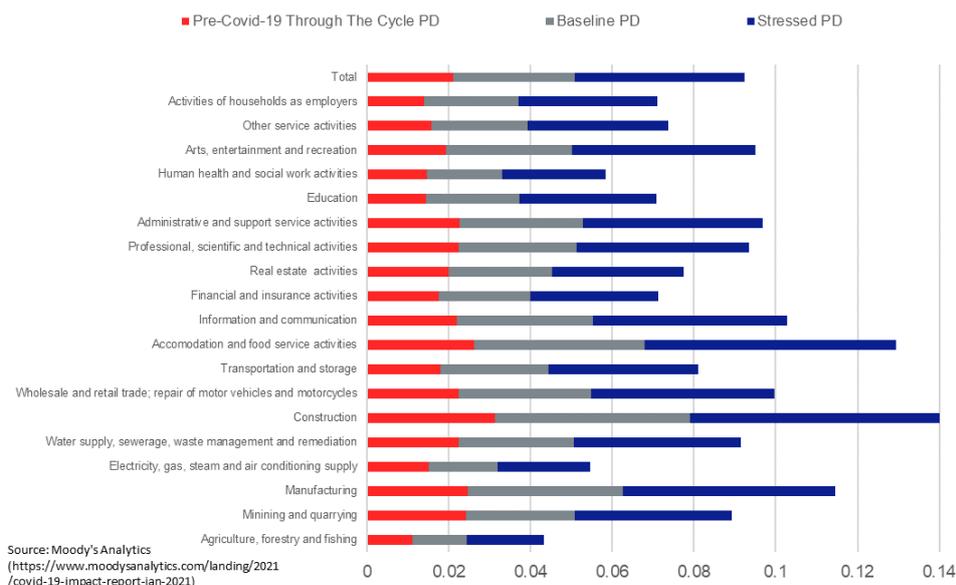
Source: Moody's Analytics
(https://www.moodysanalytics.com/landing/2021
/covid-19-impact-report-jan-2021)

Pillar 3 reports from the major UK banks are a good source of probability of default and loss given default data

Blended Average - All banks	Portfolio - Average PD	Portfolio - Average LGD
Retail - Secured by real estate SME	27.8%	36.1%
Retail- Secured by real estate non-SME	1.7%	15.2%
Retail - Qualified revolving	2.2%	70.7%
Retail - Other SME	10.1%	54.7%
Retail - Other non-SME	4.3%	55.2%
Central government and central banks	0.0%	33.8%
Institutions	3.7%	31.1%
Corporates	4.2%	33.6%
Corporates - SME	7.8%	30.8%

Source: NatWest Group, Lloyds Banking Group, Barclays UK, HSBC UK end-2021 Pillar 3 reports

- If available, the standalone credit ratings (which exclude the potential for government support) of guaranteed recipients can be used - in conjunction with other information - to estimate the probability of default. If external ratings are not available, CLCC can assist in providing a reasonable estimate of the likely ratings in-house, assuming sufficient data is available. Even if there is no data available, CLCC should still be able to help.

- For portfolio guarantees, we suggest (where possible) segmenting by client type and credit rating. For standardised contingent liabilities (e.g. mortgage or SME/corporate loan guarantee schemes) it may be appropriate to calculate the expected loss based on historical default and recovery rates for the entire pool of similar guarantees, annualising the probability of default from the weighted average portfolio maturity. This data is published periodically by rating agencies. If available, internal data on historical losses on similar risk exposures may also be a useful data source.

Example: Expected Loss

Time Horizon	Loan Amount Outstanding	Government Exposure at Default (GBPm)	Marginal Probability of Default	Cumulative Probability of Default	Loss Given Default	Marginal Expected Credit Loss (£m)	Cumulative Expected Credit Loss (£m)	Loss rate (ECL/ending balance)	Weighted average loss rate
Year 1	505	404	2.00%	2.00%	65%	5.3	5.3	1.3%	
Year 2	405	324	1.50%	3.50%	65%	3.2	8.4	1.0%	
Year 3	305	244	1.00%	4.50%	65%	1.6	10.0	0.7%	
Year 4	205	164	0.50%	5.00%	65%	0.5	10.5	0.3%	
Year 5	105	84	0.25%	5.25%	65%	0.1	10.7	0.2%	0.9%

The government guarantees 80% of a 5-year, £500m loan to the private sector. The borrower is expected to repay the loan in equal annual instalments, at the end of each year. The commercial lender offers the recipient of the guarantee an interest rate of 5%, based on the £500m principal (with a total interest payment of £25m spread equally across the five-year term).

Based on credit analysis of the borrower, expectations for instruments with similar credit risk (using reasonable and supportive information) and the economic outlook for the next few years, the government estimates a lifetime probability of default of 5.25% with a higher chance

of default in year 1 (2% of total loans) given the higher debt burden and lower probabilities in the remaining years – on the assumption that these loans have haven't defaulted in prior years (year 2: 1.5%; year 3: 1.0% and so on).

In the event the borrower defaults and the government steps in, it would have to repay the loan principal in full as well as any interest payments accrued. A recovery rate of 35% is assumed in the event of default.

The exposure at the end of year 1 equals 80% of the loan amount outstanding, £5m interest and the £500m of principal outstanding. The PD in year 1 is 2.0% and the loss given default is 65% (1 minus 35% recovery). Hence, the expected loss at the end of year 1 is £5.3m (£404m x 2% x 65%). The lifetime expected loss for the guarantee will be the sum of the corresponding amounts for each year giving a cumulative expected loss of GBP10.7m, equivalent to a weighted average loss rate of 0.9%.

Limitations in Estimating an Expected Loss for Guarantees

Possible limitations in being able to reliably estimate an expected loss include:

- Guarantees to counterparties that are economically unviable (e.g. a company in financial difficulty due to a weak capital structure and/or weak sales), making it difficult to assess the credit risk
- Counterparties where the government is already a major shareholder
- Guarantees with unlimited size and/or long-term maturities, making it difficult to estimate the expected loss for the whole of the term
- Typically, the government does not provide guarantees to standard loans, so some deviation from standard approaches may be needed.

One way to derive the expected loss is to use the track record of past payments which is particularly useful when there have been many guarantees (such as finance schemes for SMEs, mortgage guarantees), but where there is a smaller pool of guarantees, there may be insufficient historical data to draw conclusions about future expected losses.

Look back at previous economic cycles (e.g. 2008-09, Covid-19 pandemic) to get a better understanding of the through-the-cycle performance of certain asset classes which may make prevailing probability of defaults unreliable.