ProMS®

A Real Stress Test for CRE Portfolios

RADLEY & ASSOCIATES

Radley & Associates is an independent firm dedicated to the development of advanced simulation based analytics for the Commercial Real Estate industry. Our clients include leading banks, fund managers and REITS. We have deep expertise in property, simulation modelling, econometric analysis and risk.

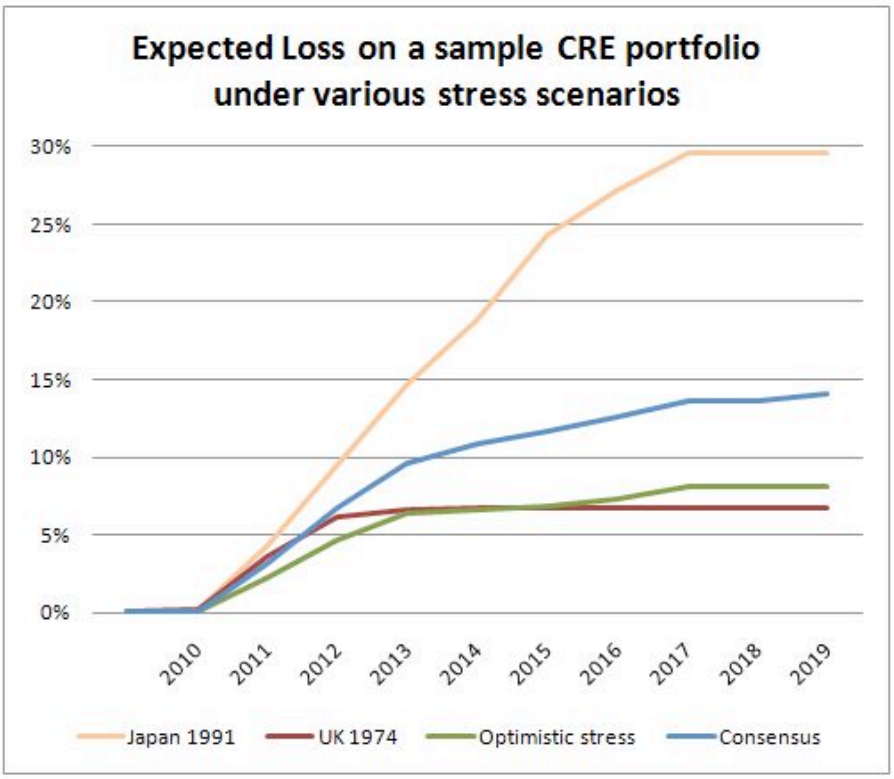
Radley & Associates
2 Nottingham Street
London
W1U 5EF
0207 224 3079

A Real Stress Test for High LTV CRE Loan Portfolios

Summary findings

If the UK were to undergo a rerun of the UK economy from 1975, cumulative losses for a typical CRE portfolio would be expected to be 6.7% of current exposure over 5 years. If, however, the UK were to experience the same macroeconomic and asset value experience as that of Japan from the early 1990s, portfolio losses would equate to 19.0% of today's exposure over 5 years and 29.6% over 10 years. These stress test results were calculated using a detailed, bottom up, simulation model on a hypothetical – but typical – back book portfolio of IPRE loans with a current LTV ratio of 110%.

Applying a UK consensus forecast for economic factors and asset values gives a more reassuring 10.1% cumulative loss over 5 years or 14.9% over 10 years. The results depend heavily on the characteristics of the portfolio as well as the chosen stress.



Background

US, UK and EU regulators have all recently asked banks to carry out stress tests on their balance sheets to determine the likely cost in terms of tier one capital of a range of scenarios. Many portfolios are relatively easy to stress test, but Commercial Real Estate loan portfolios, which represent a significant portion of banks' remaining, post crash assets, also present a significant modelling challenge. CRE loans are highly heterogeneous and are especially susceptible to changes in the economy. Top down stress tests, applied at a portfolio level, are not usually able to distinguish between, for example;

- senior and junior tranches
- fixed then floating interest rate structures
- different principle repayment structures such as surplus dependent repayment
- tenant rental agreements related to RPI or market rent
- multi-tenant and single tenant properties

These differences significantly affect losses under stress conditions: for example, the rental income of an RPI or an open market lease will affect the debt service capability of a borrower depending on the economic stress. Even collateral values depend on loan specific factors such as sectoral depreciation or the volatility of regional property value indices. To further complicate matters, some risk factors (such as whether a tenant break is exercised) are broadly independent of macroeconomic factors[*], but may combine with a fall in collateral values to cause losses.

Bottom up stress testing

The only way to properly stress a CRE loan portfolio is from the bottom up, modelling the impact of each macroeconomic factor on each risk element of every loan. To achieve this we need;

- a resilient cashflow model detailed enough to model all obligor types
- to simulation of unknown loan specific events (e.g. break exercise)
- the correct and up-to-date risk data for every loan
- a centrally managed, common set of assumptions (e.g. for collateral depreciation)

[*] Recent IPD research shows that break exercise rates were similar in 2008/9 to previous years.

- significant computer processing power for a large portfolio

For this case study, we used a specialist cashflow simulation based CRE risk management system called ProMS. ProMS has been recently developed and implemented in leading European banking books and investment portfolios. It uses Monte Carlo simulation to determine the loss for each loan in each of 10,000 iterations. For each of the stresses in the study we used a single macro-economic scenario and simulated the varying loan outcomes, generating a loss distribution for each year[†]. Sector assumptions such as lease exercise probabilities and depreciation rates are based on the best source of UK sectoral data such as the IPD/Strut and Parker surveys. Tests are run for refinance defaults in the terminal year and standard sales discounts are applied.

Test Portfolio

The test portfolio is a hypothetical portfolio representing a typical UK CRE back book portfolio[‡], which is currently suffering from low collateral valuations and high LTVs. The portfolio characteristics are as follows;

- 18 loans
- Average LTV 112% (range 64% to 132%)
- Average DSCR 179% (range 110% to 234%)
- Terms range from 5 – 25 years
- Origination dates: 26% before 2005; 44% during 2006-07; 29% after 2008
- Fixed interest rates 83%
- Mixed sectors and geographies
- 70% single tenant and 30% multi-tenanted, including 100+ tenant shopping centre
- One junior loan: the remainder are senior
- All the loans were performing at the point of the analysis

The composition of the portfolio, especially the distribution of LTV ratios and the mix of fixed and floating, significantly affect the results.

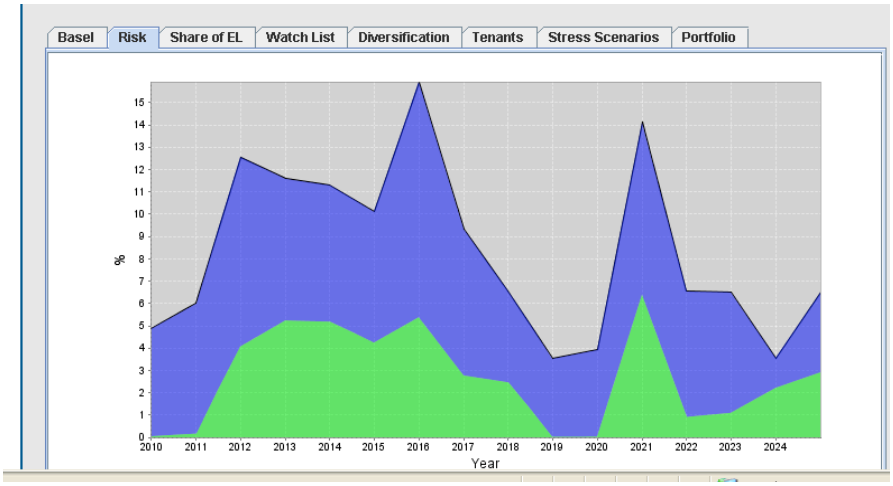
[†] The system can also be used with a comprehensive set of macroeconomic scenarios to generate PD, LGD, MPL etc.

[‡] All loan data used in this case study is created by the authors, it is illustrative only and does not reflect in any way any of the loan portfolios of any of R&A's customers

Stress scenarios

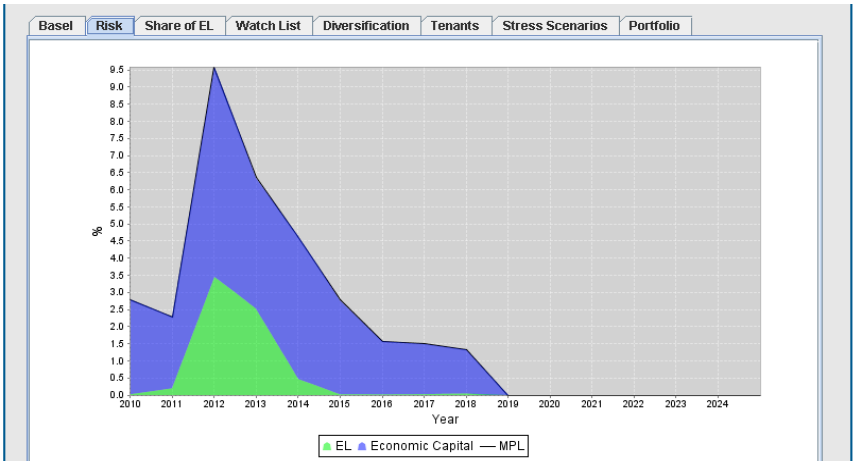
A. Japan 1991 - 2001

From 1991 – 2001, the Japanese market saw low GDP growth, interest rates and inflation whilst average commercial property capital values fell 52% over the decade. In the stress test, losses rise significantly after 2011 and continue at high levels over the next decade.



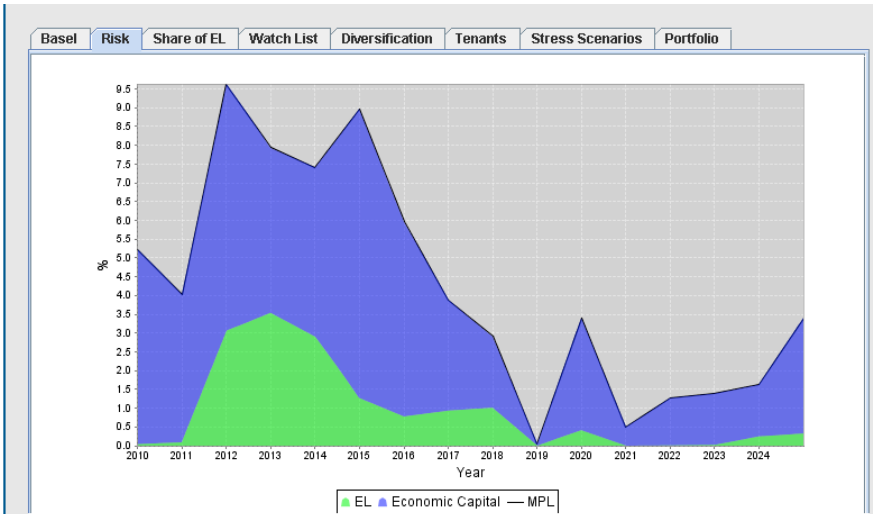
B. UK 1975 – 1984

In this stress, the economy experiences a severe recession, increasing tenant default rates and void rates but also exhibits high levels of inflation and collateral value growth. After a lag, interest rates also rise significantly. The impact of higher interest rates increases the default of floating rate loans to 100% but the fixed rate loans benefit from rising collateral values and, in the longer term, falling LGDs.



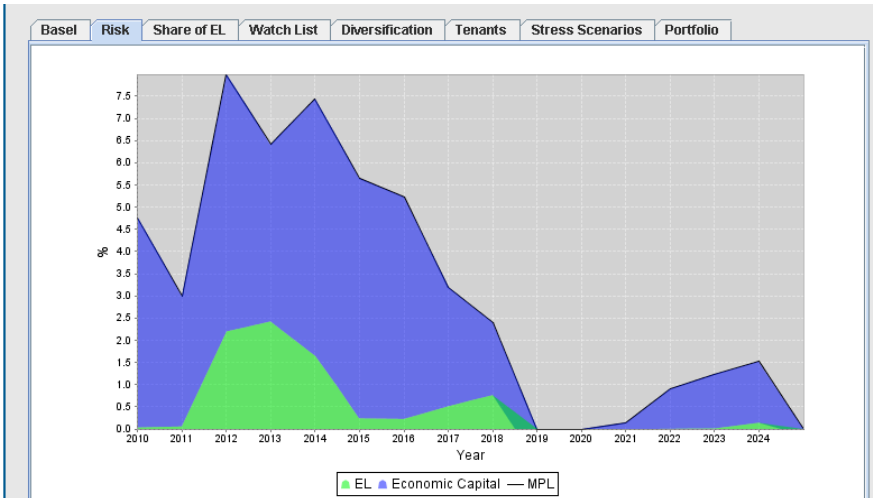
C. UK consensus

In this scenario, we took consensus views for the short and medium term for the macroeconomic factors (e.g. GDP, LIBOR and inflation) and used IPF consensus forecasts for the future path of collateral values (IPD indices) and market rents (ERVs). Here, strong capital growth leads to a 40% growth in collateral values (before depreciation) by 2020. However, the absence of high inflation, means that the collateral values grow *less* than the inflation fuelled growth of the 1970s.



D Optimistic

In the final scenario set, Radley and Associates devised a scenario where all macroeconomic factors recover over 5 years to the long term trend. Capital values increase in the short term to recover to the long term trend and then continue to grow at the long term trend. Capital values in this scenario grow by 58% over the next decade.



Summary results

Portfolio managers have reason to fear a repeat of the Japanese experience of the 1990s, though those with predominantly fixed rate loans with longer maturities would benefit from a 1970s style inflationary surge. Interest rate derivatives, IPD property derivatives and even inflation derivatives can be used to reduce downside risk at the portfolio level under some of these scenarios. (See our portfolio hedging case study, to follow).

Cumulative EL as % Today's Exposure

Scenario	5 year	10 year
Japan 1991	19.0%	29.6%
UK 1974	6.7%	6.8%
UK consensus	10.9%	14.1%
UK optimistic	6.6%	8.1%

It is worth noting that these cumulative losses can be offset by net interest margin income. Using ProMS, we calculated that the net interest income revenue of the portfolio amounted to approximately 4.6% and 5.9% of current exposure over a 5 year and 10 year period respectively. Capital and operational costs are excluded.

Questions

A complete set of data for the test portfolio and a detailed description of the methodology used are available from:
Charles Cardozo (07798 643306) *charles.cardozo@radleyassociates.com*
or
Julian Goldberg (020 7794 8202) *julian.goldberg@radleyassociates.com*

Sources

Japan: Ministry of External Affairs and Communications, Statistics Bureau
UK: Office of National Statistics, IPD