Testing times

Quintin Rayer explores how portfolio stress testing can address trustees' concerns about the impact of extreme market events on portfolios, and help them meet fiduciary responsibilities

KEY POINTS

WHAT IS THE ISSUE?
Extreme market moves can impact portfolios, causing them to lose value, which may not be captured by conventional risk measures. Diversification breakdown may mean portfolio values are not protected.

WHAT DOES IT MEAN FOR ME?
With guidance, you may be able to determine the impact on your portfolio and arrange for portfolio restructuring to limit the downside.

WHAT CAN I TAKE AWAY?
Protecting portfolios from adverse consequences of extreme events is possible, and, in the process, you will have made an active contribution to fulfilling your fiduciary duties.

Meaningfully assessing portfolio risks is never easy. Often, conventional risk measures do not fully capture all risks inherent in a portfolio, particularly under difficult market conditions. For these conditions, a trustee (or other individual responsible for portfolio oversight) may wish to consider stress testing a portfolio against significant historical market events, or against some invented scenario that reflects their particular concerns.

Portfolio stress testing helps identify and quantify risks within a portfolio and can reassure a trustee as to how their portfolio might respond to specific market outcomes or other concerns.

Financial professionals are likely aware of the stress testing regulators have applied to banks and financial institutions to help identify how resilient their balance sheets would be to renewed market crisis. However, it may not have occurred to them that conceptually similar approaches can be applied to their own portfolios. In this respect, portfolio stress testing provides a useful mechanism for trustees to work with asset managers to ensure their portfolios are better positioned to protect against particular market concerns.

WHAT IS PORTFOLIO STRESS TESTING?

Portfolio managers associate a number of activities with stress testing, such as looking at the potential downside risk of portfolios, or methods that help them estimate what response might be expected under difficult (stressed) conditions. Stress testing cannot be guaranteed to identify actual impacts of future events on a portfolio, but it is another tool in the risk manager's armoury. A stress test should be designed to determine how a portfolio might respond to adverse developments, so that weak points can be identified early and preventative action taken. A typical focus is on key risk areas, such as credit, market risk and liquidity. One definition of stress testing regards it as:

- **a method of the quantification of potential future extreme, adverse outcomes in a portfolio of financial instruments; and**
- **a palliative for the anxiety that is experienced by managers with significant risk exposures.**[1]

This brings out some key aspects: stress-test outcomes need to be quantified in monetary terms, but the tests do not provide statistical estimates of outcome probabilities. The scenarios indicate potential future outcomes under extreme conditions; however, a scenario is not a stress test unless the outcome is detrimental for the portfolio. Scenarios that anticipate positive outcomes are not stress tests.

Of course, stress testing only identifies potential problems, it does not resolve them. Thus, it may be palliative, since it can reassure a trustee if no issues are detected, but leaves unanswered questions as to those that have been identified, or even as to whether the

selected stressed scenarios are sufficient to identify all key areas of portfolio weakness.

A CLASSIFICATION

A wide range of approaches can be used for stress testing, and the literature often uses various terms rather loosely, making a full classification difficult. The classification shown in the figure[2] on this page gives an idea and is helpful for framing further discussion. Often, historical events provide a source of ideas; however, practitioners are free to imagine any damaging situation and attempt to quantify its portfolio impact.

A key distinction is between historical scenarios (historical re-enactments of particular market events with defined start and end dates) and artificial scenarios (invented to capture a particular concern).

For example, in the run-up to the UK's Brexit vote, a scenario based on the impact of currency devaluation could have been considered, with market response being based on historical events surrounding previous currency devaluations; this would be a historical scenario. However, if a trustee had identified a whole range of factors unique to Brexit that they wished to explore, this would have to be an artificial scenario, since Brexit has never occurred before, and so there is no historical data to base it on.

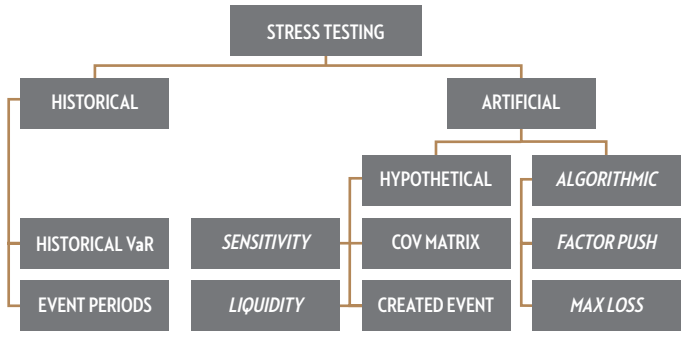
HISTORICAL v ARTIFICIAL STRESS TESTING

Historical stress testing's strength is that assets actually behaved in the way captured by the scenario, adding credibility. Although, if markets have changed since the historical scenario's period (perhaps because of regulation changes), such a response may no longer be possible. Also, historical events can be 'messy'; numerous knock-on effects and proxy shocks can make it hard to isolate individual aspects for application to the portfolio.

Artificial stress tests raise the question as to whether the proposed scenario is even possible; it can be difficult to make such tests realistic. How can the designer possibly include all responses, direct and indirect, to portfolio assets? However, artificial stress tests can attempt to include the impact of changes (or anticipated changes) on markets, perhaps due to regulatory developments, new currencies and so on. An artificial test can also isolate specific portfolio concerns.

Hypothetical tests explore aspects like the robustness of portfolio diversification through the asset correlation matrix, look at liquidity events, or shock specific risk factors while neglecting correlation.

STRESS-TESTING CLASSIFICATION



Finally, algorithmic stress tests attempt to systematically identify the worst outcome within a defined envelope. Risk factors can be 'pushed' in a direction that results in portfolio losses. It can help identify sets of changes in market risk factors that would result in the greatest portfolio loss.

IMPLEMENTING PORTFOLIO STRESS TESTING

Stress testing tends to be an ad hoc and practical activity rather than a purely theoretical exercise. Essentially, any potential set of market events that might keep one awake at night could be regarded as the basis for a stress-test scenario. Consequently, there will be efforts to examine the impact the scenario would have on the portfolio. Guidance may be required on how to turn initial concerns into a useful stress-test scenario, and suitable definition may require experience and judgment. Thereafter, implementation of the stress test can become more scientific. The selection of scenarios will depend on various assumptions, generally regarded as 'unlikely but plausible'.[3]

The judgmental aspects of defining stressed scenarios make involvement of stakeholders (including trustees and portfolio managers) essential. This will likely be better achieved if stress testing is undertaken regularly as an integral part of portfolio oversight. The portfolio manager's input will also be invaluable in helping to identify issues of concern, with discussion around the appropriate severity of a stressed scenario. Managers should not see stress testing as an inconvenience, but as a reassurance to trustees and others of the quality of their investment decisions.

Stress testing may also be conducted from a corporate social responsibility perspective. By making investment outcomes more robust, trustees and beneficiaries should benefit, and reputation should be enhanced.

Implementing stress-testing can be seen as a four-step process:[4]

1. **risk identification: historical events or anticipated concerns;**
2. **definition of stressed scenarios: involvement of stakeholders, trustees, advisors and portfolio managers; integration within investment decision making;**
3. **execution of stress-test scenarios: derivation of portfolio value; and**
4. **analysis of results: commentary in periodic reporting.**

The definition of stress-test scenarios cannot be regarded as a 'once and forever' activity. Existing scenarios should be constantly reviewed, re-evaluated and adjusted to maintain their usefulness, with a policy established to review stressed scenarios periodically to assist in establishing good discipline and to learn from experience.

Once the outcomes of stress tests are known, trustees and portfolio managers can consider the outcomes in the light of stated trust and portfolio objectives. In some cases, the stress test may reveal that the identified scenario has little impact. When this occurs, trustees have reassurance that the event is perhaps a lesser concern than they feared. On the other hand, if the stress test suggests that the portfolio may be adversely impacted by the scenario to an unacceptable level, discussions can follow as to how to restructure and reposition the portfolio to make it more resilient against the possible events considered.

By including an ongoing programme of stress testing in portfolio review and oversight, with the scenarios, methods and outcomes documented, it will be clear that trustees are actively working to protect the portfolio assets against more extreme market events. Such a programme would help demonstrate that trustees are seriously considering their fiduciary responsibilities.

1 B Schachter, 'Stress testing', *The Professional Risk Managers' Handbook*, Vol 3, C Alexander and E Sheedy eds, PRMIA Publications (2004)
2 QG Rayer, 'Dissecting portfolio stress-testing', *Review of Financial Markets*, Vol 7, the Chartered Institute for Securities and Investments (2015), pages 2–7
3 M Crouhy, D Galai and R Mark, *The Essentials of Risk Management*, 2nd edition, New York: McGraw-Hill Education (2014)
4 Deloitte, 'Risk management within AIFMD for private equity and real estate funds', 24 September 2014, available at bit.ly/2cTirp6 [accessed 6 July 2015]

DR QUINTIN RAYER IS A CHARTERED FELLOW OF THE CISI, AND A CHARTERED WEALTH MANAGER AT LYN FINANCIAL SERVICES