

Stress testing can help estimate portfolio impacts with restructuring to limit the downside. With guidance, advisers may be able to help protect clients' portfolios, giving an opportunity to add real value

# TESTING GROUND



**M**eaningfully assessing portfolio risks is difficult. Conventional risk measures may not capture all risks, particularly under challenging market conditions. Portfolio stress testing helps identify and quantify risks, helping reassure advisers how portfolios might respond to significant market events or particular concerns, and supporting advisers to add value for their clients.

Stress testing includes a range of approaches. Historical events can provide ideas; however, advisers can imagine many damaging situations for investigation using artificial scenarios.

A major distinction is between historical and artificial scenarios. Historical scenarios recreate previous market events, while artificial scenarios are invented, giving freedom to explore forward-looking concerns. Thereafter, classification becomes more complex with artificial scenarios split into hypothetical and algorithmic scenarios. Hypothetical tests explore aspects like diversification, liquidity events or shock-specific risk factors.

Algorithmic stress tests attempt to identify worst outcomes within a defined envelope.

Consider Brexit: a currency devaluation scenario could have been explored before the referendum, with response based on previous currency devaluations giving a historical scenario. But when unique Brexit factors are considered, this requires an artificial scenario; Brexit has never occurred before, giving no historical data to base it on.

Historical stress testing's strength is that assets actually behaved that way, adding credibility. However, if markets have changed since the historical period (maybe regulation changes), the response may no longer be possible. Historical events can also be 'messy', making isolation of individual aspects difficult. Artificial tests can lack credibility; is the proposed scenario possible? Can one really include all responses, direct and indirect, to portfolio assets? But they can address anticipated market changes, perhaps regulatory developments, new currencies, or isolate specific concerns.

## HISTORICAL STRESS TESTING

Historical scenarios have defined start and end dates spanning an interval when assets performed poorly. Asset price movements are applied to determine portfolio response. Approaches include 'value-at-risk' and 'event period' tests.

Value-at-risk (VaR) may make assumptions that can be inadequate during crises; in this case a technique known as 'historical VaR' may be better. Historical VaR stress tests incorporate returns from an earlier period that would not usually be included, to see how these affect the result. Suppose returns from 2014 to 2016 were used. If a period in 2008 caused concerns, one could include

this and recalculate the result. There are criticisms of this technique, but it does explore the potential impact from a previous period of market difficulty.

Event period tests require crisis start and end dates. These may be less obvious than initially appears. In portfolios, decline in one asset may occur while another rises, then the second may collapse as the first recovers. This suggests either selecting fixed dates and allowing the rise in one asset to offset the other's decline, or applying maximum declines in each simultaneously. Preserving the timeline makes better economic sense but is less demanding. Simultaneous price falls make little economic sense, but a tougher test.

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## ARTIFICIAL STRESS TESTING

Artificial stress tests can explore diversification, liquidity events or shock-specific factors.

Diversification uses decorrelated assets. Correlations often increase during market crises. Stress testing diversification involves increasing selected correlations, quantifying portfolio impact using volatility or other measures. But correlations can link. Suppose low correlations between UK, US and Chinese equities. Say a test increases US-UK and UK-China correlations; this implies

higher US-China correlations. Hypothetical, created event stress tests use invented scenarios, giving freedom to choose portfolio 'shock' factors. An envelope approach promotes consistency and inclusion of important factors. Factors and worst shocks are determined, with scenarios using shock magnitudes within the envelope. Multiple scenarios capture differing concerns. However, there is no guarantee that scenarios are economically realistic or sufficiently extreme. The advantage is flexibility to assess any imagined scenario, including regulatory changes or new developments in markets or geopolitics, potentially adding real value.

## IMPLEMENTING PORTFOLIO STRESS TESTING

Developing tests requires judgment, using 'unlikely but plausible' assumptions. Advisers can help identify issues of concern and scenario severity, and should see stress testing as supporting their investment process, with robust outcomes enhancing reputation. In practice, advisers are likely to require professional advice on implementation, although some online training is available.

A stress-testing programme, including documented scenarios, methods and outcomes, with restructuring if necessary, shows that advisers are actively looking to protect portfolio values against extreme market events. This helps demonstrate that robust investment processes are in place and that advisers are working hard to protect the value of client portfolios. ●

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