Still or sparkling?

Approaches to changing portfolio compositions in long-term stress-tests and scenario analyses

1 IN 1000

About us

About 1in1000

1in1000 is a research program by 2° Investing Initiative that brings together new & existing research projects on long-termism, climate change, and (inter-)connected future risks for financial markets, the economy, and society. Its objective is to develop evidence, design tools, and build capacity to help financial institutions and supervisors to mitigate and adapt to future risks and challenges. The programme focuses on climate change (inter-) connected risks and challenges, notably risks stemming from ecosystem services and biodiversity loss, as well as risks from social cohesion and resilience. To achieve this objective, 1in1000 operates with three main areas: i) Long-term metrics; (ii) Risk (management) tools and frameworks; and (iii) Policies & incentives.

Author: Jakob Thomä

About our funder

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Introduction

Financial supervisors and central banks are evolving traditional stress-testing frameworks towards more long-term analysis.

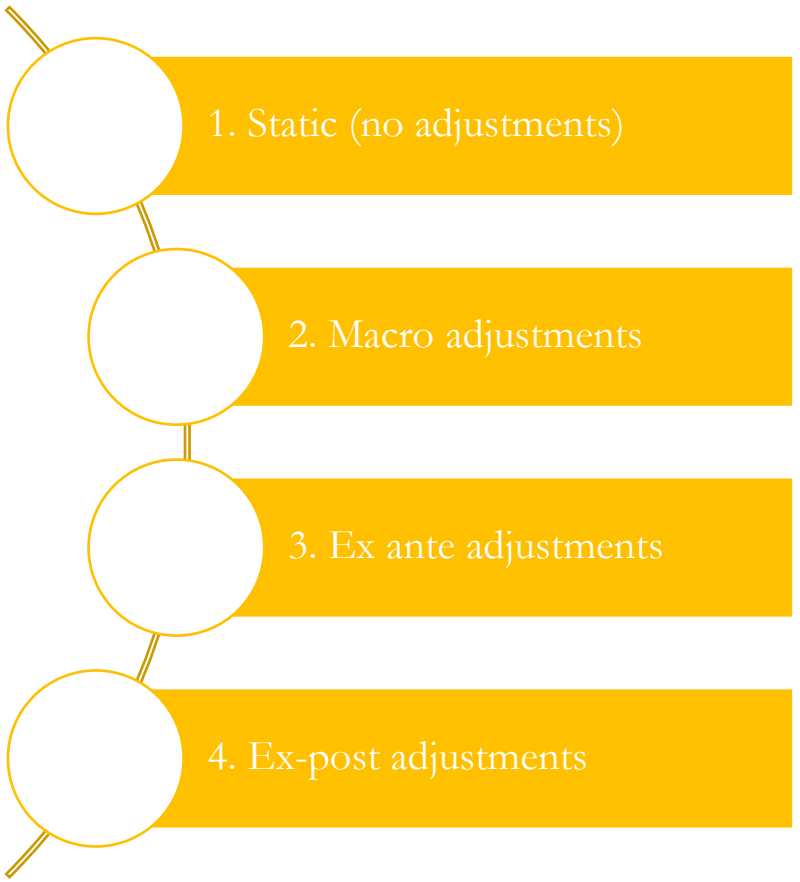
The Bank of England CBES has an analytical time horizon out to 2050 and analysis by EIOPA introduces the concept of "delayed stress-testing". Some private sector exercises even go out to 2070 or 2100 in their risk modelling.

One of the key methodological challenges associated with these types of long-term assessments relates to whether portfolios should be modelled as dynamic or static portfolios.

Specifically, one of the core questions explored by supervisors is whether the assessment should consider that portfolios remain unchanged throughout the asseessment period or whether they evolve as the economy transforms. To date, research on the appropriate approach and even more generally the different kinds of options is limited.

This paper summarizes the key options identified in terms of dynamic vs. Static portfolios, and their relative pros and cons. It also provides a simplified simulation to demonstrate the sensitivity of a sample stress-test run to different assumptions based on different time horizons.

FIG 1: PORTFOLIO ADJUSTMENT APPROACHES (SOURCE: AUTHORS)



Option #1: Static portfolio approach

Description:

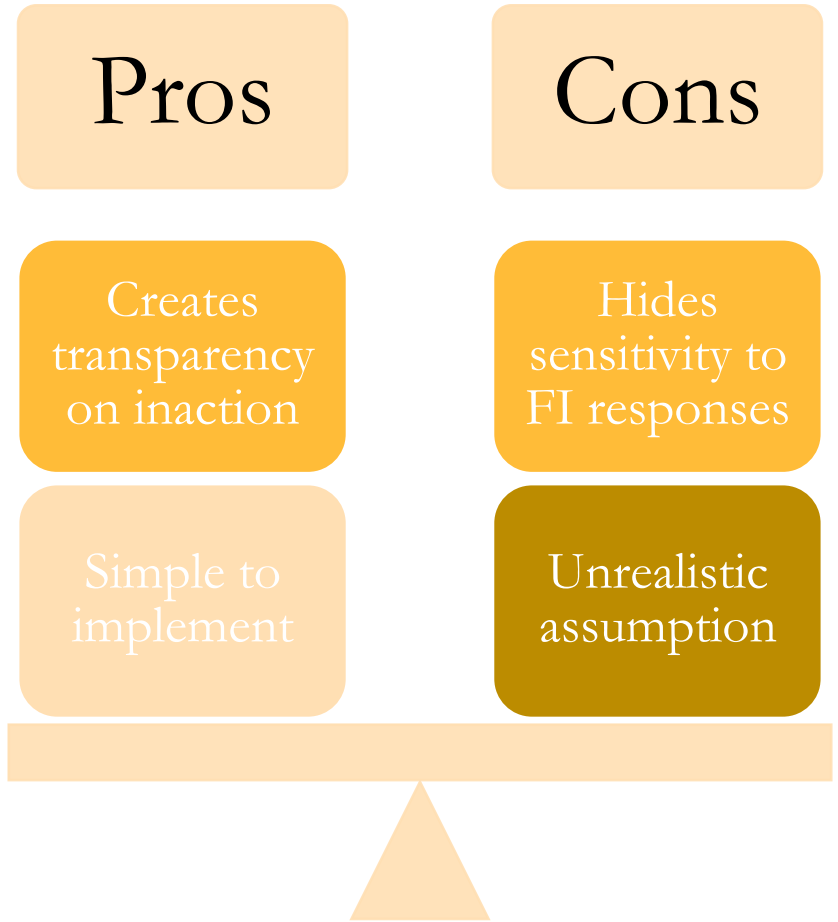
The static portfolio approach is currently the most widely adopted approach to long-term scenario analysis. As the name suggests, it keeps the portfolio composition constant for the duration of the stress-test run.

The primary logic of using static portfolios is that the stress-test run creates transparency on future outcomes assuming inaction by the financial institution. This creates an – albeit unrealistic – baseline against which different outcomes can be compared and ensures the results are exclusively driven by the exogenous shocks. The additional benefit of this approach is aligning with standard stress-test approaches, but given that these are typical short-term, the relevance is limited. One combination used here is frequently front-loading the climate shock to today, although underlying assumptions can be somewhat unrealistic when this approach is chosen and not representative of actual risk dynamics.

Example of application:

EIOPA 2022

FIG 2: PROS AND CONS OF THE STATIC APPROACH (SOURCE: AUTHORS)



Option #2: Macro adjustment approach

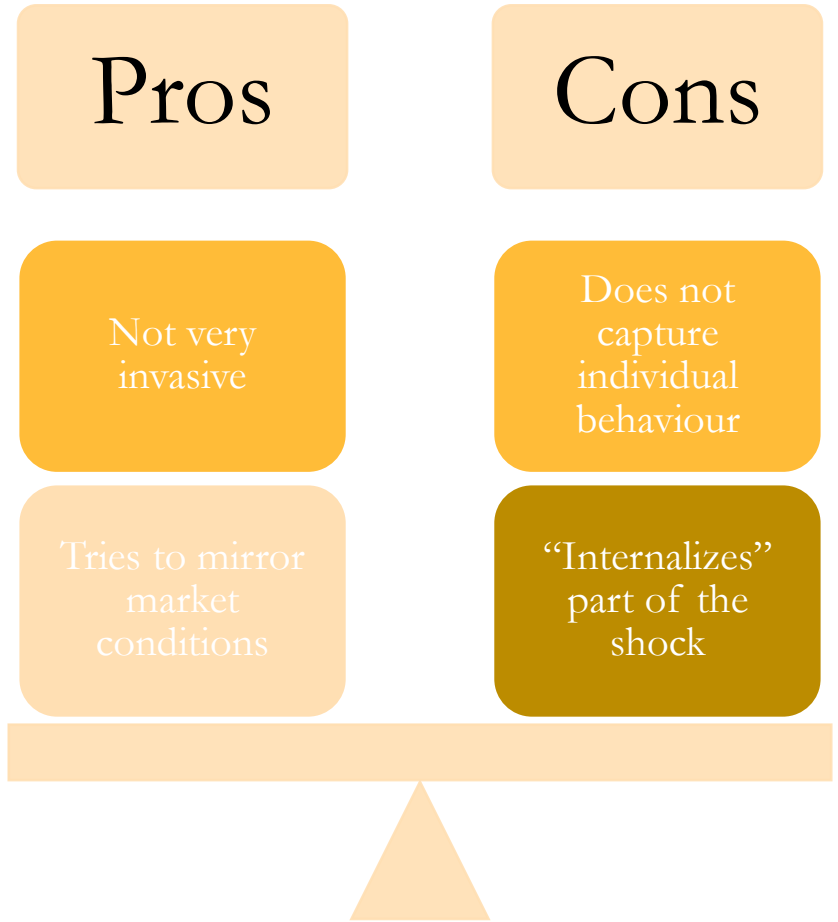
Description:

The macroeconomic adjustment approach is based on the principle that portfolio composition is adjusted in line with a non-shocked macroeconomic evolution (*baseline)* that then gets adapted to implications for portfolio exposure. This can be applied based on some generic macro baseline scenario (e.g. oil & gas expansion by 3% is downscaled to the portfolio weight of the sector) or the actual baseline company plans as derived from company targets and / or asset-level data.

This approach is designed to reflect likely increased / decreased need for capital before a shock materializes. However, a key challenge is the complexity of appropriately calibrating the adjustment and the inability to capture the heterogeneity of firm / financial institution responses. This option is the least invasive in terms of portfolio shifts, next to the static approach.

Example of application: California Insurance Commissioner's Office 2019

FIG 3: PROS AND CONS OF THE MACRO APPROACH (SOURCE: AUTHORS)



Option #3: Ex ante approach (*index calculation rules logic)*

Description:

The index calculation rule approach adjusts the future portfolio composition based on ex ante defined calculation rules derived from a financial institutions forward-looking targets and commmitments and / or other factors.

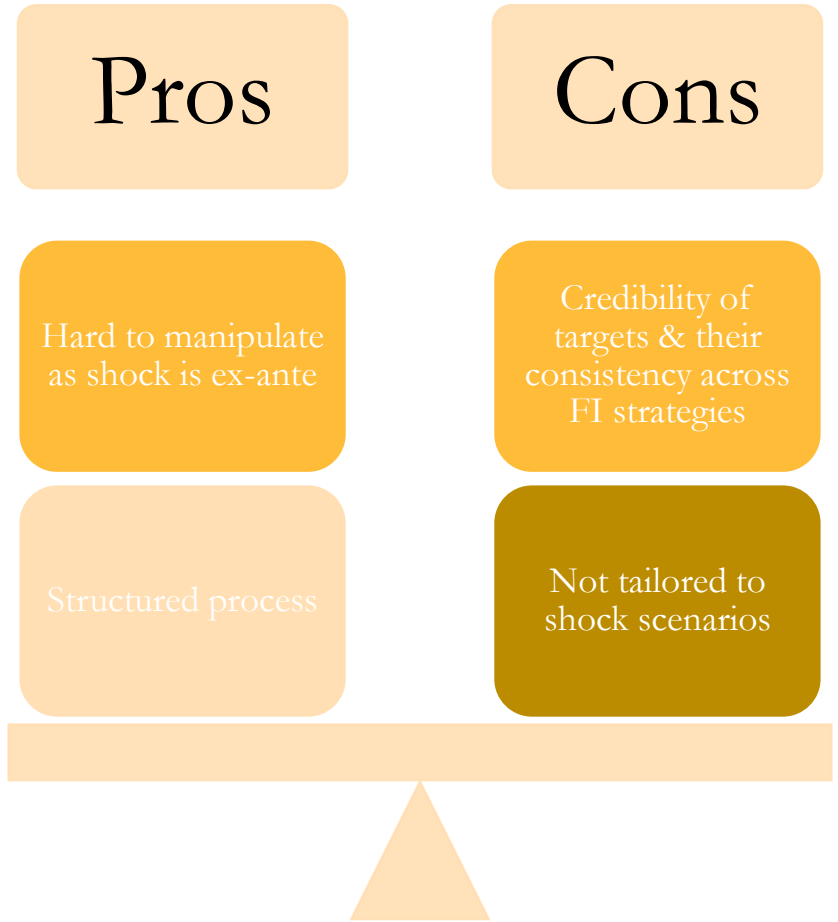
For example, a portfolio with this approach may be adjusted to reflect a forward-looking coal divestment policy of the financial institution. Alternatively, it could reflect the forward-looking requirements of the climate benchmarks as laid out by the EU benchmark regulation. Here too however, index calculation rules have to be *translated* into alternative portfolio pathways.

The upside of this approach is that – given the rules are defined ex-anted and should be grounded in existing financial institution strategies – they are harder to game. The downside is in particular questions around the credibility of the targets and their consistency across financial institutions.

Example of application:

NA

FIG 4: PROS AND CONS OF THE EX ANTE APPROACH (SOURCE: AUTHORS)



Option #4: Ex post approach (*Strategic response)*

Description:

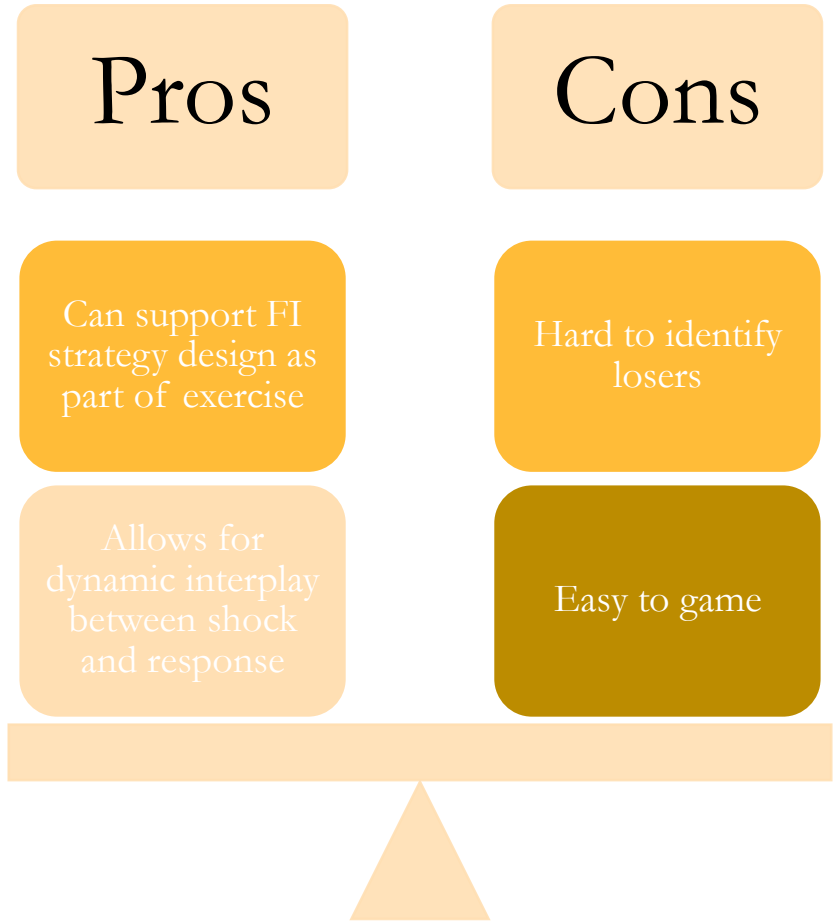
The ex post approach allows financial institutions to adjust their portfolio composition at different moments in the stress-test application in response to the shocks identified. Typically, ex post approaches only allow for medium-term adjustments as the first strategic response only sets in after the first losses are identified, but the specific calibration can of course be tailored depending on the supervisory perspective.

The advantage of this approach is that it helps financial institutions game plan actual scenarios and thus involves a behavioural component with the exercise. The obvious disadvantage is the potential capability for financial institutions to game the system as it is difficult to set up meaningful constraints, which need to consider historical reference points for unprecedented risks, the extent to which different financial institutions responses in the exercise can be implemented in parallel and are consistent with one another

Example of application:

BoE CBES (qualitative)

FIG 5: PROS AND CONS OF THE EX POST APPROACH (SOURCE: AUTHORS)

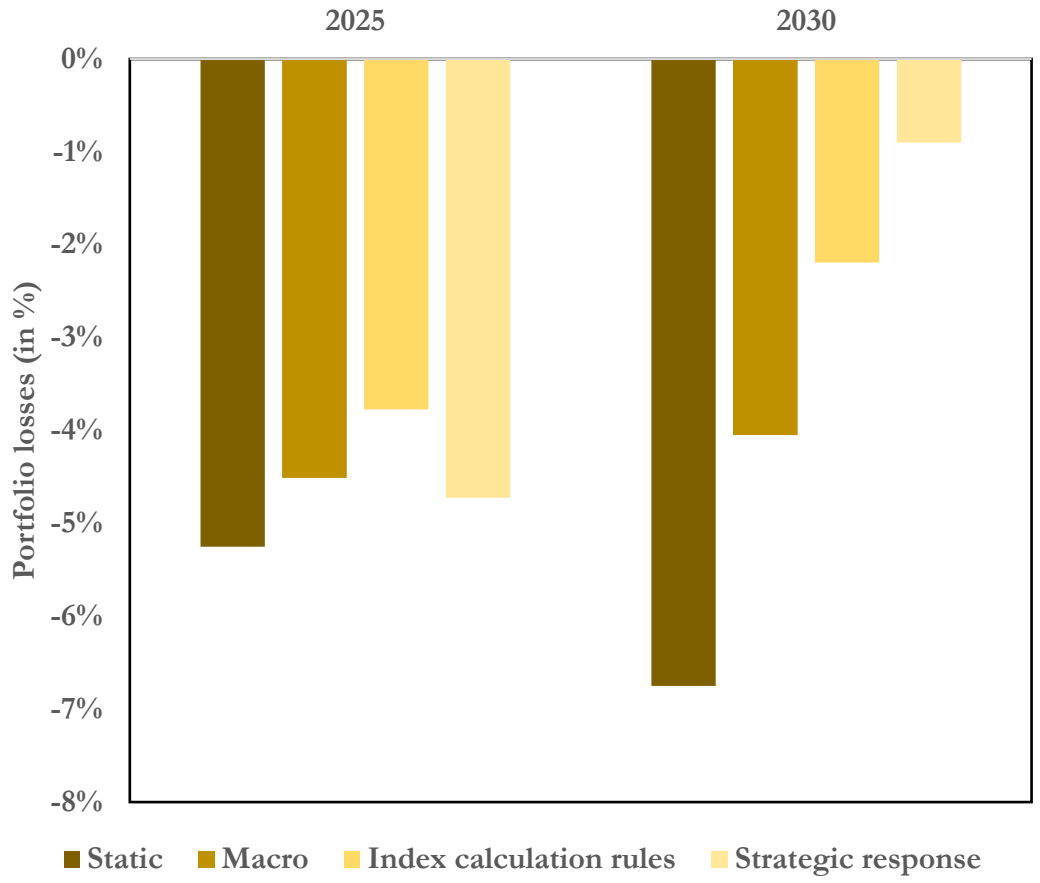


Simulation of losses using different approaches

The figure on the right demonstrates the sensitivity of a stress-test or scenario analysis result to different portfolio compositions. The simulation involved the application of a high-carbon negative shock / low-carbon positive shock at two time periods (2025, 2030) on four different types of portfolios following the logic outlined on the previous pages. The two time periods were chosen to identify the extent to which dynamic portfolios drive results as the time horizon of the analysis gets lengthened. Specifically:

- Static portfolio: No adjustment, baseline of 18% high-carbon / 3% low-carbon exposure
- Macro adjustment: +/-3% yoy change in portfolio exposure of high-carbon / low-carbon exposures
- Index calculation rules: +/-7% yoy change in portfolio exposure, mirroring the 7% decarbonization rate of the EU Climate Benchmarks
- Strategic response: No high-carbon adjustment in 2025, but 50% growth in low-carbon exposure. Alignment of low-carbon / high-carbon exposure to even levels by 2030 in response to 2025 shock.

FIG 6: PORTFOLIO LOSSES APPLYING THE SAME STRESS-TEST SCENARIO UNDER DIFFERENT PORTFOLIO COMPOSITION APPROACHES (SOURCE: AUTHORS)



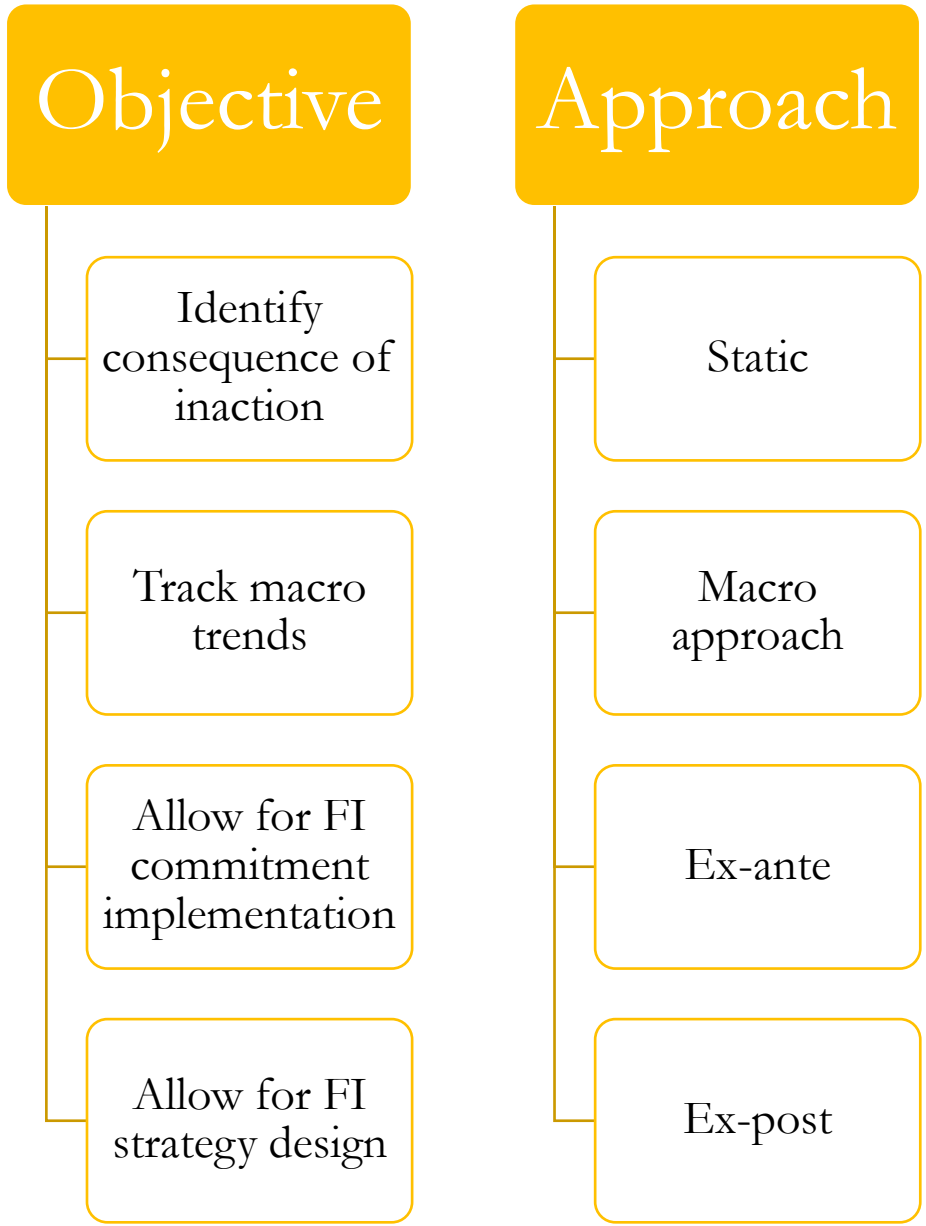
Conclusion

This research note summarized the current options in terms of dynamic and static portfolio adjustments.

Whereas most stress-tests and scenario analysis approaches (including those run or supported by 2DII) provide for a static portfolio, there is growing awareness for the need to consider more sophisticated approaches. While there have been some preliminary pilots around moving away from static portfolios, these are still in their early stages.

Ultimately, as with everything when it comes to stress-tests, the most relevant choice is a function of the objective.

The figure on the right summarizes the objectives most closely linked to different approaches. The early stage of the research means that some of these assessments may change over time and additional approaches developed.



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