One-off "Fit-for-55" Climate Scenario Analysis: Frequently Asked Questions

Key features of the one-off "Fit-for-55" Climate Scenario Analysis

FAQ 1 – What is the "Fit-for-55" package?

The "Fit-for-55" package is a set of legislative proposals and policy initiatives designed as part of the European Green Deal with the aim of ensuring that EU policies are aligned with the climate goals agreed by the European Council and the European Parliament. More precisely, "Fit-for-55" refers to the EU's target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to the 1990 levels. The EU commitment is to transition to a climate-neutral economy by 2050.

FAQ 2 – What is the objective of the "Fit-for-55" climate scenario analysis?

In accordance with its 2021 Strategy for financing the transition to a sustainable economy [1], the European Commission invited the European Supervisory Authorities (ESAs) and the European Central Bank (ECB) to conduct a one-off "Fit-for-55" climate risk scenario analysis focusing on banks, investment funds, occupational pension funds and insurers. The objective is to assess the resilience of the EU financial sector to climate and macro financial shocks, while the Fit-for-55 package is being smoothly implemented in the EU. This exercise is based on three scenarios that were developed by the European Systemic Risk Board (ESRB). It is part of the ESAs and ECBs' joint effort to develop more advanced methodologies to better capture climate risks, in light of the urgency of the challenges posed by climate change. Additionally, it allows to gain insights into the financial sector's capacity to support the green transition even under conditions of stress.

FAQ 3 – How was the "Fit-for-55" climate scenario analysis performed?

The “Fit-for-55” climate scenario analysis is run in a top-down manner over an 8-year horizon, between 2023 and 2030. It covers data for thousands of EU financial institutions, including banks, insurance companies, institutions for occupational retirement provision (IORP) and investment funds. The exercise goes beyond the assessment of individual sectoral vulnerabilities (first-round losses) to consider the EU financial system as a whole, including the modelling of contagion and amplification effects across firms and sub-sectors of the financial system (second-round losses). The exercise focuses on the assets held by the financial entities in scope, without capturing the potential additional effects on liabilities. Moreover, the exercise is about the assessment of risks, focusing only on the asset side of the balance sheet, without considering the evolution of income components, which could potentially mitigate losses. The analysis for each individual sector is performed under a static balance sheet assumption. Some dynamic effects are included in the cross-sectoral analysis.

FAQ 4 – How is the “Fit-for-55” climate scenario analysis different from other climate stress tests (e.g. the SSM 2022 climate stress test)?

The “Fit-for-55” climate scenario analysis is the first EU-wide cross-sectoral climate stress test for the entire financial system. It assesses the impact of the same scenarios on the different sectors of the financial system, and includes a system-wide perspective, as opposed to standard climate stress tests, which focus only on individual sectors. The exercise does not only assess individual sectoral vulnerabilities, but also investigates how stress, triggered inter alia by climate factors, propagates through the financial system and how financial institutions’ reactions might amplify it, thereby providing a better understanding of the possible vulnerabilities in the financial system as a whole.

FAQ 5 – How is the “Fit-for-55” climate scenario analysis different from the ESAs supervisory stress tests?

The ESAs supervisory stress tests are performed regularly and individually within each sector, to assess the resilience of financial institutions to severe shocks. They aim at identifying residual areas of uncertainties, and to inform the supervisory decision-making process.

On the other hand, the “Fit-for-55” exercise is a one-off exercise that is run with a system-wide perspective, i.e., looking at the entire financial system and at the interlinkages across sectors. It does not aim at assessing capital implications or the resilience of particular entities. For further details on the differences on how results are used in the “Fit-for-55” exercise compared to the ESAs supervisory stress test, please refer to FAQ 24.

FAQ 6 – What are the roles of the ESAs, the ECB and the ESRB?

The ESRB, in close cooperation with the European Central Bank (ECB), was responsible for designing both the baseline and the two adverse scenarios, following the high-level narratives outlined in the mandate by the European Commission. This was intended to ensure consistency across sectors and synergies with the scenarios used in other stress tests. The scenarios were approved by the ESRB General Board in December 2023.

Each ESA was responsible for assessing the vulnerabilities in the form of first-round losses of the sector within its competence. The ECB supported the European Banking Authority (EBA) in assessing the resilience of the banking sector. The ECB was also responsible for the cross-sectoral module of the exercise, which required modelling contagion and second-round effects across firms and sub-sectors of the financial sector.

FAQ 7 – What is the role of the Competent Authorities (CAs) in this exercise?

CAs have closely monitored the process governing the “Fit-for-55” exercise. They were involved in the design of the scenarios provided by the ESRB and provided feedback to the ESAs and the ECB on the scenarios and the methodological framework. For the insurance and IORPs sectors, CAs supported European Insurance and Occupational Pensions Authority (EIOPA) in the data validation process. Concerning the banking sector, CAs also provided support to the EBA for the data collection.

FAQ 8 - What does “contribution of the financial system to funding the transition” mean?

The European Commission estimated that the EU will need EUR 350 billion in additional investment per year between 2020 and 2030 to meet its 2030 emission reduction target in energy systems alone. Such a level of investment cannot be achieved just by public

spending. The EU has, therefore, developed a sustainable finance framework that aims to channel private financial flows into sustainable economic activities. Assisted by the Platform on Sustainable Finance, capital flows into sustainable investments are set to be regularly monitored by the Commission.

There is very little time to achieve the goals set for 2030, and the transition towards these goals could be derailed by adverse developments in the financial sector. Therefore, it is important to not only monitor progress, but also to anticipate shocks to the financial system that could jeopardise the viability of financial institutions or the financial system as a whole, or the EU's ability to achieve its climate and environmental goals, and to be ready to react swiftly to any such adverse shocks.

While the primary focus of the "Fit-for-55" climate scenario analysis is to assess the resilience of the financial sector in line with the Fit-for-55 package, the exercise is also intended to provide insights into the capacity of the financial system to support the transition to a lower carbon economy even under conditions of stress.

Key features of data coverage

FAQ 9 – Since the "Fit-for-55" climate scenario analysis is a top-down exercise, did the ESAs and the ECB rely solely on internally available data?

EIOPA and the European Securities and Markets Authority (ESMA) relied on internally available data (including commercial data) for insurers, IORPs and investment funds. In contrast, an ad-hoc data collection was launched by the EBA and the ECB Banking Supervision to support the banking module of the exercise. This enabled the acquisition of granular data on banks' exposures to high-emitting sectors and counterparties, which were used in the top-down model in combination with the scenarios provided by the ESRB and other data internally available at the EBA and the ECB.

FAQ 10 – What is the data coverage of the exercise for the different sectors?

The exercise assesses the impact of the three scenarios on 110 banks, 2,331 insurers, 629 IORPs and around 22,000 EU-domiciled funds. The data coverage accounts for less than half of the total assets held by these types of entity at aggregate level across the EU. In

particular, the share of assets covered for each sector is: 35% of total credit risk exposures and 26% of total market risk exposures for banks, 81% of total investments for insurers, 76% of total investments for IORPs, and 77% of total assets in scope (i.e. exposures to equities and bonds) for investment funds. Market risk exposures represent the largest share of total assets modelled, while credit risk exposures are unique to the banking sector.

Key features of scenarios

FAQ 11 – How many scenarios are considered in this exercise and what is the narrative behind them?

The exercise considers three scenarios, focusing on transition risk: one baseline and two adverse scenarios. The high-level narrative of the scenarios was defined by the European Commission in the original request. One adverse scenario focuses on climate-change related risks that already materialise in the near term, in the form of asset price corrections triggered by a sudden reassessment of transition risks. A second adverse scenario combines such climate-change related risks with other stress factors, as far as possible consistent with scenarios for regular stress-testing exercises. The adverse scenarios are compared to a baseline scenario in which the implementation of the "Fit-for-55" package progresses as planned and within the economic environment as forecasted at the launch of the exercise.

FAQ 12 – What is the "Run-on-Brown" and how is it calibrated?

The "Run-on-Brown" incorporated in the two adverse scenarios is a sudden negative reassessment of transition risks by market participants that materialises in the form of a confidence shock. The shock uniquely reflects a sudden downward change in the perception of climate-related risks and is not attributed to the implementation of the "Fit-for-55" package. The shock is characterised by asset price falls, which are triggered by a sell-off of carbon-intensive assets (hence "Run-on-Brown"). This flight-to-quality away from such assets causes higher financings costs and less access to funding for carbon-intensive firms.

The "Run-on-Brown" materialises as an instantaneous shock on 1st January 2026 and changes the path of the transition. Its technical implementation consists of three main steps. First, an exogenous shock on the financial constraints of firms is determined based on their degree of brownness (and consequently their exposure to transition risk). The firm-level metric used to measure the degree of brownness is the brown energy intensity, i.e. firms' fossil fuel consumption over revenues. Second, the impact of changes in firms' financial constraints on changes in their profitability is estimated. Third, the impact on credit risk and market risk is measured and translated into valuation shocks to the assets included in the exercise.

FAQ 13 – Does the exercise measure the stress caused by the implementation of the" Fit-for-55" package?

No, it does not. A key assumption in this exercise is that the "Fit-for-55" package is implemented as planned under all scenarios. This exercise looks at adverse scenarios where stress does not result from the "Fit-for-55" package (e.g. a late and rushed implementation), but rather from other sources. There might be disorderly market developments in the early stages of the transition, for example, a sudden repricing of 'carbon-intensive assets' and/or macro-financial stress factors, but the exercise does not assume that the "Fit-for-55" would be the origin of the stress.

FAQ 14 – Are there common elements between the baseline and the two adverse scenarios?

Yes. All three scenarios reflect the European Commission's request to assume that the "Fit-for-55" package will be fully implemented and that its objectives will be achieved by 2030. This is guaranteed by two assumptions common to all scenarios:

- The EU achieves an emission reduction of 55% by 2030 with respect to 1990 levels; and
- The amount of energy-related investments in the EU is the same across scenarios.

Investment estimates are provided by the European Commission for 27 Member States and 4 economic sectors, and further disaggregated using ECB climate models.

FAQ 15 – What are the key features of the "Fit-for-55" baseline scenario?

The baseline scenario reflects a smooth, timely and widely anticipated green transition, in which governments implement the policy measures in the Fit-for-55 package as anticipated. The macroeconomic projections under the baseline scenario for GDP, interest rates and inflation reflect the June 2023 Eurosystem staff Broad Macroeconomic Projection Exercise (BMPE) projections. Under the baseline scenario, the economy and financial system develop according to macroeconomic and financial conditions that facilitate an orderly transition to a lower-carbon economy in line with the "Fit-for-55" package, with a 11% cumulative GDP growth over the 8-year horizon and relatively stable energy prices. Nevertheless, the structural changes necessary to align the economy with the "Fit-for-55" objectives require firms to allocate almost EUR 3.7 tn to energy-related investments over the same period, temporarily increasing their leverage and financial expenses and, in turn, financial risk for their counterparties. These large-scale investments are collectively needed to mitigate the most extreme costs of climate change further in the future, beyond the modelling horizon of the exercise.

FAQ 16 – What are the key differences between the two adverse scenarios?

The first adverse scenarios focus on climate-change related risks that could already materialise in the near term in the form of asset price corrections triggered by a sudden reassessment of transition risk ("Run-on-brown"). The second adverse scenario is structured in the same way as the first adverse scenario, but the transition happens under a deterioration of global macro-financial conditions. The selection of non-climate related stress factors represents a subset of the main financial stability risks to which the EU financial system is exposed, including geopolitical risk, and are line with the scenario for the EBA's 2023 EU-wide banking sector stress test exercise.

FAQ 17 - How does the Fit-for-55 baseline scenario differ from the baseline scenario of the most recent sector-specific stress tests performed by the ESAs?

The "Fit-for-55" baseline scenario differs from a baseline scenario in regular supervisory stress tests not only in its time horizon (8 years instead of 3 years), larger coverage of variables and higher granularity, but also in terms of assumptions on the implementation of the "Fit-for-55" policies. For instance, the baseline scenario in the EBA EU-wide stress test coincides with the economic forecast, although the current policies included in the forecast

are unlikely to be sufficient to fully meet the EU targets. For the EIOPA EU-wide insurance stress tests, the baseline scenario has been, so far, the Solvency II data at the reference date of the exercise. The Fit-for-55 baseline should thus be interpreted as a 'reference trend' that, while generating somewhat higher losses with respect to the 'current policies trend' in regular stress tests, keeps the world on a safer global temperature trajectory and reduces physical risk in the long run. In other words, unlike baseline scenarios typically used in non-climate-related stress testing, it assumes that necessary policy action will be taken, thereby incurring short-term costs to avert the most catastrophic long-term economic, social and ecological costs of global heating.

FAQ 18 - How does the "Fit-for-55" second adverse scenario differ from the adverse scenario of the most recent sector-specific stress tests performed by the ESAs?

Considering the banking sector, the "Fit-for-55" second adverse scenario differs from the EBA's 2023 EU-wide stress test in its time horizon (8 years instead of 3 years), larger coverage of variables and higher granularity, as well as in terms of assumptions on the implementation of the "Fit-for-55" policies. In the "Fit-for-55" climate scenario analysis it is assumed that the "Fit-for-55 package" is fully implemented, as such all scenarios include several components reflecting the energy-related investments and changes in the composition of firms' energy mix required to achieve the "Fit-for-55" objectives, which are not included in the EBA's EU-wide banking sector stress test. While both adverse scenarios consider a -6% EU GDP adverse cumulative growth from the starting point in the first 3 years, followed by a recovery in the "Fit-for-55" climate scenarios, the shocks profile of the financial variables sometimes differ. For instance, the shocks for SWAP rates, government and corporate credit spreads applied in the first three years of the "Fit-for-55" second adverse scenario are, in general, more severe than those applied in the EBA's 2023 EU-wide stress test. Furthermore, the "Fit-for-55" second adverse scenario includes a significant increase in gas and carbon prices, whereas in the EBA's 2023 EU-wide stress test the increase in gas prices is smaller and no increase in carbon prices is taken into consideration.

The 2022 IORP Climate stress test addressed transition risk, however under a different trajectory for both the climate-specific shocks, as well as the macroeconomic environment, which were based on the NGFS "Delayed Transition" scenario. Therefore, the equity as well as government and corporate credit spreads differ, while especially the swap shocks are more severe in the "Fit-for-55" second adverse scenario. The EIOPA 2024 EU-wide insurance stress test did not feature specific climate components, and its time horizon is one year. The swap shocks derived from the adverse scenario for the 2024 insurance stress test are milder than the ones prescribed in the second adverse scenario of the "Fit-for-55" exercise (e.g. the EUR 10Y swap rate increases by 46 basis points in the 2024 EIOPA insurance stress test, while it increases by 219 basis points in the "Fit-for-55" second adverse scenario).

Key methodological features

FAQ 19 – What are the main commonalities and differences between the methodologies used to determine first-round losses for the sectors under consideration?

The assessment of first-round losses for each individual sector is performed under a static balance sheet assumption without considering any reactions by financial institutions or other market participants to mitigate losses and focusing only on the asset side of the balance sheets. This assumption is partially relaxed for banks (in Box 1 of chapter 3 of the FF55 report) to show how they might adjust their lending in response to the macroeconomic environment and transition risks. Furthermore, for insurers and IORPs positive shocks to swap rates through discounting would lead to a significant decrease in liabilities, partially offsetting the drop in market value of investments (see Box 2 of chapter 4 of the FF55 report).

The estimation of credit risk losses is unique to the banking sector and is based on the methodology used in the 2023 EU-wide stress test, as described in the EBA methodological note. Credit losses are estimated separately for real estate and non-real-estate exposures at bank-country-sector level and are driven by changes in counterparties' probabilities of default (PDs) and loss-given-default (LGDs).

Market risk losses for the four sectors are generated by applying the financial shocks provided in the scenario to the fair value of the instruments at the starting point, based on an instantaneous shock assumption. The scope of market risk exposures included differs between sectors and ranges from 26% for the banking sector to 81% for insurers (see FAQ 10 for more details). Hedges are considered only for banks due to their relevance for the banking sector, but this simplification means that hedging effects that would otherwise reduce losses among funds and insurers are not modelled.

FAQ 20 – What are the specificities and key features of the methodological framework used in Box 1 covering banking sector amplification and real economy effects?

Box 1 complements the analysis of first-round losses for the banking sector by relaxing the constant-balance assumption and incorporating feedback effects between the real economy and the euro area banking sector. This allows for an assessment of how banks adjust their lending in response to the macroeconomic environment and transition risks, as well as the potential amplification effects on macroeconomic variables. The analysis uses a macro-micro model covering all euro area economies and 98 significant banks, representing over 80% of the euro area banking sector (Budnik et al. 2023). The modelling of banks' behaviour relies on empirical relationships that capture banks' reaction in terms of lending volumes, pricing, liability structure and profit distribution.

FAQ 21 – What are the specificities and key features of the methodological framework used in the cross-sectoral module of the exercise?

The integrated structure of the financial system calls for more holistic risk assessments and for an understanding of the complex interactions between different financial institutions. The Interconnected System-wide stress test Analytics (ISA) model purports to address these issues and extends the toolbox available on stress test. It captures the contagion and amplification of financial shocks between sectors.

The ISA model covers banks, investment funds and insurances and takes into account an extensive set of channels featuring default, credit, market and redemption risk among them. The model operates in a multi-country setup with firm-level data.

The second-round effects (the amplification) assess how the stressed position on solvency and liquidity after the initial shock leads to further losses through cross-sectoral exposures. They manifest through two channels, which are the key ones identified in the interconnectedness literature:

- Direct exposures through the holdings of equity or debt issued by other firms within the financial sector. This includes fund shares, equity securities, bonds, and loans. All of them are affected in the case of the default of a counterpart, and the value of fund shares is dynamically updated.
- Indirect exposures through overlapping portfolios, i.e. different financial institutions hold the same securities issued by non-financial corporations, non-modelled financial firms, or governments (indirect exposures through households exist but do not contribute to the contagion). Then, when liquidity constraints force some financial institutions to sell assets (also known as fire sales), prices of these assets may decrease, which affects other holders.

FAQ 22 – What are the main limitations of the methodologies used in this exercise?

The exercise marks a significant advancement in the field of climate stress testing, particularly in terms of its complexity and the integration of interconnected features. Nonetheless, the estimates depend on several important assumptions, some of which are also present in the EU-wide stress test. These include, for instance, the static balance sheet assumption, which does not allow to consider reactive management decisions to mitigate losses, and the instantaneous shock assumption used to assess market risk losses for the four sectors, which is less realistic with an 8-year horizon. Additionally, the scope of the exercise does not encompass the entirety of the balance sheet of the financial institutions in question. For instance, income components for banks and liabilities for insurances and IORPs are not considered in the exercise. Even on the assets' side, the exercise does not cover all financial institutions' portfolios (see FAQ 10 for more details). Modelling uncertainty is also a significant factor underlying for both risk assessment and scenario calibration, as the construction of the scenarios themselves involves highly detailed macroeconomic modelling.

Results

FAQ 23 - How should the results of the "Fit-for-55" climate scenario analysis be interpreted?

The results presented in the "Fit-for-55" report allow to assess the resilience of the financial sectors considered, as well as of the EU-wide financial system, to climate-related shocks, also in an adverse macroeconomic environment. The exercise does not only provide detailed information on the magnitude and concentration of vulnerabilities, but also insights on the capacity of the EU-wide financial system to support the transition to a lower-carbon economy. However, the outcomes are subject to inherent uncertainty, as with all forward-looking projections, adding to the estimation errors linked to the novelty of the climate stress testing approaches as well as data quality concerns. Therefore, the results should be understood as relating only to the specific scenarios considered in the exercise, and as based only on part of financial institutions' total exposures.

Considering the banking sector results, it is important to note that banks' income components were not modelled as part of this exercise, although they could mitigate losses, especially during high-interest rate periods. Similarly, as far as insurance and IORPs are concerned, the results might overestimate the actual impact for several reasons. First, the exercise focuses on the impact on investments of insurers and IORPs and does not include the effect on liabilities. Across all scenarios and most notably under the second adverse scenario with its significant positive shock to swap rates, discounting of liabilities, especially for long durations such as in life insurance business or for IORPs, would consequently lead to a significant decrease in liabilities, partially offsetting the drop in market value of investments. Furthermore, part of the impact is borne by policyholders, as is the case for unit-linked business or for DC IORPs which further softens the impact for parts of both sectors. Finally, no reactive management actions have been considered, thus their mitigating effect is not included in the assessments.

In general, the results for the fund sector should be understood as a percentage of assets in scope, i.e. funds' direct and indirect exposures to equities and bonds. Cash and derivatives (e.g. those used for hedging) are excluded from this measure, which simplifies the analysis

but tends to increase the reported first-round percentage losses. In the second round, the modelling focuses especially on price effects associated with investor redemptions, rather than those by banks' depositors (see FAQ 26).

FAQ 24 – Are the results of the "Fit-for-55" climate scenario analysis comparable with those of the sector-specific supervisory stress tests run by the ESAs?

No, the results of this exercise are not directly comparable to the sector-specific supervisory stress tests. Firstly, the scenarios of the "Fit-for-55" exercise as a specific feature include several components related to the implementation of the Fit-for-55 package. Furthermore, the magnitude of the shocks will generally differ across different exercises, depending on how each set of scenarios is designed. Secondly, for banks' exposures in scope and the starting point data used for the "Fit-for-55" exercise are based in part on data collected specifically for the exercise, making direct comparison with supervisory stress tests (such as the EBA's EU-wide stress test) difficult. Thirdly, for the banking sector the credit risk parameters of the "Fit-for-55" exercise are calibrated based on a top-down, firm-level model designed for the purpose of climate stress testing, to capture the most relevant channels of climate-related risks at granular level and embedding climate-related features such as changes in energy expenses and debt raised to finance the green transition. Finally, the exercise did not feature insurance or IORPs-specific shocks nor recalculation of their liabilities that could have partially mitigated the impact of the shocks on the assets side of the balance sheets. All these are significant components of the regular EIOPA stress tests that are carried out typically via a bottom-up approach.

FAQ 25 – Will the results of the "Fit-for-55" climate scenario analysis be used to review capital requirements?

The results of this exercise are not expected to feed into the setting of micro- or macro-prudential capital requirements for financial institutions. Instead, they may inform the future considerations and work of the European Commission and could feed into supervisory or monitoring programs of the ESAs and the ECB on a qualitative basis.

FAQ 26: Why do investment funds suffer worse second-round effects than the other sectors? Why are banks largely unaffected?

The estimated second-round effects are mostly related to market risk. In particular, the second-round modelling assumes that the initial asset price shock, as specified in the scenarios, trigger investors to redeem investment fund shares. To meet this spike in redemption demand, fund managers have to sell assets in a 'fire sale', which creates downward pressure on asset prices. Investment funds on average experience significant reductions in value as a result, as do insurance sector entities with large exposures to funds. Losses of insurers are somewhat mitigated by their loss-absorbing capacity though.

Banks, on the other hand, have relatively limited exposure to funds, while depositors are assumed not to liquidate their deposits, and the knock-on impact of asset fire sales to default risk on outstanding loans is very limited. Moreover, banks benefit from both hedging and the categorisation of part of their assets as held-to-maturity, which limits second-round effects as it does for the first round.

In general, the results for the fund sector should be understood as a percentage of assets in scope, i.e. funds' direct and indirect exposures to equities and bonds. Cash and derivatives (e.g. those used for hedging) are excluded from this measure, which simplifies the analysis but tends to increase the reported percentage losses.

Lastly, the granular level of the price impact that is triggered by fire sales means that sellers are the most affected. Thus, although the portfolios of other sectors present some overlap with selling funds, the investment funds sector remains the most affected.

Next steps

FAQ 27 – What is the connection between the "Fit-for-55" climate scenario analysis and the future sector-specific regular climate stress tests?

The "Fit-for-55" climate scenario analysis marked a significant advancement in the field of climate stress testing, being the first EU-wide and cross-sectoral exercise for the financial sector carried out jointly by European institutions and supervisory authorities. In response to the European Commission's request, the ESAs and the ECB have enhanced their modelling toolkits, shared their expertise and gained valuable insights by identifying key risks associated with the transition to a green economy. The exercise will, therefore, inform

future work on this crucial topic, as the European Commission in its 2021 Strategy for financing the transition to a sustainable economy recommends the ESAs and the ECB to regularly perform sectoral climate risk stress tests.

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[1] COM//2021/390, "Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Strategy for financing the transition to a sustainable economy", July 2021.