Norges Bank Investment Management

Stress testing

Standard risk measures, such as volatility of returns, may not fully capture the potential impact of extreme events. Norges Bank Investment Management therefore supplements such measures with stress testing as a part of the investment risk framework. Stress tests aim to quantify potential losses in highly adverse scenarios in order to evaluate the portfolio's resilience. The fund conducts multiple forms of stress testing including historical stress testing and hypothetical, also known as predictive, stress testing. Historical stress testing uses changes in drivers of market risk such as equity prices, interest rates and real estate prices during historically stressed periods applied to the current portfolio to evaluate the impact of these events on the value of the fund. As a part of historical stress testing, we compute expected shortfall, which measures average loss of the portfolio in the worst q percent of outcomes. Hypothetical stress testing supplements subjective views with historical data to define shocks to a core set of systematic risk factors for a given scenario and map these risk factors to the current portfolio holdings to calculate the impact on the fund.

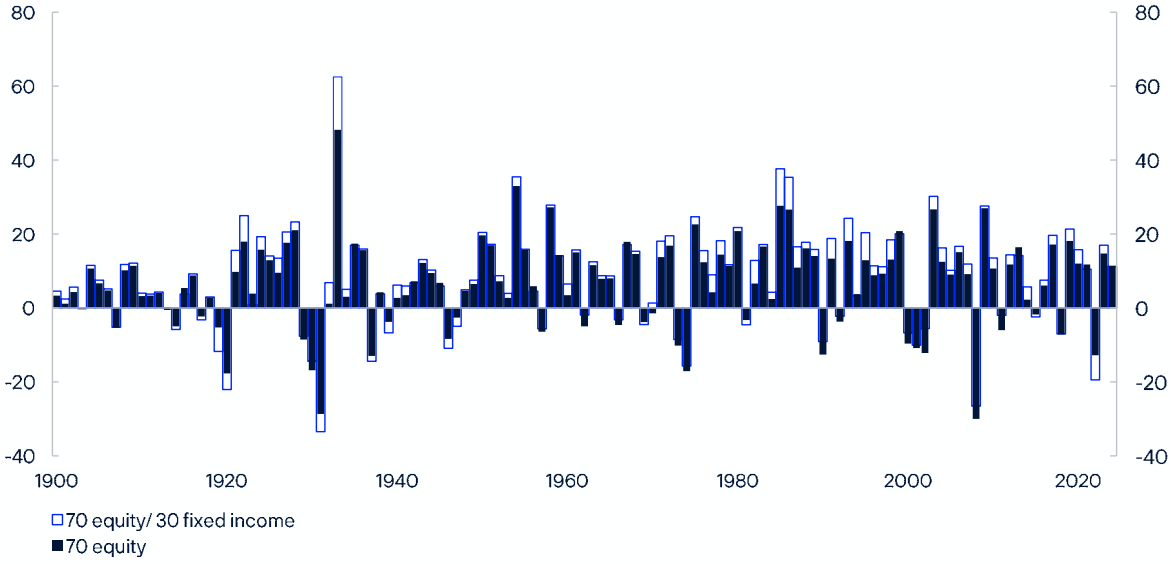
Historical stress tests

This section shows returns from historically stressed periods for the current asset composition of the fund. The section starts with an analysis of a stylised version of the fund's portfolio of global equities and bonds for a long historical sample. Then, historical simulations for the fund's positions at the end of 2025 are presented, using a model that covers all current investments. The section both includes simulated returns for specific historical scenarios as well as expected shortfall for various confidence levels.

Long historical sample

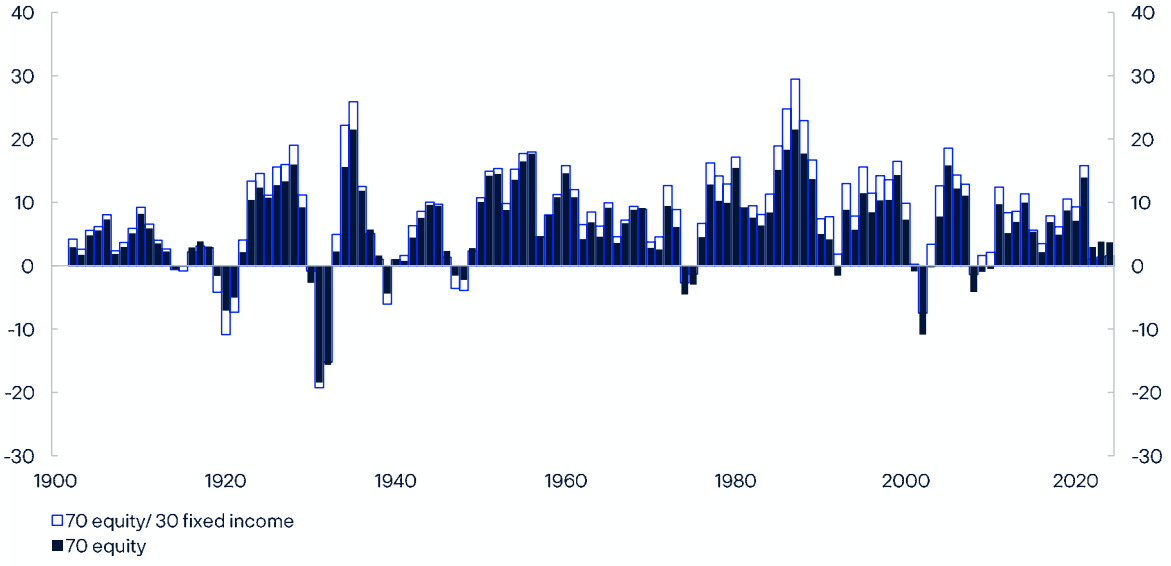
Figure 1-4 show rolling annualized returns over one, three, five and ten-year periods for a hypothetical portfolio made up of a fixed allocation of 70 percent equities and 30 percent fixed income. The returns are measured in US dollars and go back to 1900, covering more than 100 years of annual returns.

Chart 1 Annual return of 70 equity/30 fixed income. Measured in dollars. Percent.



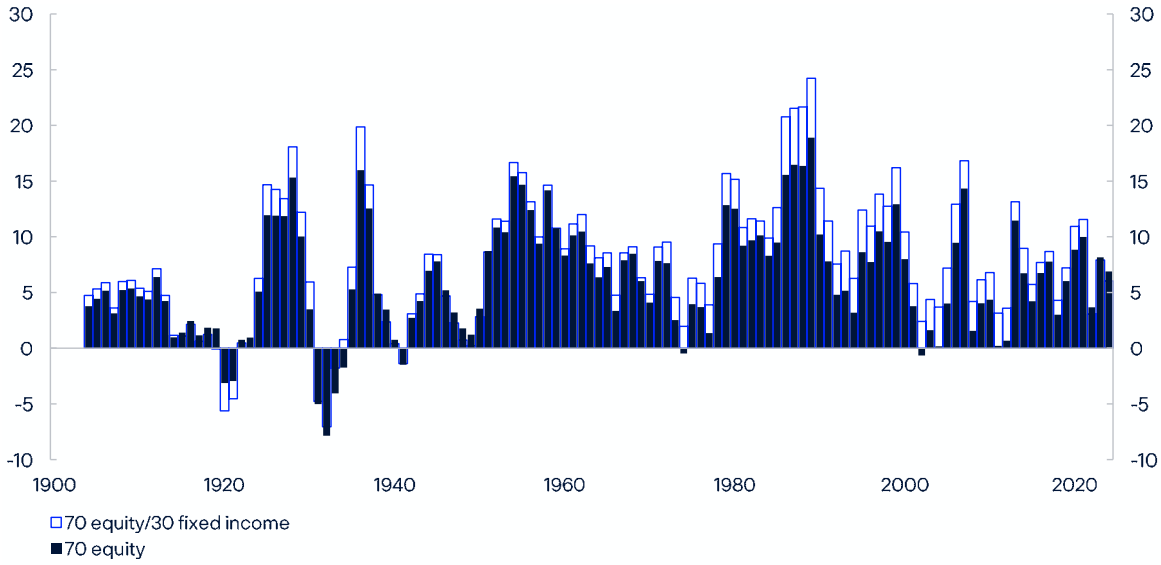
Source: Dimson-Marsh-Staunton global return data

Chart 2 Annualised 3 -year rolling return of 70 equity/30 fixed income. Measured in dollars. Percent.



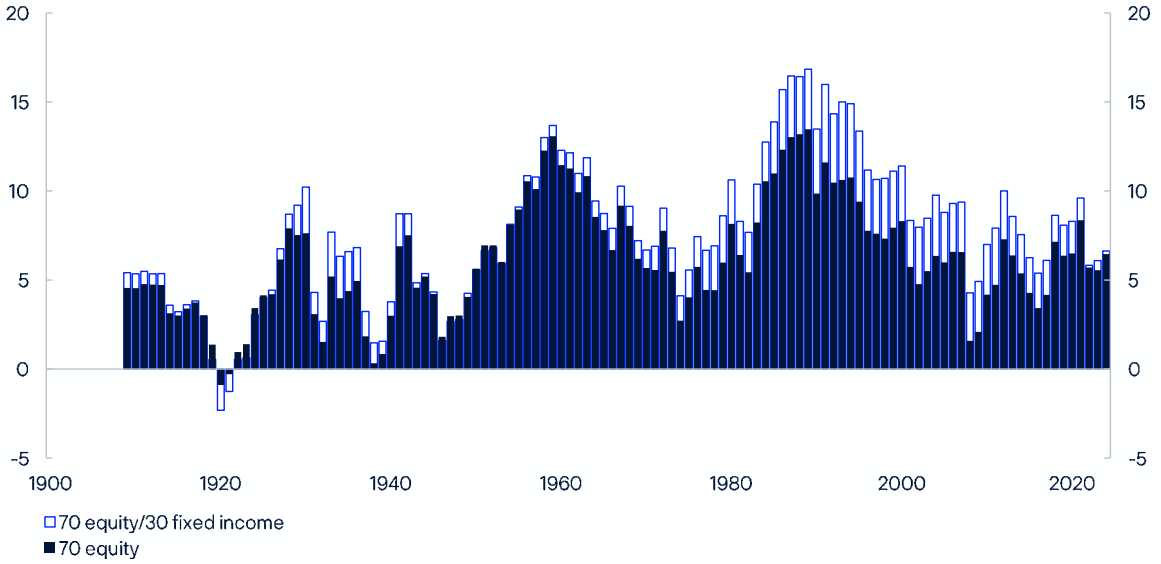
Source: Dimson-Marsh-Staunton global return data

Chart 3 Annualised 5 -year rolling return of 70 equity/30 fixed income. Measured in dollars. Percent.



Source: Dimson-Marsh-Staunton global return data

Chart 4 Annualised 10 -year rolling return of 70 equity/30 fixed income. Measured in dollars. Percent.



Source: Dimson-Marsh-Staunton global return data

Historical scenarios

Table 1 shows simulated portfolio returns for a selection of widely reported on events since May 1997. We have added a new scenario this year to capture the tariff event of early 2025. Due to the brief duration of this event, we have defined this scenario with daily precision rather than month-end dates. Results are shown both for the fund as well as equity and fixed income management.

Table 1 Historical simulations of event returns for the fund, equity management and fixed-income management as at 31 December 2025, measured in the currency basket. Returns in percent of entity NAV.

Event	First date	Last date	Numbers of months	Fund	Equity manage-ment	Fixed income manage-ment
Asian financial crisis	01.07.1997	31.12.1997	6	9,3%	11,2%	3,9%
Russian default	01.08.1998	30.09.1998	2	-7,2%	-12,0%	4,7%
Dot com crash 1	01.09.2000	31.03.2001	7	-8,9%	-14,3%	4,4%
9/11	01.09.2001	30.09.2001	1	-8,9%	-13,0%	0,9%
Dot com crash 2	01.01.2002	30.09.2002	9	-12,5%	-20,6%	6,9%
Global Financial Crisis	01.05.2008	28.02.2009	10	-29,8%	-40,9%	0,9%
Euro debt crisis	01.04.2011	30.11.2011	8	-4,3%	-7,8%	4,8%
Taper Tantrum	01.05.2013	31.08.2013	4	3,8%	7,2%	-4,2%
Oil price decline	01.07.2014	31.12.2014	6	5,7%	7,1%	1,7%
EM slowdown	01.06.2015	30.09.2015	4	-5,9%	-8,5%	0,3%
Brexit referendum	01.06.2016	30.06.2016	1	-0,5%	-1,4%	1,6%
Volatility spike	01.09.2018	31.12.2018	4	-9,6%	-13,4%	-0,2%
Covid pandemic	01.02.2020	31.03.2020	2	-13,3%	-18,3%	0,3%
DM rate hike	01.01.2022	30.09.2022	9	-19,8%	-21,5%	-14,4%
Tariff shock	18.02.2025	08.04.2025	2	-11,5%	-16,3%	0,7%

Absolute expected shortfall

Figures 5 to 8 show the fund's expected shortfall for multiple tail probabilities using weekly historical simulations since January 2007. The figure also shows sensitivity to the choice of reporting currency. Whereas the Norwegian kroner depreciated in several past crises, other currencies appreciated. This analysis highlights how a stressed scenario where the Norwegian krone does not depreciate increases expected tail risk.

Chart 5 Expected shortfall of actual portfolio as at 31 December 2025. Confidence level 90%. Percent.

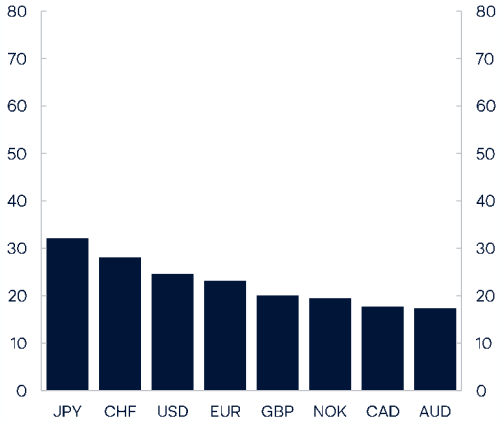


Chart 6 Expected shortfall of actual portfolio as at 31 December 2025. Confidence level 95%. Percent.

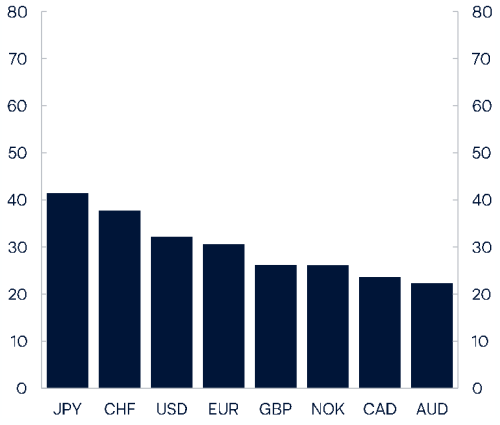


Chart 7 Expected shortfall of actual portfolio as at 31 December 2025. Confidence level 97.5%. Percent.

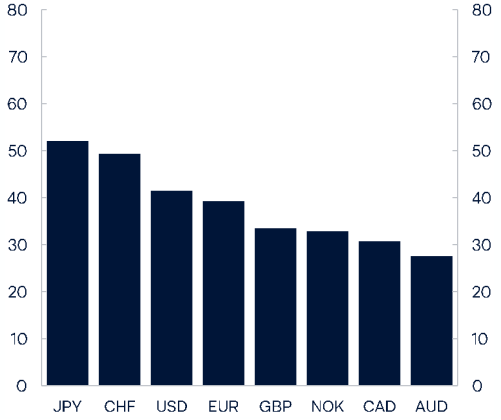
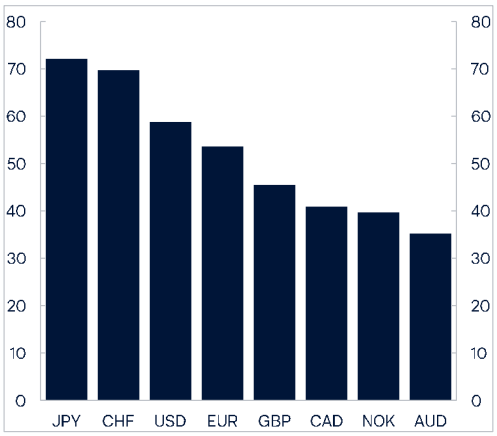


Chart 8 Expected shortfall of actual portfolio as at 31 December 2025. Confidence level 99%. Percent.



Hypothetical stress tests: Systematic risk factors

An important drawback of historical simulations is that future crises may play out differently than in the past. To explore the performance of the fund's portfolio under a range of adverse scenarios, Norges Bank Investment Management performs scenario-based forward-looking stress tests. Our stress tests are designed to capture extreme market outcomes over a short to medium-term time horizon.

The selection of scenarios is informed by key topics that have the potential to shape the macro environment over the next years. We model four relevant risks, chosen from a longer list of stressed events that could have a large adverse impact on the fund's portfolio. We identify the risks by considering both their probability of occurring and severity. The list of scenarios therefore evolves from year to year and is shaped by changing world affairs, economic conditions, and movements in asset prices. Among the selected scenarios, this year we have also included a climate-related food supply shock scenario to highlight how environmental developments increasingly can affect financial markets.

Given that we are explicitly looking at stressed events, only reasonably high-impact scenarios will make the list, and such scenarios, by definition, have a relatively low likelihood of occurring. Because we consider both probability and impact, there will be some scenarios with catastrophic impact but very low probability, and vice versa, that do not make the list.

In last year's stress test report, we considered the following scenarios: AI correction, debt crisis, and fragmented world. As tail scenarios, we would typically expect none of them to materialize, yet this year we saw hints of all three. The fragmented world scenario partly played out through escalating tariffs and trade barriers, the AI sell-off scenario briefly surfaced early in the year with a sharp but short-lived correction, and debt sustainability concerns have grown amid questions over central bank credibility and rising defence spending commitments.

Markets responded to these developments with limited disruption. Yet, geopolitical tensions, elevated equity valuations in the AI sector, and fiscal pressures remain relevant and continue to represent plausible tail events that warrant stress testing. This year's scenarios therefore maintain similar themes, refined to reflect developments over the past year.

We discuss each scenario in more detail below.

AI correction

Since last year, AI buildup has intensified and consequently the scenario is more severe. Market concentration has increased, and AI-related capital expenditure has grown large and concentrated. If AI capex fails to deliver productivity gains, growth expectations could revert sharply. This would lead to a downward shift in expected cash flows and an increase in the equity risk premium, transmitted to broader markets through wealth effects and funding market stress. In fixed income markets, central banks' intervention would lower short-term rates while long-term rates decline somewhat on reduced growth expectations.

Fragmented world
The world fragments into multiple distinct economic blocs. The challenging geopolitical environment leads to sweeping tariffs followed by widespread retaliation. Both regulation and restrictions on foreign investment increase. The uncertainty and reduced economic cooperation result in lower global growth and increased market volatility. The impact on corporate profitability is severe, as expected cash flows are shifted downward permanently. Equity risk premiums rise sharply as investors demand compensation for heightened risks. Inflation remains elevated but is partly offset by weak demand.

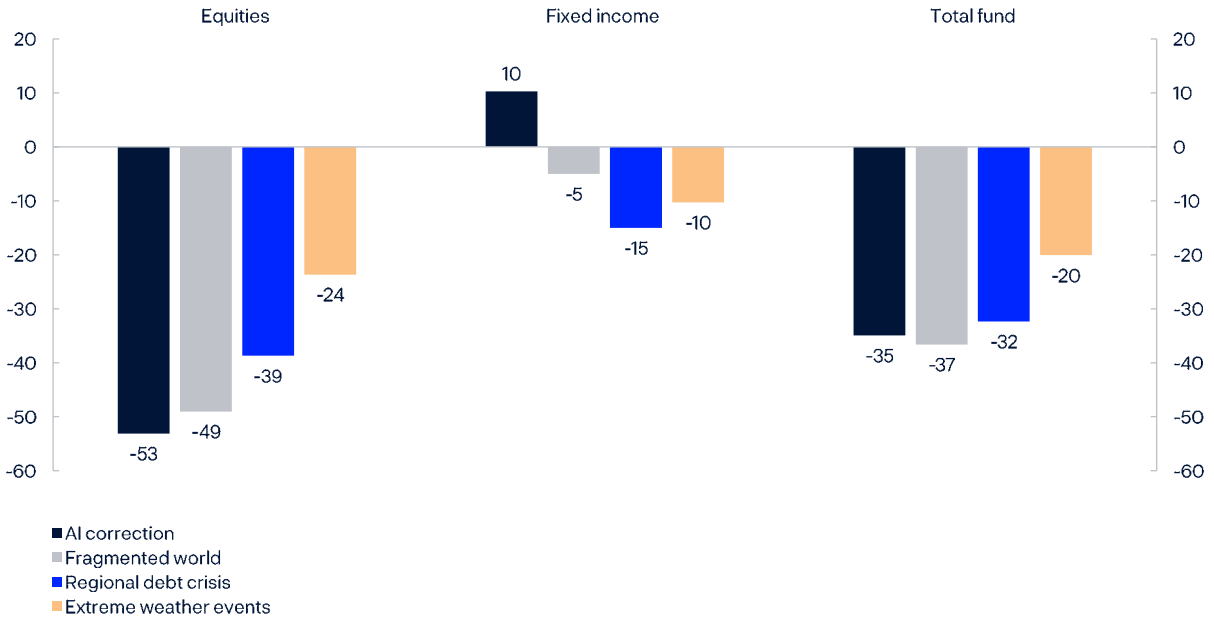
Regional debt crisis
Deterioration of public finances, the threat of financial repression, and political uncertainty lead to a loss in investor confidence, with government bonds no longer regarded as the safest assets. This triggers a shift in demand for government bonds, resulting in rising long-term yields and equity risk premium in the affected region. Unlike previous scenarios, this confidence crisis remains contained to one region without broader contagion to global markets, while some markets benefit from capital inflows as investors seek alternative safe havens.

Extreme weather events
Global warming and environmental degradation weaken agricultural systems and reduce crop resilience in major production zones. Acute weather events trigger simultaneous crop failures across two major staple food production areas, causing global food supply shocks and price spikes. Supply chain disruptions, amplified by extreme weather events, further push up food costs. The crisis cascades through economies with markets anticipating higher inflation and lower growth.

We translate these four narratives into portfolio impacts by quantifying shifts in the main drivers for equities and fixed income returns. These are dividend growth, equity risk premium, inflation expectations, real rates, and term premium. To quantify shifts in these drivers, we use a combination of relevant historical episodes, auxiliary models and empirical evidence, while ensuring economic consistency. Each scenario is created through a particular combination of shifts in these drivers. We then estimate the exposures of each asset class to the return drivers listed above. Finally, we compare our scenario-implied prices with the current market pricing of each asset class to obtain the portfolio impact for each asset class.

The aggregate portfolio impacts are shown in Chart 9 and represent the change in portfolio value over the short- to medium-term.

Chart 9 Hypothetical scenario impact for GPFG as at 31 December 2025, measured in local currency. Percent.



The three key takeaways from this year's stress test are:

1) **Last year scenarios are still relevant:** Elements of all three scenarios modelled last year appeared in 2025, yet markets recovered relatively quickly each time. The scenarios remained independent and the self-reinforcing dynamics that turn corrections into crises did not take hold. This does not mean that these risks have passed, but rather that they have not yet escalated.

2) **Potential for a combined scenario**: The four scenarios we have considered are designed to be complementary rather than overlapping, although they feature certain commonalities in their underlying macro-economic shocks. In reality, multiple scenarios tend to play out at once. The most severe scenario this year is "Fragmented world", which may turn even worse if it undermines AI investment returns. Fiscal stress can be triggered by growth disappointments, while climate shocks may add inflationary pressure that constrains policy response. A combination of these scenarios would produce larger losses than any single scenario considered separately.

3) **Limited hedging**: In "AI correction", fixed income gains partially offset equity losses as we model a policy response from central banks. The other three scenarios offer no such protection: equities, bonds and real assets all fall together. This is due to a combination of higher discount rates and deteriorating growth prospects.

Among our scenarios, "Fragmented world" results in the largest total fund drawdown. Historically, a 37 percent drawdown on a portfolio like the fund's would be a very severe and rare outcome. At the same time, larger losses are possible. The estimated impact is in line with the one estimated in last year's report. This year's "AI correction" scenario envisages a wider equity market crash than last year and results in very large equity losses that are only partly offset by fixed income gains. The portfolio impact of the "Debt crisis" scenario is smaller than

the scenario modelled last year because this year we have modelled a more regional crisis, with capital inflows to non-affected sovereign bond markets. The impact could be more severe if investors instead sought alternative safe haven assets outside of the fund's investment universe. "Extreme weather events" is a new scenario characterised by inflationary pressure and some moderate impact on growth, with a total portfolio drawdown estimated at 20 percent.

In Table 2 we provide more details on the impacts by asset class. In general, the largest losses come from equities, which are especially vulnerable in the current environment with low risk premiums and high concentration. We see differences across scenarios in the impact on fixed income returns. "AI correction" leads to a flight to safety whereas "Regional debt crisis" leads to large losses for bond investors.

Table 2 Hypothetical scenario impact for GPFG portfolio as at 31 December 2024.

	Exposure	Shock				Impact			
	Billions of kroner	Percent				Billions of kroner			
	Market Value	AI Correction	Frag-mented world	Regional debt crisis	Extreme weather events	AI Correction	Frag-mented world	Regional debt crisis	Extreme weather events
Equities in local currency	**14 844**	-53	-49	-39	-24	-7 888	-7 283	-5 745	-3 514
Fixed income in local currency	**5 655**	10	-5	-15	-10	582	-282	-849	-582
Real Assets in local currency	853	-16	-27	-34	-21	-133	-234	-290	-176
Total in local currency	**21 286**	**-35**	**-37**	**-32**	**-20**	**-7 439**	**-7 799**	**-6 885**	**-4 272**

Notes: Cash and FX are included in the total. Swaps included in FI. Futures mapped to underlying. CDX included in corporates..

Relative expected shortfall

The Executive Board has set a mandate limit for expected stressed relative loss versus the fund's benchmark index. The fund is to be managed in such a way that the annual expected shortfall does not exceed 3.75 percentage points. Table 3 shows relative expected shortfall for the fund as well as each of the fund's investment strategies.

Table 3 Expected shortfall relative to benchmark of investment strategies as at 31 December 2025. Each strategy measured stand-alone with the other strategies positioned in-line with the benchmarks. All numbers measured at fund level in the fund's currency basket. Basis points

	Expected shortfall price history since 01.01.2007
Market exposure	19
Asset positioning	19
Security selection	39
Internal security selection	29
External security selection	26
Fund allocation	99
Real estate	112
Unlisted real estate	50
Listed real estate	69
Renewable energy infrastructure	21
Allocations	65
Total	**101**