

# sigma

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Resilience Index 2022:  
risks to resilience on the rise  
again after a year of respite

# Executive summary

## Macroeconomic resilience

- The world economy regained macroeconomic resilience in 2021, benefiting from the cyclical rebound from the COVID-19 crisis and rising long-dated interest rates during the year.
- In 2021, our SRI Macroeconomic Resilience Index rose 12% to 0.50 compared with 2020 globally, primarily due to improvement in fiscal space. Advanced economies fell behind the curve in tightening monetary policy, limiting monetary policy space gains.
- We estimate that global macro resilience will only this year recoup its losses from the 2020 COVID-19 crisis. Cyclical economic tailwinds will further support fiscal space, while central bank action to tame persistent inflation will expand monetary policy space.
- We estimate the global index to reach about 0.53 in 2022 (+7% vs 2021), on a par with the 2019 pre-COVID-19 level (0.54), though still well below the pre-global financial crisis level of 0.62 (2007).
- Structural indicators continue to weigh on global macroeconomic resilience. Human capital and labour market efficiency are key headwinds, particularly in emerging markets.
- Anticipated economic deterioration in the coming months suggests that policymakers should focus on lifting trend growth by strengthening structural parameters such as infrastructure, human capital and inequality.
- The current cost of living crisis brings inequality into focus. Economic shocks typically hit the lowest-income households hardest, creating unequal outcomes that require a policy framework to support inclusive growth.

## Insurance resilience

- Global insurance resilience recovered in 2021, primarily due to strong improvement in health resilience, which offset weaker mortality and natural catastrophe resilience.
- The SRI Global Composite Insurance Resilience Index (I-RI) rose slightly to 54.3% in 2021 (2020: 54.2%), but remains lower than prior to the COVID-19 shock (54.4%) and the financial crisis (56.4%).
- Global mortality resilience declined to 45.7% in 2021, led by falls in emerging Asia, emerging Europe and North America. Natural catastrophe resilience remained low, with 75% of global exposures unprotected in 2021.
- The combined world protection gap for health, mortality and natural catastrophe risks rose marginally to a new record of USD 1.42 trillion in 2021 (2020: USD 1.38 trillion).
- The global health protection gap narrowed by 4.3% to USD 737 billion in 2021, aided by robust insurance market growth and scaled-up government efforts to cover pandemic-related health spending.
- While insurance protection is still growing strongly in 2022, we expect scaled-back government benefits and declining asset values to erode insurance resilience overall.
- Simulating how high inflation may affect protection gaps, we estimate that price increases in 2022 could translate into a USD 55 billion widening in the global insurance protection gap for 2021, or about 3.8% of the total gap.

## Insurance resilience in China's provinces

- In addition to calculating China's national resilience index and protection gap, we investigate the profile of its 31 mainland provinces to mortality and natural catastrophe risks in 2019–2021 to analyse the diversity of insurance resilience.
- We find mortality resilience differs widely across provinces in 2021, ranging from less than 20% to more than 50%. For 29 out of 31 provinces, mortality resilience has declined continuously for the past three years.
- In contrast, natural catastrophe resilience indices show steady improvement annually since 2019 both nationally and for most provinces. We find that Beijing and Shanghai are the most resilient administered municipalities in 2021.

# Macroeconomic resilience: threatened by lower growth and persistently high inflation

Macroeconomic resilience replenished in 2021 as a cyclical economic recovery expanded countries' fiscal and monetary policy space. Our global SRI Macroeconomic Resilience Index gained 12% relative to the 2020 pandemic shock, to 0.50, albeit still below pre-pandemic (2019: 0.54) and pre-global financial crisis (2007: 0.62) levels. Fiscal space benefited from the strong rebound in economic activity from easing lockdown measures and continued stimulus, while monetary policy space was somewhat supported by rising long-dated interest rates. However, a belief that inflationary pressures were transitory meant advanced economy central banks delayed actively tightening monetary policy. This limited the extent to which monetary policy space was replenished in 2021.

In 2022, preliminary calculations point to improving macroeconomic resilience as growth remains supportive. Nonetheless, the economic outlook has worsened substantially since the start of the year and further deterioration risks being a headwind for global shock-absorbing capacity. We estimate that global macroeconomic resilience will recoup its COVID-19 related losses, with about a 7% improvement in the global index to approximately 0.53 this year. This will be driven by gains in fiscal and monetary policy space from still positive economic activity and interest rate rises, respectively. In advanced economies, resilience is expected to rise by 10% to 0.64. Such an increase would dampen the output shortfall (GDP growth performance relative to historical long-term trends) by 0.9 percentage points (ppts) should an economic shock occur in the next year.<sup>1,2</sup>

The full extent of the impact of slowing growth, soaring inflation and geopolitical tensions globally this year is still unknown and uncertainty is high. For example, as monetary policy tightens in response to high and persistent inflation, it may prompt further economic slowdown and rising debt costs that constrain economies' fiscal space. A key policy route to securing higher macroeconomic resilience is to foster higher trend growth by strengthening structural parameters such as infrastructure, human capital and reducing inequality. The disproportionate impact of today's cost of living crisis on the lowest-income households highlights the need for a policy framework to support inclusive growth, as our *sigma* research earlier this year finds.<sup>3</sup>

<sup>1</sup> The relationship between resilience and the output shortfall is based on the experienced of 2020 at the height of the COVID pandemic which represents the most recent economic shock. The relationship was also investigated for emerging economies, however, the link between resilience and output shortfalls is not as clear. There was significantly less stimulus response in these economies, meaning that monetary and fiscal space were much less reduced than in advanced markets despite output shortfalls.

<sup>2</sup> *sigma Resilience Index 2021: a strong growth recovery, but less resilient world economy*, Swiss Re Institute, 14 June 2021

<sup>3</sup> *sigma 2/2022 – Reshaping the social contract: the role of insurance in reducing income inequality*, Swiss Re Institute, 11 May 2022.

## SRI Macroeconomic Resilience Index (E-RI)

**Table 1**  
Scores and rankings

	2021												2022		
	Rank 2021	Resilience index level	Fiscal space	Monetary policy space	CO <sub>2</sub> emissions	Insurance penetration	Financial market development	Human capital	Economic complexity	Labour market efficiency	Banking industry backdrop	Income inequality	Resilience index level	Rank 2022	Rank difference
Switzerland	1	0.77 ▲	0.98 ▲	0.04 ▲	1.00 =	0.55 ▼	1.00 =	0.80 ▼	1.00 =	1.00 =	0.96 ▼	0.97 ▲	0.79 ▲	1	=
Finland	2	0.72 ▲	0.88 ▲	0.05 ▲	0.66 ▲	0.91 ▲	0.89 ▲	0.97 ▼	0.80 ▲	0.73 ▲	1.00 =	0.89 ▼	0.73 ▲	4	-2
Norway	3	0.72 ▲	1.00 ▲	0.09 ▲	1.00 =	0.30 ▼	0.69 ▼	0.74 ▲	0.29 ▲	0.81 ▼	0.93 =	1.00 =	0.75 ▲	3	=
Netherlands	4	0.71 ▲	0.97 ▲	0.05 ▲	0.55 ▲	0.77 ▼	0.76 ▼	0.84 ▼	0.53 ▼	0.87 ▼	0.85 ▲	0.96 ▼	0.72 ▲	5	-1
Denmark	5	0.70 ▲	0.99 ▲	0.05 ▲	1.00 =	1.00 =	0.38 ▲	0.84 ▼	0.47 ▼	1.00 =	0.77 ▼	0.88 ▼	0.73 ▲	6	-1
Sweden	6	0.69 ▲	0.97 ▲	0.05 ▲	1.00 =	0.61 ▼	0.61 ▼	0.82 ▼	0.88 ▲	0.64 ▼	0.68 ▼	1.00 =	0.71 ▲	7	-1
Canada	7	0.67 ▲	0.75 ▲	0.07 ▲	0.22 ▲	0.66 ▼	0.92 ▼	0.92 ▼	0.42 ▼	0.88 ▼	0.99 ▼	0.49 =	0.75 ▲	2	+5
Australia	8	0.67 ▲	0.97 ▲	0.07 ▲	0.27 ▼	0.25 ▼	0.89 ▲	0.80 ▼	0.00 =	0.63 ▲	1.00 =	0.52 =	0.71 ▲	8	=
South Korea	9	0.64 ▲	0.98 ▲	0.12 ▲	0.19 ▲	0.98 ▼	0.80 ▲	1.00 =	1.00 =	0.37 ▲	0.58 ▲	0.48 =	0.67 ▲	11	-2
New Zealand	10	0.64 ▼	0.87 ▼	0.11 ▲	0.57 =	0.29 ▼	0.07 ▼	0.78 ▲	0.08 ▼	0.95 ▼	0.93 ▼	0.74 =	0.68 ▲	10	=
US	11	0.64 ▲	0.69 ▲	0.07 ▲	0.38 ▲	1.00 =	1.00 =	0.78 ▼	0.83 ▲	1.00 =	0.82 ▲	0.29 =	0.69 ▲	9	+2
Germany	12	0.63 ▲	0.89 ▲	0.05 ▲	0.53 ▲	0.48 ▼	0.67 ▼	0.83 ▼	1.00 =	0.78 ▼	0.55 ▼	0.70 ▲	0.65 ▲	12	=
Ireland	13	0.63 ▲	1.00 ▲	0.05 ▲	1.00 =	0.43 ▲	0.54 ▲	0.89 ▼	0.66 ▼	0.92 ▼	0.23 ▲	0.81 ▼	0.64 ▲	14	-1
Austria	14	0.60 ▲	0.75 ▲	0.05 ▲	0.64 ▲	0.27 ▼	0.33 ▼	0.78 ▼	0.82 ▼	0.55 ▼	0.85 ▲	0.93 ▲	0.65 ▲	13	+1
Belgium	15	0.53 ▲	0.71 ▲	0.05 ▲	0.50 ▲	0.40 ▼	0.29 ▲	0.78 ▼	0.67 ▼	0.41 ▼	0.59 =	0.81 =	0.54 ▲	19	-4
France	16	0.53 ▲	0.54 ▲	0.05 ▲	0.93 ▲	0.82 ▲	0.64 ▼	0.70 ▲	0.71 ▼	0.37 ▲	0.72 ▼	0.98 ▲	0.56 ▲	17	-1
Chile	17	0.50 ▼	0.77 ▼	0.39 ▲	0.22 ▲	0.13 ▼	0.00 =	0.31 ▼	0.00 =	0.37 ▼	1.00 =	0.00 =	0.51 ▲	18	-1
China	18	0.49 ▲	1.00 ▲	0.29 ▲	0.04 =	0.19 ▼	0.49 ▼	0.17 ▼	0.47 ▲	0.22 ▼	0.25 =	0.35 =	0.50 ▲	21	-3
Japan	19	0.48 ▲	0.18 ▲	0.05 ▲	0.36 ▼	0.69 ▲	0.94 ▲	1.00 =	1.00 =	0.73 ▲	0.77 ▼	0.53 =	0.56 ▲	16	+3
South Africa	20	0.46 ▲	0.74 ▲	0.27 ▲	0.00 =	1.00 =	0.33 ▲	0.00 =	0.00 =	0.29 ▼	0.79 ▲	0.00 =	0.40 ▼	26	-6
UK	21	0.44 ▲	0.00 ▲	0.07 ▲	0.91 ▲	1.00 ▲	1.00 =	0.78 ▲	0.78 ▼	0.88 ▼	0.64 ▼	0.80 ▼	0.62 ▲	15	+6
Russia	22	0.40 ▲	0.86 ▲	0.47 ▲	0.00 =	0.00 =	0.00 =	0.80 ▼	0.12 ▼	0.30 ▲	0.00 =	0.54 =	0.42 ▲	27	-5
India	23	0.37 ▼	0.75 ▼	0.27 ▲	0.01 =	0.22 ▼	0.15 ▼	0.00 =	0.18 ▲	0.00 ▼	0.31 ▼	0.26 =	0.37 ▲	24	-1
Spain	24	0.36 ▲	0.13 ▲	0.05 ▲	0.56 ▲	0.33 ▼	0.85 ▼	0.72 ▼	0.34 ▼	0.30 ▲	0.51 ▲	0.86 ▲	0.50 ▲	20	+4
Portugal	25	0.34 ▲	0.44 ▲	0.05 ▲	0.49 ▲	0.40 ▲	0.40 ▼	0.76 ▼	0.14 ▲	0.39 ▼	0.00 =	0.78 ▲	0.45 ▲	22	+3
Hungary	26	0.33 ▲	0.30 ▲	0.28 ▲	0.24 ▼	0.01 ▼	0.00 =	0.69 ▼	0.74 ▲	0.20 ▲	0.62 ▲	0.93 ▲	0.26 ▼	25	+1
Mexico	27	0.33 ▲	0.00 =	0.55 ▲	0.21 ▲	0.03 ▼	0.00 =	0.06 ▲	0.56 ▼	0.08 ▲	0.78 ▲	0.00 =	0.31 ▼	28	-1
Italy	28	0.32 ▲	0.20 ▲	0.05 ▲	0.57 ▲	0.78 ▼	0.80 ▲	0.67 ▼	0.67 ▼	0.11 ▼	0.10 ▲	0.83 ▲	0.39 ▲	23	+5
Brazil	29	0.26 ▲	0.00 =	0.36 ▲	0.38 ▲	0.18 ▼	0.54 ▲	0.00 =	0.12 ▲	0.00 =	0.85 ▲	0.01 =	0.26 ▼	29	=
Turkey	30	0.16 ▲	0.00 =	0.27 ▼	0.19 ▲	0.00 =	0.36 ▲	0.37 ▲	0.17 ▼	0.00 =	0.31 ▲	0.17 =	0.16 ▲	31	-1
Greece	31	0.16 ▲	0.00 =	0.05 ▲	0.33 ▲	0.03 ▼	0.22 ▲	0.40 ▼	0.02 ▼	0.00 =	0.00 =	0.85 ▼	0.16 ▲	30	+1
World		0.50 ▲	0.68 ▲	0.19 ▲	0.29 ▲	0.50 ▼	0.62 ▼	0.51 ▼	0.56 ▼	0.48 ▼	0.53 ▲	0.43 ▼	0.53 ▲		
Advanced		0.58 ▲	0.60 ▲	0.06 ▲	0.49 ▲	0.80 ▲	0.87 ▼	0.81 ▼	0.77 ▼	0.77 ▼	0.72 ▲	0.55 ▼	0.64 ▲		
Emerging		0.41 ▲	0.76 ▲	0.32 ▲	0.07 ▲	0.17 ▼	0.34 ▼	0.19 ▼	0.34 ▲	0.15 ▼	0.33 ▲	0.29 ▲	0.42 ▲		

The 2021 table shows the unweighted scores of all components as of 2021 (or latest available data point). Ranks are determined by taking a three-year average of the overall E-RI score so as to minimise the impact from data revisions year-on-year. This means that index scores may not necessarily run in chronological order. Symbols represent the direction of change from 2020 to 2021 (or the latest available data point relative to the prior year). Latest data release: 2020 for income inequality, CO<sub>2</sub> emissions and economic complexity; 2019 for financial market development, labour market efficiency and banking industry backdrop. The 2022 fiscal and monetary policy space are computed based on expected developments over the year and are therefore tentative figures. The primer work on the E-RI was a collaboration between Swiss Re Institute and the London School of Economics. For more visualisations and the full methodology, visit the *sigma explorer* website.  
Source: Swiss Re Institute

The world regained some economic resilience in 2021, driven by strong improvement in fiscal space...

The world economy regained macroeconomic resilience in 2021, benefiting from the cyclical rebound from the COVID-19 crisis. Our SRI Macroeconomic Resilience Index (E-RI) ended 2021 12% higher than in 2020 (to 0.50 from 0.45) as lockdown measures eased while stimulus remained supportive. The rebound in shock-absorbing capacity was much stronger in advanced than emerging economies (+17% to 0.58 and +5% to 0.41, respectively). Fiscal space improved strongly worldwide, up by 27% to 0.68, largely driven by advanced economies (+66% to 0.60) due to strong economic growth. In emerging economies, fiscal space changed much less in 2021 (+5% to 0.76), because it was far less eroded in 2020 at the height of the pandemic than that of advanced economies, so experienced less of a rebound.<sup>4</sup> With a fiscal space reading of 0.76, emerging economies have recovered above pre-pandemic and pre-global financial crisis levels (0.69 as of 2019 and 0.72 as of 2007). Advanced economies' fiscal space was still lower last year (0.60) relative to 2019 (0.80) and 2007 (0.84).

...and monetary policy space, though advanced markets fell behind the curve in tightening monetary policy.

All countries except Turkey secured higher monetary policy buffers in 2021 due to rising long-dated interest rates, but in advanced markets these remained virtually exhausted. Advanced economy central banks fell behind the curve in active tightening of monetary policy in the belief that inflationary pressures were transitory, which limited the replenishment of monetary policy space in 2021. However, rising inflation expectations in financial markets drove advanced economies' long-term government nominal yields higher in 2021, which supported the increase in monetary policy space to 0.06. In emerging economies, monetary policy space rose +29% (to 0.32) in 2021 as central banks raised their policy rates in the second half of the year given high inflation and in anticipation of rising rates in the US.<sup>5</sup>

We expect a slight rise in resilience in 2022, but slowing growth and persistent elevated inflation are headwinds.

In contrast, 2022 feels much like 2020, with the world back in crisis and a highly uncertain outlook. The invasion of Ukraine in February unleashed a geopolitical and economic shock that has heightened inflation and recession risks. Central banks in major economies have been forced to prioritise taming inflation over supporting growth, a trade-off that risks tipping economies into recession – a “hard landing”. However, based on preliminary calculations, we forecast a slight improvement in worldwide resilience to 0.53 in 2022 (+7% vs 2021) as fiscal and monetary policy space continue to recover (+9% to 0.74 and +48% to 0.28, respectively). This essentially brings the global index back to its 2019 pre-COVID-19 level.

Policy buffers in advanced economies are expected to continue to recover this year.

Policy buffers in advanced economies are expected to continue to recover this year from government and central bank responses to the pandemic in 2020. Emerging economies' policy buffers are forecast to stay higher than advanced economies this year,<sup>6</sup> but are more exposed given their greater dependencies upon other countries. First, deceleration in major economies (including the US and China) risks reducing external demand for goods and services for many emerging economies more strongly than currently anticipated. Second, concerns are growing about the impact of significant rises in US interest rates. When tightening in global financial conditions is driven by concerns about inflation rather than by positive news about the US economy, it may be challenging for emerging economies. Uncertainty is high, especially for economic activity, a driver of fiscal space, and for inflation and yields, key factors affecting monetary policy space. We expect the US Federal Reserve's policy rate to increase 350 basis points (bps) and the ECB to increase its refinancing rate by 175bps over 2022. Such rate rises affect countries' monetary policy differently: while the Fed raising its policy rate will enhance US monetary policy space, the impact on emerging economies will be negative.

<sup>4</sup> Less stimulus was provided by emerging economies in 2020 because: 1) in China, the largest emerging economy, less stimulus was needed given the rapid imposition of measures to contain virus spread, enabling a higher degree of “normality” through most of 2020; and 2) emerging economies benefitted from looser international and USD financing conditions that resulted from easy monetary policy across key advanced economies.

<sup>5</sup> With the exception of China and India, who benefited from higher US policy space and greater government efficiency. China for instance, was still challenged by lockdown measures which hindered economic activity which left the PBoC relatively accommodative.

<sup>6</sup> Preliminary 2022 fiscal space calculations point to 0.75 for emerging economies versus 0.73 for advanced economies, and 2022 monetary policy space calculations forecast 0.36 for emerging economies versus 0.20 for advanced economies.

Accelerating monetary tightening has de facto ended the global experiment in negative nominal yields.

Monetary tightening in major economies is accelerating in response to signs of inflation becoming more persistent and broad-based than previously anticipated.<sup>7</sup> This has de facto ended the global experiment in negative nominal yields and is finally, after more than a decade of financial repression, replenishing countries' monetary policy buffers. However, it now looks increasingly difficult for central banks to engineer a soft landing for their economies, and the risk of recession in the next 12 to 18 months has risen significantly. As such, while policy buffers may strengthen in the near term, the linked economic slowdown implies only a remote chance of returning to pre-GFC levels of monetary policy space.

Geopolitical developments risk substantially hindering fiscal policy space going forward.

The war in Ukraine and other geopolitical developments are adding downside risks to growth while driving inflation higher. Declining real GDP growth and higher debt costs risk substantially hindering fiscal policy space going forward. Emerging markets' lower levels of macroeconomic resilience make it harder for them to soften the negative impact on their economies, and they are also more reliant on foreign funding, all of which further lowers their fiscal space.<sup>8</sup> Their monetary policy space is also more affected by external dependencies, such as on the US dollar. We expect a decrease in resilience of economies dependent on trade with Russia,<sup>9</sup> as the deterioration in the Russian economic outlook weighs on their economic outlook through the interconnectedness channel. At a global level, the war in Ukraine has exacerbated the current cost of living crisis by pushing up energy and food prices further. Low-income households in particular have little cushion to absorb price rises and are the hardest hit.<sup>3</sup> A sustained rise in inequality would further weigh on economic growth as it impacts productivity and aggregate demand.

Structural factors, particularly human capital and labour market efficiency, continue to hinder economies' shock absorbing capacities, especially in emerging markets.

Beyond the cyclical picture, structural factors weighed on macroeconomic resilience again in 2022 (−1.5% to 0.52). Structural parameters weakened most in emerging economies (−1.5% to 0.27), with sharp falls in insurance penetration (−17% to 0.17), human capital (−16% to 0.17), and labour market efficiency (−16% to 0.15). Advanced economies' structural macroeconomic resilience improved slightly (+0.8% to 0.74 in 2022), attributable to a reduction in CO<sub>2</sub> emissions and a sounder banking industry backdrop. Structural indicators are slower-moving than cyclical factors, and gains in advanced economies are a positive step. Nonetheless, some of these structural parameters are released with substantial time lags so could have deteriorated during the pandemic. For instance, the latest data point for labour market efficiency is 2019. Once figures from 2020 and beyond are published, the impact on resilience is likely to be a negative one.

The uncertain outlook highlights a need to strengthen structural parameters to increase resilience.

In the current environment, the importance of securing higher macroeconomic resilience should not be underestimated. The high risk of further economic deterioration in the coming months suggests that governments cannot feel sure of benefiting from cyclical resilience gains. We believe policymakers' focus should be on lifting trend growth by strengthening structural parameters such as infrastructure, human capital and reducing inequality. Inequality in particular has come into focus in the current cost of living crisis. Our sigma research this year finds that economic shocks hit the lowest-income households hardest. These unequal outcomes require a policy framework to reduce inequality by supporting inclusive growth. The past two years are a reminder that exogenous economic shocks can never be ruled out, but strong and reliable levels of structural parameters can cushion their negative impact. In last year's *sigma* Resilience Index 2021, for example, we found that at the height of the COVID-19 pandemic during 2020, advanced economies would have experienced output shortfalls 1.5ppts smaller for every 10ppts increase in their macroeconomic resilience.

<sup>7</sup> *Economic and financial risk insights: inflationary recessions on the horizon for major economies*, Swiss Re Institute, 10 June 2022.

<sup>8</sup> Emerging economies have lower fiscal space as they have less means to cope with higher prices, experience greater exchange rate pressures and have overall higher debt levels.

<sup>9</sup> Within the macroeconomic resilience index, Finland is most exposed as Russia is the fifth largest importer of Finnish goods. Russia's top 5 trading partners (China, the Netherlands, Germany, Turkey and South Korea) import 34% of the total exported goods from Russia as well as 44% of exported Russian energy. This is according to the United Nations Statistics Division (retrieved May 2022) and the Observatory of Economic Complexity (May 2022).

# Insurance resilience regains ground, but protection gaps at risk from inflation and economic slowdown

Global insurance resilience improved in 2021, supported by strong insurance growth and scaled-up government health expenditure. The global composite SRI Insurance Resilience Index rose slightly to 54.3%. For 2022, we see continued tailwinds from strong premium growth, fuelled by tight job markets and higher health and mortality risk awareness. However, we expect scaled-back government benefits and declining asset values to erode insurance resilience overall.

The global insurance protection gap for health, mortality and natural catastrophe risks rose by 3% in nominal terms in 2021 to USD 1.42 trillion. The health protection gap showed strength, narrowing by 4.3% to USD 737 billion globally, but mortality and natural catastrophe protection gaps widened, reflecting higher catastrophe losses as well as slower growth in life insurance coverage and social security benefits than the protection needed in North America, emerging Europe and emerging APAC. Higher penetration of property insurance in China improved natural catastrophe resilience in emerging Asia to 6.2% in 2021. We simulate the impact of inflation on protection gaps, estimating that 2022 inflation would widen the 2021 global insurance protection gap by USD 55 billion, or about 3.8% of the total.

## SRI Insurance Resilience Indices (I-RIs)

**Table 2**

Scores and protection gaps

	SRI Insurance Resilience Indices in % (I-RIs)			Protection gap, USD bn		
	2010	2020	2021	2010	2020	2021
<b>SRI Composite Insurance Resilience index</b>	<b>54.8</b>	<b>54.2</b>	<b>54.3 ▲</b>	<b>973</b>	<b>1 379</b>	<b>1 420 ▲</b>
<b>SRI Health Resilience index</b>	<b>93.0</b>	<b>91.9</b>	<b>92.5 ▲</b>	<b>462</b>	<b>770</b>	<b>737 ▼</b>
North America	97.4	97.1	97.3 ▲	74	126	122 ▼
Latin America	79.2	80.6	82.1 ▲	81	89	84 ▼
Advanced EMEA	94.7	94.2	94.7 ▲	94	117	108 ▼
Emerging EMEA	86.3	86.9	88.1 ▲	51	64	60 ▼
Advanced Asia-Pacific	94.3	93.5	93.8 ▲	45	63	61 ▼
Emerging APAC	71.9	73.7	77.2 ▲	116	311	301 ▼
<b>SRI Mortality Resilience index</b>	<b>47.0</b>	<b>46.1</b>	<b>45.7 ▼</b>	<b>343</b>	<b>394</b>	<b>433 ▲</b>
North America	55.4	55.9	55.2 ▼	57	62	67 ▲
Latin America	34.8	43.6	46.3 ▲	35	27	26 ▼
Advanced EMEA	60.7	60.9	61.6 ▲	51	60	68 ▲
Emerging EMEA	43.5	36.2	34.6 ▼	101	88	97 ▲
Advanced Asia-Pacific	55.4	59.9	60.9 ▲	33	31	31 =
Emerging APAC	20.2	27.3	26.0 ▼	66	126	144 ▲
<b>SRI Natural Catastrophe Resilience Index</b>	<b>24.5</b>	<b>24.8</b>	<b>24.6 ▼</b>	<b>169</b>	<b>216</b>	<b>251 ▲</b>
North America	39.5	40.1	39.4 ▼	37	56	67 ▲
Latin America	21.0	6.3	6.1 ▼	18	18	20 ▲
Advanced EMEA	35.7	43.8	43.5 ▼	18	17	21 ▲
Emerging EMEA	8.7	8.7	8.6 ▼	28	33	40 ▲
Advanced Asia-Pacific	21.2	23.5	23.9 ▲	42	42	45 ▲
Emerging APAC	6.2	5.8	6.2 ▲	25	50	59 ▲

Note: I-RIs are based on research into protection gaps and measure the relation between protection needed and available. The value ranges from 0–100%. The greater the value, the greater the protection relative to the needs and the higher the resilience. Some historical values changed due to data revision or revised estimates. For Latin America, the revised estimates are based on a broader sample of countries. Protection gaps are measured in premium equivalent terms; the red up arrows denote widening protection gaps in 2020 vs 2021. See *sigma* 5/2019, *Indexing resilience: A primer for insurance markets and economies*, for the methodology.

Source: Swiss Re Institute.

## Improvement in global insurance resilience in 2021, but pressures ahead in 2022/23

Global insurance resilience for all perils improved slightly in 2021, but will face pressure this year and next.

Global insurance resilience regained some ground in 2021 as health resilience benefited from a recovery in household incomes and higher public health funding. The SRI Global Composite Insurance Resilience Index (I-RI), which aggregates the three resilience sub-indices, improved marginally to 54.3% in 2021, from 54.2% in 2020. However, it remains lower than prior to both the COVID-19 shock and the GFC. In 2022, we see risks building that will put global insurance resilience under increasing pressure. While insurance protection is still growing strongly, we expect scaled-back government benefits and declining asset values to erode insurance resilience. Mortality resilience is expected to face pressure as household financial assets decline and social security benefits lag behind the growth in protection needs. We see health resilience weaken as governments withdraw pandemic support for public health systems and patients catch up on deferred elective medical treatment. However, rising risk awareness by consumers will continue to be a longer-term tailwind. We forecast heightened recession risk in the next 12–18 months, with weaker employment and insurance demand likely in 2023.

We expect the global protection gap to widen in 2022.

The combined world protection gap for health, mortality and natural catastrophe risks rose marginally to USD 1.42 trillion in 2021, despite the rise in the overall resilience index. A reduction in the health protection gap could not offset a combined USD 74 billion worsening in the mortality and natural catastrophe protection gaps in 2021. Emerging markets accounted for 59% of the total global gap: emerging EMEA, emerging APAC and Latin America have a combined gap of USD 831 billion. We expect the total global protection gap to widen in 2022 and 2023 due to macroeconomic and climate related challenges, including the impact of high inflation this year (see *High inflation worsens protection gaps, especially in Europe*).

The health resilience index improved to 92.5% in 2021, close to the 93% score in 2010.

### Health resilience: insurance is key to enhancing protection

The health resilience index improved by 0.7ppt to 92.5% in 2021, close to the 93% score in 2010. The global health protection gap declined by 4.3% to USD 737 billion. Strong health insurance growth, scaled-up government efforts to cover pandemic-related health spending, and a reduction in elective medical treatment resulted in a decline in stressful out-of-pocket expenditure on health in 2021. The improvement was global, but most pronounced in emerging Asia Pacific, Latin America, and emerging Europe. Emerging markets accounted for ~60% of the global health protection gap in 2021, and emerging Asia-Pacific alone represented more than 40% of the total. Economies with lower health resilience scores or less robust health infrastructure, and high levels of out-of-pocket spending on health, are most vulnerable to emergencies such as COVID-19.

In 2022 we expect health resilience to weaken.

In 2022 we expect weakening health resilience, with reduced government funding for healthcare as public budgets come under pressure, and a resurgence in elective treatments. Higher inflation and a weaker macroeconomic environment pose further downside risks to global health resilience in 2022. We expect weaker consumer purchasing power and lower available household protection from health insurance, particularly where healthcare is an employment benefit. However, the pandemic has encouraged greater risk awareness and demand for health insurance. Our latest estimates find that emerging markets health insurance premiums grew by more than 9% in real terms in both 2020 and 2021. We expect this to offset some of the weakening expected in global health resilience. Affordable health insurance has a key role to play in enhancing protection, reducing financial risks and improving overall health resilience.

The global mortality protection gap widened to USD 433 billion and remains dominated by emerging Asia.

### Mortality resilience remains weak despite increase in risk awareness

Global mortality resilience continued to decline in 2021. The global mortality protection gap widened by almost 10% to USD 433 billion globally in 2021, led by emerging Asia, Europe and North America. This translates into a global SRI Mortality Resilience Index of 45.7%, meaning that household assets available to support the financial need (wage replacement and household debt) of dependent family members in the event of premature death of a breadwinner, fell short by 54%. Assets can take the form of life insurance, social security survivor benefits, household savings and more. In emerging Asia, China's protection gap rose by more than 20% to USD 79.5 billion, as protection needs grew while sums-insured of life insurance remained largely flat and household



debt rose (see *Mapping insurance resilience in China's provinces*). In North America, life insurance coverage and social security benefits grew more slowly than protection need.

We expect further deterioration in mortality resilience, with a wider protection gap, in 2022.

We expect further deterioration in mortality resilience, with a wider protection gap, in 2022. Life insurance continues to grow strongly, supported by increased risk awareness post-pandemic, but the other components of available protection are weakening. The COVID-19 experience has reinforced the relevance of mortality protection for many households, and insurance companies have the agility to adapt payouts to the high-inflation environment. Surveys by Swiss Re show that the pandemic has prompted consumers to consider purchasing new or additional life insurance, particularly in emerging markets, which account for about 62% of the global mortality protection gap.<sup>10</sup> However, high inflation and volatile financial markets are eroding the assets and savings available to households. With government finances stretched in many economies, social security survivor benefits will likely lag protection needs.

Natural catastrophe resilience remains low, with almost 75% of global exposures unprotected.

### Natural catastrophe resilience is low with only 25% of risks covered

Higher frequency of flooding in advanced EMEA and North America – perils that are typically less insured – contributed to weaker natural catastrophe resilience in 2021. The global SRI Natural Catastrophe Resilience Index remained low at around 25% in 2021.<sup>11</sup> The index score reflects the degree of annual modelled expected losses from wind, flood and earthquake risks covered by private insurance. This means that in 2021 only about 25% of global economic exposure to natural catastrophes were insured or protected, or 75% of global exposures left unprotected. The global natural catastrophe protection gap was more than USD 250 billion in 2021. Resilience globally has not improved over the last 10 years, largely because insurance penetration in high-growth emerging economies has remained low, alongside higher take-up rates in slow-growth advanced markets.

Advanced EMEA and North America have highest resilience to natural catastrophe shocks.

By country, the populations of Denmark, France, New Zealand, Australia and UK were most protected against natural catastrophe risks in 2021. By region, resilience is highest in advanced EMEA, followed by North America, reflecting the existence of robust private insurance and national disaster protection sectors, which help businesses and homeowners to manage the financial fallout from natural catastrophes. Nevertheless, in both regions the index was slightly lower than in 2020, primarily due to a higher frequency of floods, both as independent events and associated with tropical cyclones, relative to other peril events. Flood risk is typically less insured, so creates a larger impact on resilience.<sup>12</sup> Latin America has the lowest score at 6.1%, meaning about 94% of potential natural catastrophe losses in the region are uninsured. Emerging Asia-Pacific's natural catastrophe resilience index continues to improve, led by China. We see both higher awareness of protection against natural catastrophes and joint efforts from both insurers and governments across China's provinces having a positive impact.

<sup>10</sup> *Swiss Re global COVID-19 consumer survey 2022*, Swiss Re Institute, 31 May 2022.

<sup>11</sup> Based on modelled exposure of the key perils: storms, earthquakes and floods.

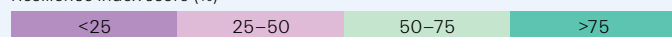
<sup>12</sup> *sigma* 1/2022, Natural catastrophes in 2021: the floodgates are open, Swiss Re Institute, 30 March 2022.

**Table 3**

SRI Natural Catastrophe Resilience Index: scores, rankings and protection gaps

	Natural Catastrophe I-RI		Protection gap, USD bn	(continued)	Natural Catastrophe I-RI		Protection gap, USD bn
	Index (%)	Rank			Index (%)	Rank	
<b>Denmark</b>	82	1	0.1	<b>Japan</b>	22	17	28.9
<b>France</b>	78	2	0.9	<b>Portugal</b>	21	18	0.2
<b>New Zealand</b>	74	3	0.2	<b>Colombia</b>	19	19	0.3
<b>Australia</b>	69	4	0.6	<b>Canada</b>	15	20	2.2
<b>United Kingdom</b>	68	5	1.2	<b>Ecuador</b>	15	21	0.4
<b>Poland</b>	60	6	0.1	<b>South Africa</b>	15	22	0.3
<b>Switzerland</b>	58	7	0.7	<b>Mexico</b>	13	23	4.5
<b>Israel</b>	53	8	0.4	<b>Italy</b>	12	24	4.6
<b>Belgium</b>	50	9	0.5	<b>Taiwan</b>	11	25	5.5
<b>Czech Republic</b>	50	10	0.1	<b>Peru</b>	10	26	0.6
<b>Austria</b>	41	11	0.4	<b>Uruguay</b>	10	27	0.1
<b>United States</b>	40	12	51.0	<b>China</b>	9	28	25.6
<b>Germany</b>	35	13	2.4	<b>Philippines</b>	7	29	2.8
<b>Netherlands</b>	31	14	1.1	<b>Brazil</b>	6	30	0.5
<b>Turkey</b>	30	15	2.3	<b>Indonesia</b>	5	31	2.8
<b>Chile</b>	29	16	0.9	<b>India</b>	5	32	2.6
				<b>Greece</b>	3	33	0.7

Resilience index score (%)



Source: Swiss Re Institute

High inflation hurts household financial assets and reduces purchasing power.

We simulate the impact of the current inflation surge on insurance resilience.

The regions suffering high inflation experience a greater widening of the protection gap.

### High inflation worsens protection gaps, especially in Europe

Higher inflation tends to negatively impact the value of household financial assets including insurance coverage, particularly for mortality where benefits are defined at the inception of the policy. Soaring prices also decrease households' purchasing power and increase household financial stress, which hinders families from purchasing more insurance or leveraging other tools to improve the protection gap.

We simulated the impact of the inflation surge to broadly understand its impact on insurance protection gaps. The results show that the recent high inflation significantly exacerbates households' vulnerabilities when other factors are held constant. To quantify this, we first discounted the 2021 protection gap numbers by the average inflation in the period 2018–2020 (as a proxy for households' inflation expectation); second, applied the predicted inflation rate for 2022 to simulate its impact on protection gaps by region for 2021; and third, calculated the difference between the two simulated numbers and estimated the impact of the price surge between pre- and post-inflation crisis.

Our results indicate that the inflation surge would have a USD 55 billion, or 3.8%, upward impact on the 2021 protection gap (see Table 4). Excluding China due to its minimal inflation pressure, the global insurance protection gap for 2021 could have been 5.1% higher, compared to its 2021 level. The impact is greatest in the regions suffering high inflation, such as emerging Europe (2022 CPI forecast: 13.3% vs. 2018–2020: 3.8%) and advanced Europe (2022 CPI forecast: 6.9% vs. 1.1%). In these regions the protection gap would be 8.9% and 5.7% wider, respectively. For markets in which CPI inflation has been stable, such as emerging Asia excluding China (2022 CPI forecast: 5.0% vs. 2018–2020: 3.5%) and China (2.3% vs. 2.5%), we witnessed far smaller effects on the protection gaps (+1.5% and –0.21% respectively).

**Table 4**

Simulation of the impact of higher inflation on insurance protection gaps

SRI Insurance Protection gaps (in USD billion)	2021PG (based on precrisis inflation)*	2021PG (based on postcrisis inflation)*	Change (nominal)	Impact from price surge	
<b>SRI I-PG</b>	<b>1 460.3</b>	<b>1 515.5</b>	<b>55.2</b>	<b>3.8%</b>	
<b>SRI I-PG excl. China</b>	<b>1 099.6</b>	<b>1 155.5</b>	<b>55.9</b>	<b>5.1%</b>	
North America	260.5	274.4	13.9	5.3%	
Latin America	140.2	146.9	6.7	4.8%	
Advanced Europe	198.6	209.9	11.3	5.7%	
Emerging Europe	205.5	223.7	18.3	8.9%	
Advanced Asia-Pacific	138.4	141.8	2.4	2.4%	
Emerging Asia-Pacific excl. China	156.4	158.7	2.3	1.5%	
China	360.7	360.0	-0.7	-0.2%	

Note: \*pre-crisis inflation refers to the average CPI growth rate of 2018–2020; and post-crisis applies the 2022 high inflation change.  
Source: Swiss Re Institute

An increase in income inequality adversely affects insurance resilience.

**Rising income inequality in advanced markets creates larger protection gaps**

The war in Ukraine and the COVID-19 pandemic have caused economic disruptions that we expect will increase inequality worldwide. Our *sigma* research on income inequality this year modelled the impact of rising inequality on insurance protection gaps in advanced economies.<sup>13</sup> The results show that the natural catastrophe protection gap for 2019 was about 2.5% larger due to the rise in inequality than it would have been had inequality remained at 1990 levels. This translates into USD 4.7 billion of additional equivalent premiums (natural catastrophe protection gap) if inequality had not risen. We also modelled the impact on the mortality protection gap. The result showed that the advanced market mortality protection gap in 2019 would have been 8% larger (USD 14.6 billion equivalent premiums) than if inequality had not increased since 1990.

The insurance industry and the public sector both have roles to play in addressing this challenge.

The insurance industry and the public sector both have roles to play in addressing this challenge by transferring risk away from individuals, including by working together. Public sector risk transfer mechanisms include social security systems, public disaster assistance and acting as insurer of last resort. Private insurance providers can work with policymakers to deliver public-private partnerships for risk transfer and, with an enabling regulatory framework, can drive innovation in products and distribution to extend the reach and coverage of insurance protection. With respect to food security, which has become a key challenge due to the war in Ukraine, public-private agriculture insurance programmes can play a supportive role.

**Table 5**

A risk transfer policy matrix for reducing inequality

		Government intervention designed to reduce inequality		
		Social security risk transfer	Other government involvement	Support for private insurance risk transfer
Income cohorts	<b>Low income</b>	Reduced private social security contributions, risk transfer via social security (health, unemployment, pension) and welfare programmes	Incentives for loss prevention; public disaster assistance; PPPs with insurance sector; insurer of last resort (e.g. housing, motor, pandemic risk)	Subsidise use of private insurance (e.g. agro, mortality); regulatory support for microinsurance and digital distribution
	<b>Middle class</b>	Income-based social security contributions, risk transfer via social security (health, unemployment, pension)	Incentives for loss prevention; PPPs; insurer of last resort (e.g. housing, motor, pandemic risk)	Promote private insurance; tax benefits for life/pension insurance; regulatory support for digital distribution
	<b>High income</b>	Progressive income tax; capital gains tax, wealth tax; estate tax; corporate tax	Insurer of last resort (e.g. commercial terrorism risk backstop); policies reducing financial market risks	Promote private insurance

Source: Swiss Re Institute

<sup>13</sup> *sigma* 3/2022, Natural catastrophes in 2021: the floodgates are open, Swiss Re Institute, 30 March 2022.

# Mapping insurance resilience in China's provinces

China holds huge economic and societal diversity within its 31 mainland provinces, autonomous regions and municipalities.<sup>14</sup> As well as calculate China's national mortality and natural catastrophe resilience, we further explore such indices for each province to estimate their resilience to both risks for the period 2019 to 2021. We find significant disparity in provinces' mortality resilience, ranging from less than 20% to more than 50% in 2021. For 29 out of 31 provinces, mortality resilience declined continuously in the past three years. In contrast, natural catastrophe resilience indices show steady improvement annually since 2019, both nationally and for most provinces. Beijing and Shanghai have highest resilience to both mortality and natural catastrophe risks. We will publish a full report on this research.

Mortality resilience in China declined in most provinces in 2021.

## Mortality resilience: a challenging period for regions across China

China's mortality protection gap widened by 14% year-on-year to USD 65.6 billion in 2020, and by a further 21% to USD 79.5 billion in 2021. The causes are almost zero growth in life insurance, steady year-on-year growth in household debt and lower, but still positive, growth in incomes during the pandemic crisis. The increasing gap translates into a declining Mortality Resilience Index (M-RI) in China, from 35.8% in 2020 to 32.9% by the end of 2021, meaning that households' assets available to support the financial needs of dependent family members, in the event of premature death of primary breadwinner, fell short by about 67% in 2021. The same trend is seen in 29 of China's 31 provinces, reflective of a broad-based weaker mortality resilience in 2021. We also found the median level of all provincial M-RI to be lower than the national level. This indicates that most provinces in China have lower mortality resilience than the national M-RI. In 2021, 18 provinces (or 58% of total) have an M-RI below the national level.

There is significant disparity in M-RI across provinces in China.

The provincial view shows large disparity in mortality resilience. The M-RI scores range from less than 20% in provinces such as Tibet, Xinjiang, Qinghai, to above 50% for provinces including Beijing, Jiangsu and Shanghai (see Table 6). This reflects regional differences in economic development, which has consequences for income growth, households' financial strength, social support and life insurance ownership. Broadly, less economically developed provinces have lower mortality resilience. However, more economically developed provinces do not necessarily rank as high in M-RI as they do by per-capita GDP. For instance, provinces Fujian and Guangdong rank 4<sup>th</sup> and 7<sup>th</sup> respectively in China by economic development (per-capita GDP) but only rank 16<sup>th</sup> and 13<sup>th</sup> respectively for mortality resilience, due to different driving factors. Relatively high per-capita incomes in both provinces drive up households' financial need for future years in the event of the death of a breadwinner. However, Guangdong has a relatively lower share of non-insurance financial assets in total available assets (46% compared to a national average of 60%) due to its younger age of working population.<sup>15</sup> Fujian has a relatively lower contribution of life insurance in total available assets (38%) due to its less-developed insurance market.<sup>16</sup> Other non-financial factors, such as demographic structure, number of households with dependents, and income distribution in each province also play a role in affecting resilience level.<sup>17</sup>

<sup>14</sup> For simplicity we use 'provinces' as the general term to describe the regional level in China. We used each input variable on provincial levels and more granular data for the provincial mortality protection gap model. In particular, we calculated the sum of urban employees working in different employment categories and total income from people living in rural areas for income, and households' outstanding loans from central banks' balance sheet for total debt.

<sup>15</sup> The average age of working population in Guangdong is 36.7 years compared to the national average of 38.4, ranked from the lowest as the 5th in China, after Xinjiang, Hainan, Guizhou and Tibet in 2018. Source: [https://www.sohu.com/a/438728309\\_119778](https://www.sohu.com/a/438728309_119778)

<sup>16</sup> L&H insurance penetration in Fujian was 2.1% in 2021, compared to a national average of 2.8%, according to CBIRC data.

<sup>17</sup> Demography also drives household resilience to mortality risk. For instance, the mortality resilience of a young breadwinner household tends to be significantly higher than other age groups as they normally have lower accumulated assets/savings and more years of income to be replaced.

**Table 6**  
Mortality resilience index by province in China

	Province/autonomous region/municipality	Range of M-RI (%)	Average M-RI (%)
<b>High</b>	Beijing, Jiangsu, Shanghai, Heilongjiang, Hebei, Tianjin	>39	45
<b>Medium-High</b>	Hubei, Chongqing, Ningxia, Shandong, Shanxi, Zhejiang, Guangdong	33–39	36
<b>Medium</b>	Liaoning, Jilin, Fujian, Hainan, Anhui, Henan	27–33	31
<b>Medium-low</b>	Sichuan, Hunan, Shaanxi, Jiangxi, Gansu, Guizhou	22–27	25
<b>Low</b>	Yunnan, Inner Mongolia, Guangxi, Qinghai, Xinjiang, Tibet	<22	19
	<b>China overall</b>		<b>33</b>

Note: Provinces are clustered into five groups based on the size of mortality RI. Source: Swiss Re Institute

China sees a higher improvement potential for mortality resilience.

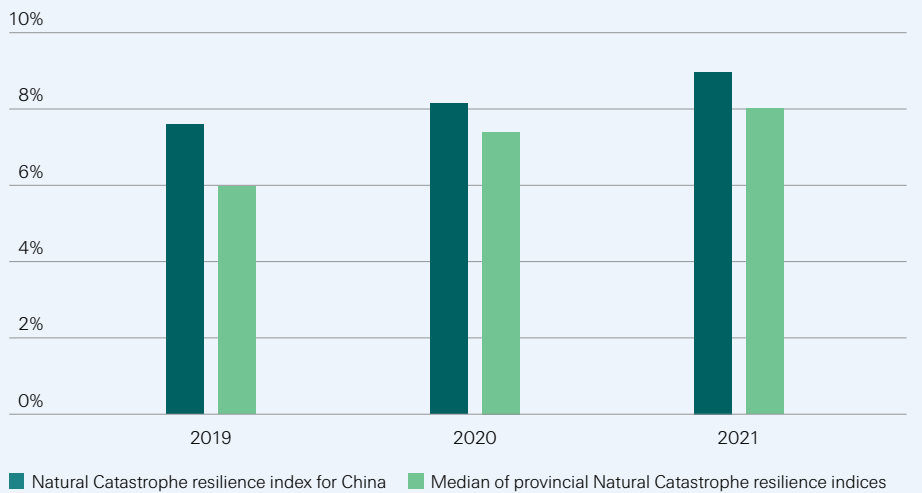
We find life insurance contributes about 40% of available financial resources for addressing mortality risk in China, low compared with both advanced markets in Asia (66%) and major emerging Asian markets (53%).<sup>18</sup> China's life insurance penetration rate was only 2.1% in 2021, compared to 5.8% in Korea, 3.9% in Malaysia and 3.4% in Thailand. We see a very important role for insurance to play in improving mortality resilience in China.

China's national natural catastrophe resilience index has risen steadily since 2019.

**Natural catastrophe resilience on the rise across provinces**

China's national natural catastrophe resilience index rose to 9.0% in 2021 from 8.1% in 2020 and 7.6% in 2019, even after major flooding in Henan province in July 2021.<sup>19</sup> The rise in China's natural catastrophe resilience also contributed to emerging Asia's natural catastrophe resilience increasing to 6.2% in 2021 from 5.8% in 2020. The improvement in resilience in China reflects an expanding non-life insurance market with steady growth in the commercial property line of business, boosted by both regulatory efforts and higher awareness of natural catastrophe protection. The joint effort of stakeholders such as governments and insurers to improve prevention services such as early warning systems is also an important contributor. For example, in the 2021 flood in Henan, online damage recognition systems helped the claims process, and insurers initially took responsibility for early warning and flood rescue in this event.<sup>20</sup>

**Figure 1**  
Natural catastrophe resilience index of China and median provincial indices, 2019 to 2021



Source: Swiss Re Institute

<sup>18</sup> For advanced Asia, average ratios include Japan (63%), Korea (74%), Singapore (65%) and Hong Kong (64%); in emerging Asia, these are: Malaysia (73%), Thailand (63%), Indonesia (38%) and India (37%).

<sup>19</sup> *sigma* 1/2022 – Natural catastrophes in 2021: the floodgates are open, Swiss Re Institute, 30 March 2022.

<sup>20</sup> "Insurance Payments Hit Historical Records in Henan Floods", *The Financial Times of China*, August 2021.

The lower median of provincial indices implies most provinces are less resilient than China as a whole.

The median provincial natural catastrophe resilience index is lower than the national level in all three years to 2021 (see Figure 1). This implies that many provinces still have lower resilience to this risk than China as a whole. However, the difference between the median provincial and national N-RI is shrinking, to 0.95ppts in 2021 from 1.63ppts in 2019, a sign that protection is becoming more consistent across the provinces.

Beijing and Shanghai municipalities have the highest natcat resilience indices.

Our model indicates that Beijing and Shanghai are the most resilient administered municipalities for natural catastrophe risks in 2021, with both indices at almost 10%. Nevertheless, even these levels are still far lower than the world average (2021: 24.6%). Provinces with relatively higher natural catastrophes resilience scores still have room to improve their resilience, for instance by working with the insurance industry in PPPs to promote provincial-level natural catastrophe insurance schemes.

Central provinces need to immediately raise risk awareness and resilience levels.

Relatively lower resilience is seen largely in provinces in central China, such as Henan, Guizhou, Anhui, Jiangxi, etc, which is likely attributed to their less-developed insurance markets as well as relatively lower risk awareness as they are less exposed to seasonal natural catastrophe risks compared to the coastal areas. For instance, Henan province, a key transportation hub in China with a capital city of over 10 million residents, high mobility and dense traffic, experienced severe flooding in 2021 that caused economic losses of more than USD 19 billion despite the use of an early-warning system.<sup>21</sup> As climate change affects the severity and frequency of natural catastrophes, immediate action is needed to enhance resilience for these inland provinces, especially for areas that are more developed or have higher population densities.<sup>22</sup>

<sup>21</sup> *sigma* 1/2022 – Natural catastrophes in 2021: the floodgates are open, op. cit.

<sup>22</sup> *Insurance in a world of climate extremes: what latest science tells us*, Swiss Re, 18 December 2019.

# Appendix

**Table 7**  
Components of the SRI Macroeconomic Resilience Index

Indicator	Weight	Source	Definition of indicator	Rationale
<b>Macro buffers</b>				
Fiscal space	35%	Swiss Re, based on data from World Bank (WB)/IMF and Swiss Re forecasts	An empirical estimate of an economy's room to use fiscal policy without risking a fiscal distress situation. This includes the level of government debt and external debt as a percent of GDP, government effectiveness, the current account balance, actual real GDP growth rates over a three-year period and potential growth rates. <sup>A</sup> For emerging markets, we include FX pressures.	We consider fiscal policy the most important policy tool to mitigate the length and depth of an economic shock.
Monetary policy space	15%	Swiss Re, based on World Bank data	Measures the ability of a central bank to ease or tighten monetary policy. This includes the distance of short and long-term rates to the zero lower bound or to "fair-value" yield estimates. For emerging markets, a proxy of central bank independence and the policy differential against the US Federal Reserve are also included.	Monetary policy is a key policy instrument to absorb economic shocks.
<b>Macro structural elements</b>				
Banking industry backdrop	18%	World Economic Forum (WEF)	The findings of a WEF survey of executives, indicating how sound a country's banks are generally considered to be. The measure is not based on economic or accounting measures, but popular perceptions around dimensions influencing the health of the banking sector (eg. capital buffers, sustainability of business models, regulatory developments and the macro environment). <sup>B</sup>	A fragile banking industry backdrop propagates shocks given the sector's interconnectedness with the economy.
Labour market efficiency	10%	WEF	Includes flexibility of wage determination, hiring and firing practices, capacity to retain talent, female participation in the labour force, etc.	More efficient and dynamic labour markets allow for easier reallocation of workers during times of stress.
Financial market development	8%	IMF	This component is a summary of how developed financial markets are in terms of depth, access and efficiency.	Developed financial markets diversify the funding sources available for the real economy.
Economic complexity	4%	The Observatory of Economic Complexity	A holistic measure of the sophistication and variety of goods produced by and exported from an economy. It shows the breadth and depth of an economy's production capacity.	An economy producing sophisticated and a variety of goods will be less affected by shocks in specific sectors.
Income inequality	4%	World Inequality Database	This indicator is measured as the ratio between the top 10 percentile of the income distribution to the bottom 50. It shows the distribution of income across a population between the poorest and the wealthiest. A higher ratio indicates higher inequality.	Low income inequality supports the purchasing power of lower-income households thus translating into stronger overall demand within an economy. This also ensures society can fare better in difficult times as households should be able to secure higher cash buffers.
Insurance penetration	2%	Swiss Re	Ratio of total (life and non-life) direct insurance premiums to GDP.	Insurance acts as a shock absorber and smoothenes financial volatility.
Human capital	2%	WB	Assesses how health and education levels shape the productivity and social mobility.	High social mobility and skill levels make a country more dynamic, such that it can better withstand and adjust to shocks.
CO <sub>2</sub> emissions <sup>C</sup>	2%	International Energy Agency (IEA)	Relates CO <sub>2</sub> emissions to GDP.	Climate change has disruptive effects on global supply chains and infrastructure. This negatively impacts government finances, firms' capital, and household wealth. <sup>D</sup>

<sup>A</sup> The measure of FX pressure relates the PPP-implied exchange rate to the nominal exchange rate against the US dollar. An overvalued currency implies an economy is less competitive which increases the fiscal default probability. We include FX pressure in the fiscal space indicator instead of the monetary policy space measure. This is because the euro area sovereign debt crisis showed that a country's inability to devalue quickly has severe repercussions for its fiscal position. In a currency union like the euro area, overvaluation can only be restored by devaluing the real economy, for example by lowering wages and prices, which is very costly in terms of GDP and employment levels. In any case, large economies with a free-floating exchange rate can also experience severe fiscal distress and adjustment, as was the case in the UK in 1976.

<sup>B</sup> Regulatory filings such as banks capital positions are not available for all countries and for a sufficient amount of time.

<sup>C</sup> This indicator replaces the Low Carbon Economy time series from Maplecroft which was previously used.

<sup>D</sup> *Climate change: a core financial stability risk*, IIF, 2019.

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