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Maintaining resilience: the role of P&C insurers in a new world order

Executive summary

Ongoing global crises will renew focus on "real" economy issues. Insurers can help maintain resilience as a new world order takes shape...

The COVID-19 pandemic and the war in Ukraine have heightened concerns over national security in different fields, compounding de-globalisation sentiment. We expect this to lead to renewed focus on "real" economy issues, with three main drivers shaping the development of a multi-polar new world order: 1) a realignment of supply chains to insulate economies against future trade disruptions; 2) added impetus to the green transition given the worries over energy security that Russia's invasion of Ukraine has sparked; and 3) higher food prices and potential for global food shortages. The financial economy is also undergoing paradigm shifts. First, after many years of low interest rates, inflation and monetary policy tightening are driving rates higher. This will improve investment returns and momentum, and spur more capital-intensive growth and productivity in the real economy. A second change is that in a multi-polar world with different trade, technology and payment systems, the global financial and monetary system may need to be reformed.

...for instance by providing businesses with protection against earnings volatility as operating conditions change, and as investors in a sustainable future.

The insurance industry will remain an agent of resilience as the world order changes. The operating environment could become more complex, such as with more stringent regulatory requirements for cross-border insurance. However, the utility of insurers as providers of risk mitigation solutions and investors in a sustainable future will hold firm. For example, commercial insurers will be a mainstay of resilience by helping businesses to maintain financial stability with coverage for the risks inherent in supply chain restructuring activities. Insurers can also facilitate the green transition by increasing their underwriting of renewable energy and decarbonisation projects, and improve global food security by extending the reach of agricultural insurance. And on the investment side, insurers can play an important role in ramping up private sector long-term investments in a sustainable future, such as in green energy and infrastructure.

Supply chain restructuring will be a main tenet of the new world order. with reshoring generating an estimated USD 30 billion in commercial insurance premiums over five years.

The multi-polar world we envisage could yield positive and sub-optimal outcomes. For instance, as part of global supply chain restructuring, reshoring and "friend-shoring" of production are set to pick up pace. Our analysis suggests that in terms of economic growth, the US, the UK and Germany stand to benefit most from re-shoring production over the coming five years. Countries like Vietnam and Mexico, on the other hand, may gain from friend-shoring. For insurers, there will be increased demand for business interruption, supply chain and other covers. In a simulation exercise, we estimate that re- and friend-shoring related covers will generate global commercial premiums of close to USD 30 billion and USD 3 billion over the next five years, respectively. Most demand will come from advanced markets. The winners from reshoring activities will be liability and commercial property insurers, with new premiums of USD 19.5 billion and USD 15.5 billion, respectively. Marine and trade credit premiums, however, will decline slightly.

If stated targets to increase renewable energy capacity are fulfilled, global green energy infrastructure investments could generate USD 237 billion in new premium volumes by 2035.

Another real economy driver shaping the new world order will be concerns over energy security. The need to move away from fossil-fuel (import) dependency has given new urgency to the green transition and investing in renewable energy. The risks inherent in constructing and operating renewable energy infrastructure are complex and need to be insured. If countries deliver on building all the renewable energy capacity they have so far targeted, we estimate that investments in green energy will generate additional energy-sector related insurance premiums of USD 237 billion by 2035. All told, however, renewable energy is just one component of the green transition. To meet the Paris Agreement goal on temperature rise, all sectors of the economy need to decarbonise. Here a multi-polar and geopolitically fragmented world may not be ideal, certainly not if it impedes the coordinated global action to fight climate change.

Agriculture insurance uptake needs to increase to mitigate food security concerns.

Global food insecurity is also a growing concern. In a world of more fragmented trade relations, countries dependent on food imports will remain vulnerable to supply shocks. Agriculture insurance can help by providing farmers with the means to continue when crop losses are incurred. However, penetration is low, less than 2% in emerging markets, and it is incumbent on insurers and governments to increase uptake. More frequent extreme weather events as the world warms could lead to increased incidence of crop losses. Here we see multi-peril crop insurance delivered through public-private partnerships as playing an increasingly important role.

Key takeaways

Growth in the US, UK and Germany seen as gaining most from reshoring; Vietnam and Mexico to benefit from friend-shoring

In the reshoring scenario, global trade activity would likely fall as manufacturers in many advanced markets move production capacity back home. Overall, however, we simulate an annual average 0.18% boost to world aggregate gross domestic product (GDP) in the period 2022–2026, with additional investment in plants and equipment to expand production domestically outweighing the negative effect of reduced trade flows. In the friend-shoring scenario, we simulate a net global GDP loss of 0.04% per year. Leading advanced markets stand to benefit most from the re-shoring of production over the coming five years. Countries like Vietnam and Mexico, however, will lose out. Conversely, the latter are set to benefit most from friend-shoring of production.

		Reshoring GDP growth impact	Friend-shoring GDP growth impact
Advanced markets	Germany	1.67%	0.09%
	UK	1.54%	0.41%
	US	1.18%	0.09%
	Japan	0.61%	0.16%
	Canada	−0.80%	0.02%
	Switzerland	−0.92%	0.07%
Emerging markets	Malaysia	−0.11%	0.52%
	Turkey	−0.46%	0.07%
	Mexico	−0.92%	1.06%
	Vietnam	−1.79%	2.13%
	China	−0.38%	−0.50%
World		0.18%	−0.04%

Note: Under reshoring scenario, we assume major advanced countries including the US, UK, Germany and Japan reduce real imports by 10% over a 5-year horizon, and increase domestic private investment accordingly. In the friend-shoring case, we assume the US and EU reduce their imports from China by 30% in strategically-important sectors, and turn to their top 3 alternative exporting countries to fill the production gap. The GDP impact is measured as deviation from the baseline (between 2022–2026).
Source: Oxford Economics Macro Model, Swiss Re Institute

Advanced market commercial insurers to benefit most from reshoring and friend-shoring

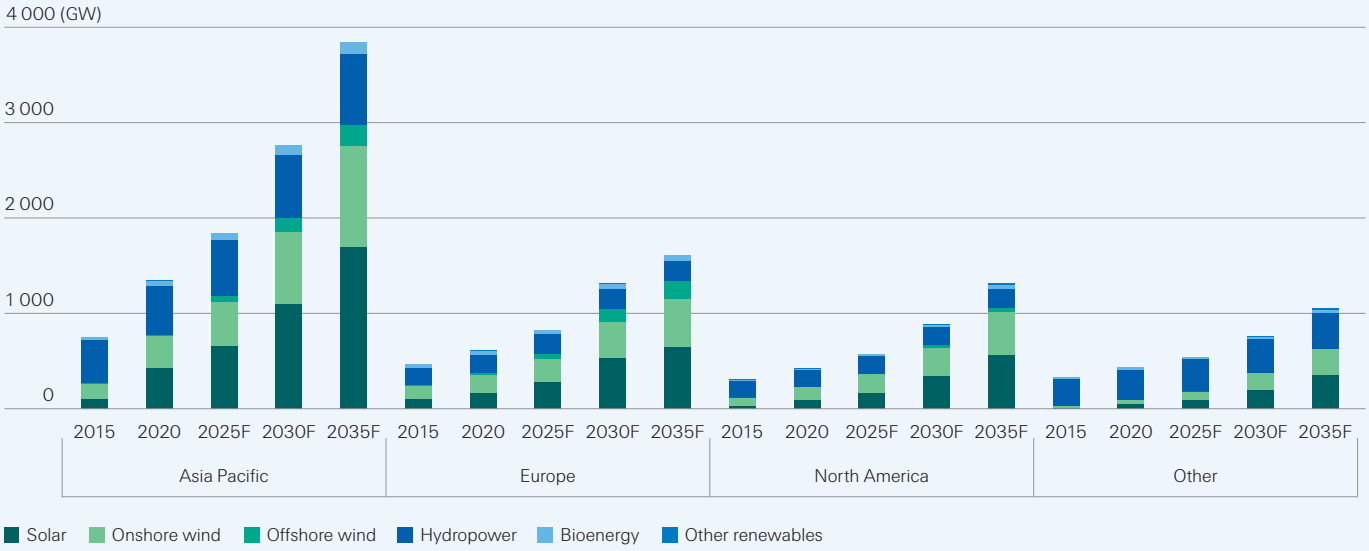
Insurers in advanced markets stand to benefit most from supply chain restructuring activities. We estimate a USD 34.4 billion-increase in advanced market commercial premium volumes in the period of 2022 to 2026 as a result of reshoring activities, with friend shoring-related business yielding a near USD 6 billion gain in premiums.

Impact on primary insurance premiums, 2022–26 (USD bn)	Reshoring	Friend-shoring
Advanced markets	34.4	5.8
Emerging markets excl. China	−1	1.1
China	−2.9	−3.9
World	**30.5**	**2.9**

Source: Swiss Re Institute

Transition to renewable energies a core component of the race to net zero

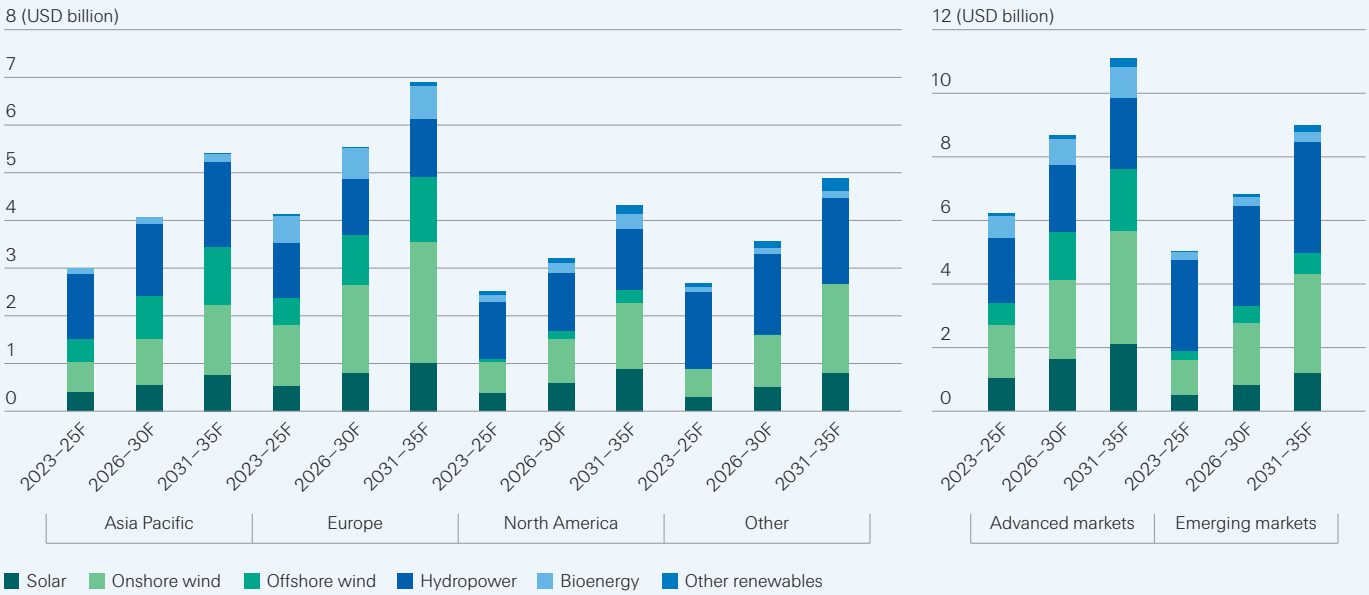
There has been a significant increase in renewable energy capacity in the last decade. If countries deliver on their stated targets, we estimate that the world will have an additional 4.6 TW of renewable energy capacity by 2035, a compound annual growth rate of 7%. Most global capacity will be solar, followed by onshore wind, and most (49%) will be in Asia-Pacific.



F = forecast; Source: IRENA, IEA, Swiss Re Institute

Investments in renewable energy to promote global insurance premium volumes

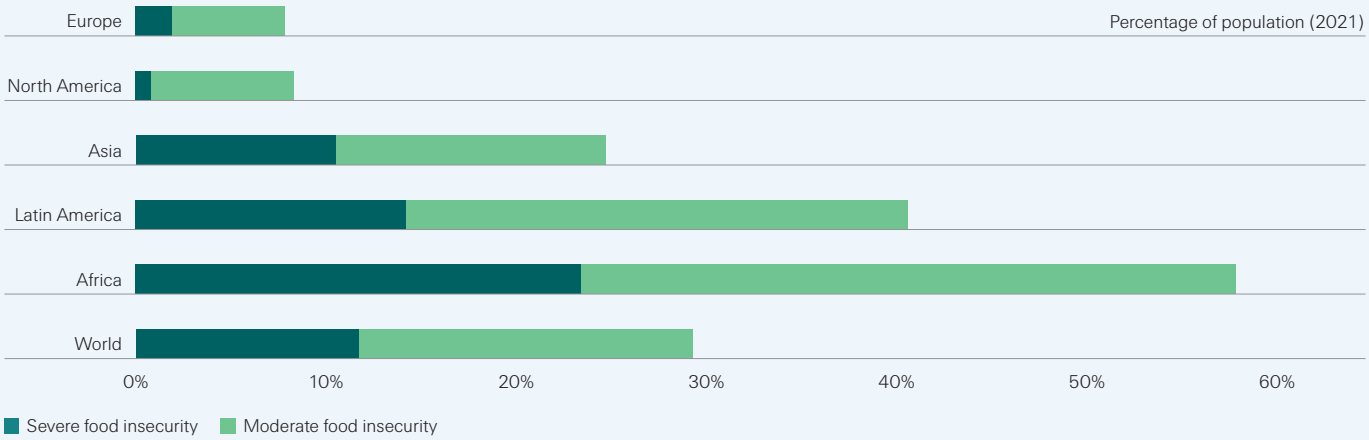
Based on announced targets, we estimate that global investments in renewable energy will generate total cumulative premiums of USD 237 billion between 2022–2035. These premiums will in part replace business from fossil-fuel risks as insurers pull back from underwriting the latter. However, renewable energy is just one component of the green transition. To reach the Paris Agreement target on global temperature rise, all sectors of the economy need to be decarbonised.



Source: Swiss Re Institute

Many low-income countries are vulnerable to food insecurity

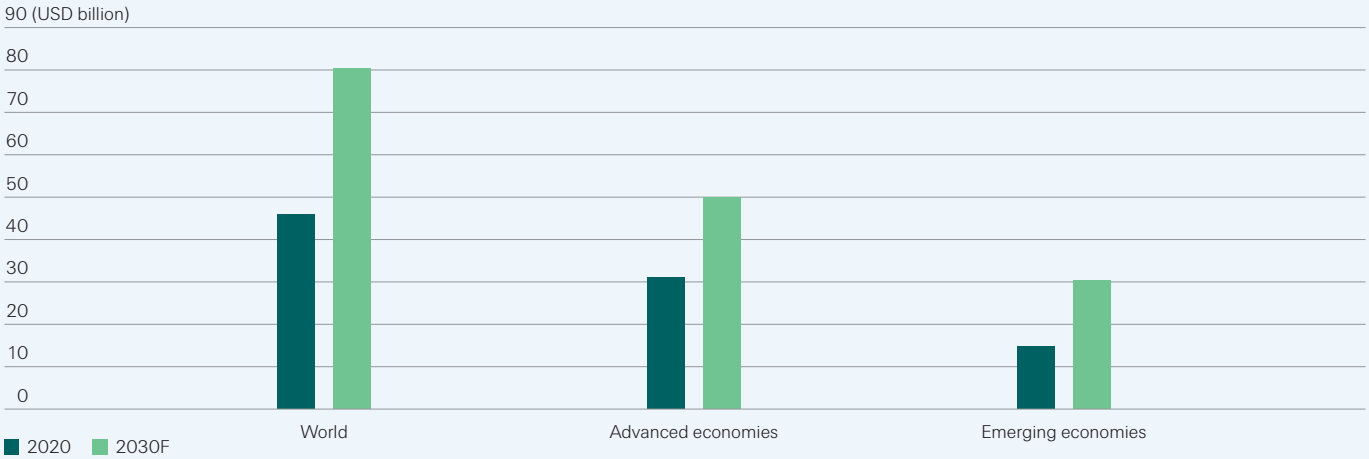
We expect food prices to remain high and volatile in the coming years, alongside the ongoing vulnerabilities in agriculture commodity supply chains, which could impact food insecurity further. Populations in Africa and Latin America are most exposed to food insecurity.



Source: Food and Agriculture Organization of the United Nations, Swiss Re Institute

We forecast a near doubling of global agricultural insurance premiums by 2030

We estimate that global agriculture premiums reached almost USD 46 billion in 2020, with the insurance market in advanced economies twice as large as in emerging economies. The US and China are among the largest agriculture insurance markets. Based on current trends, we forecast that the global market will reach more than USD 80 billion in premiums by 2030. However, penetration remains low, more so in emerging markets: it is incumbent on insurers and governments to extend insurance reach.



Note: Premium data includes agriculture insurance government programmes run through insurance companies, and life and property covers when available.
Source: Swiss Re Institute

A new world economic order in the making

With the COVID-19 pandemic and war in Ukraine coming in quick succession, a state of flux and uncertainty permeates the global economic system. We anticipate that rising concerns over security, in particular around energy and food supplies, will lead to a resetting of geopolitical and trade alliances, leading to a new world order of multi-polar blocs of economic influence. This will likely be accompanied by renewed recognition of real economy issues. We believe three main real economy drivers will shape the development of a new world order: restructuring of global supply chains, accelerated efforts to reduce fossil fuel dependency and increase renewable energy capacity; and a focus on potential for food shortages in different parts of the world. With respect to the financial economy, the main paradigm shift from the last decade will be high long-term interest rates.

The return of the "real" economy

The world is becoming more fragmented, with concerns about security exposing growing fissures.

The dual crises of the pandemic and war in Ukraine have intensified East-West tensions. We see risks of the world fragmenting into different blocs with economic and other consequences. While a deceleration of globalisation was already underway, calls for reshoring and friend-shoring of supply chains are accelerating this trend. In this context, efficiency no longer reigns supreme but is being dethroned by security concerns around a range of issues, including energy and food supplies. And at the same time, defence spending commitments are expanding.

We see a new world order taking shake, one of multi-polar blocs of economic and strategic influence.

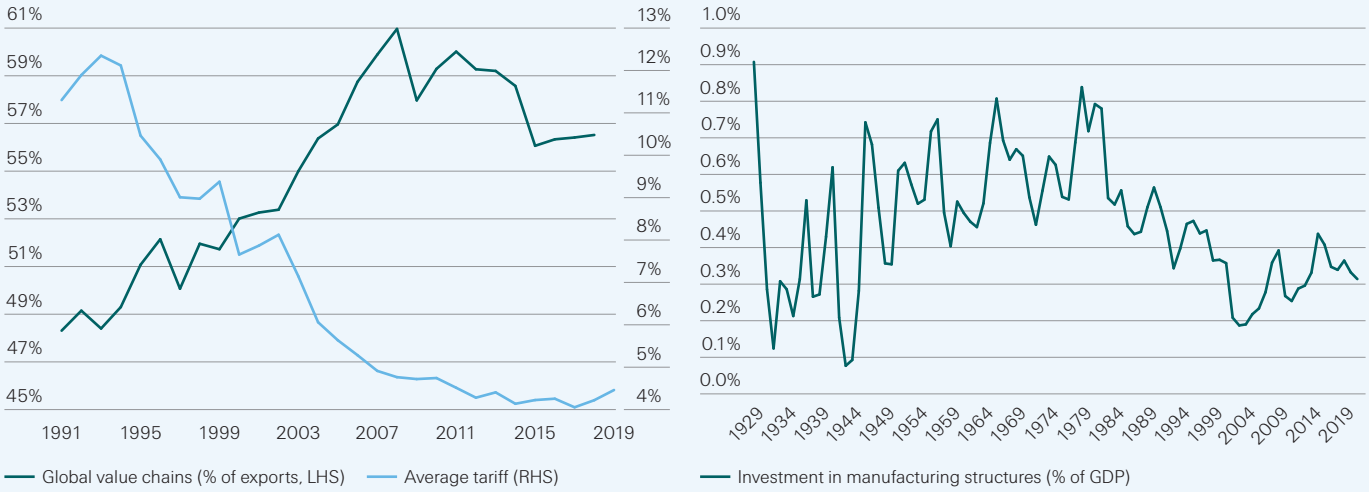
We believe these different points of fragmentation will lead to a new world order in which centres of geopolitical and economic influence change as, among others, trade lines are redrawn and green energy replaces fossil-fuel dependency. We expect the outcome will be a more multi-polar world, one of resurgent nationalism where concerns about domestic or regional security become the focus of policy making at the expense of inclusive, global economic development.

A new super-cycle is emerging.

As we emerge from a period of intense turmoil, the world economy will look very different. We are witnessing the emergence of a new super-cycle, marking an end to the prior neo-liberalism cycle that lasted for 40 years (since the 1970s stagflation episode). Neoliberalism brought free trade, deregulation, a smaller role for governments and large-scale labour immigration.[1] Free trade enabled the expansion of supply chains at a global level (see Figure 1, left). The sustained downward trend in trade tariffs also influenced the path for domestic and international investments as companies stopped investing at home (see Figure 1, right). The emergence of a new super-cycle that places renewed emphasis on the real economy will come with profound implications, including higher interest rates, rising defence spending and deglobalisation.

[1] D. Perkins, *The new macro supercycle*, TS Lombard, August 2022.

Figure 1
Tariffs and global value chain participation (left); US private investments in manufacturing structures (right)



Source: World Bank, US Bureau of Economic Analysis, Swiss Re Institute

We see three main "real economy" tenets as shaping the multi-polar world.

Going multi-polar: three real economy drivers

Till end 2021, the financial economy – the part of the economy concerned with transactions of money and financial assets – had become increasingly disconnected from the "real" economy, namely the production, purchase and flow of goods and services. A successful economy needs both the real and financial sector to thrive. To this end, we believe the global circumstances currently in play are bringing renewed recognition of and focus on the real economy. With respect to a multi-polar global economy and what it means for the insurance industry, we see three real economy tenets shaping the world that will be:

- **Global supply-chain restructuring**: The COVID-19 pandemic led to interruptions to trade flows, also of input goods. Deglobalisation sentiment was already in play before the pandemic began, but we expect supply chains will now further shrink and realign around regional trading blocs as a means to insulate businesses against future global shocks. The war in Ukraine has only instilled more urgency for re- and friend-shoring of production activity.

- **Transition to a green economy**: The move from fossil fuels to renewable sources of energy is one pillar of the drive to mitigate the effects of climate change, and also achieve net-zero emission goals. The war in Ukraine has led to national energy security concerns and high energy prices, reaffirming and adding urgency to the need for national economies to go green.

- **Volatile and higher food prices**: Food prices have soared since last year, and the war in Ukraine has also led to food shortages in many parts of the world. We expect food prices will remain volatile and higher than pre-pandemic levels and that in a multi-polar world, food *in*security could become more commonplace.

After considering changes in the financial economy, this report presents deep-dives into each of these three real-economy tenets that will shape the new world order, and the associated insurance market implications.

The tangible 2020s

The disconnect between the financial and real economy coincided with a decade of very low interest rates.

The said growing disconnect between the real and financial economies coincided with a decade of ultra-accommodative (and unconventional) monetary policy in advanced economies, causing a sharp drop in both risk premiums and risk-free discount rates.[2] Subdued inflation and low interest rates favoured private investment in companies with "intangible" value (eg, derived from intellectual property, branding, market power) rather than companies with "tangible" value.[3] At the start of this year, the 15 largest intangible companies in the S&P 500 index reported USD 2.5 trillion in assets and capitalisation of USD 15 trillion. The remaining 485 tangible companies control USD 40.4 trillion in assets but are worth just USD 26 trillion.[4] Over the same period, public investment in the real economy was low. In the US, government investment as a share of GDP was on a downward trend and net government investment was nil in the euro area. Productivity largely stagnated.

Current high levels of inflation are driving interest rates higher, leading to a reallocation of investment to the real economy.

We anticipate two fundamental changes to financial economy conditions in the coming years. First, inflation and monetary policy tightening are driving long-term interest rates higher, and we believe the period of negative interest rate experiment is over. This shift is likely to contribute toward reallocating private sector investment away from intangible and towards tangible assets, bringing the financial and the real economies closer together. The reallocation of private investment is particularly relevant. With public budgets already under strain, we expect the private sector will be increasingly responsible for ramping up investment.

Governments are set to increase public investments, but the private sector can become the main investor in a sustainable future.

Governments are set to provide a more meaningful catalyst for economic growth through higher spending on national defence, public infrastructure and the transition to a green economy. This will improve investment momentum and promote capital-intensive growth and higher productivity. Studies have shown that increased public investment raises output, both in the short (with a multiplier of about 0.4) and longer terms (1.4), crowds in private investment, and reduces unemployment.[5] The reality, however, is that public investment during the last decade has been restricted by government budget constraints still in effect today. Government debt in many countries is at an all-time high, and rising interest rates are making that debt more expensive. The private sector, including the insurance industry, will be particularly important in ramping up investment in green infrastructure projects that contribute to a sustainable future. To that end, the World Bank estimates that a USD 1 investment in infrastructure to facilitate the green transition can unlock new economic opportunities and jobs to the value of USD 4.[6]

The global monetary and financial system may also see reform.

A second change is potential reform of the global monetary and financial system. In a world economy made up of multi-polar blocs with different trade and technology standards, payment systems and reserve currencies, the US dollar's dominance as the world's currency reserve may no longer be sustainable, nor economically efficient. To cater to the needs of the more fragmented global economy, a future monetary system may continue to evolve into a direction where central banks hold a wider range of reserve assets.

The negative interest rate experiment is over

High inflation and the unwinding of accommodative monetary policy are pushing interest rates higher.

After many years of low yields, today's high inflation environment stemming from ongoing geopolitical events and lasting effects from the COVID-19 pandemic, has fundamentally changed the interest rate outlook. The combination of high inflation (which we expect to remain for a while yet) and monetary policy tightening is driving long-term sovereign bond yields higher and in our view, the global experiment in negative rates of recent years is effectively over.[7] We expect yields will end this year slightly higher than current levels, with the 10-year US Treasury at 3.2%, rising to 3.5%

[2] *The Disconnect between Financial Markets and the Real Economy*, International Monetary Fund (IMF), 26 August 2020.
[3] *USD weaponization & the "tangible 20s"*, TS Lombard, 24 March 2022.
[4] *Capitalism without capital: the test of inflation*, StoneX, January 2022.
[5] "The macroeconomic effects of public investment: Evidence from advanced economies", *Journal of Macroeconomics*, vol. 50, December 2016.
[6] *Lifelines: The Resilient Infrastructure Opportunity*, World Bank. See also *Financing Climate Action*, United Nations.
[7] For more information on the significant central bank policy shift, see: *Economic Insights: Goodbye to all that: central banks step into a brave new world*, Swiss Re Institute, June 2022.

by end-2023. This will be driven by further unwinding of ultra-loose monetary policy, despite recession concerns.

We expect that structurally higher inflation will keep interest rates higher.

We expect that interest rates will remain higher over the longer term, as inflation moves structurally higher rather than lower, as in the last 40 years. The following factors will underpin this dynamic:

- **The green transition** will likely push inflation structurally higher due to drivers such as "fossilflation", "greenflation" and "fiscalflation".[8] This is one of the key reasons we forecast that US headline CPI inflation will be around 0.6 percentage points (ppt) higher (+0.7 ppt for the euro area) on average in the years 2024 to 2033 than the average of the previous economic cycle (2010–2019). This will feed into the higher interest rate environment. We forecast average 10-year yields of 3.4% in the year 2024 to 2033, up from 2.4% in the last cycle.

- **Weaker global yield anchors**: Euro area and Japanese yields are often said to be the global low yield anchors. This comes as European and Japanese investors allocate funds overseas (eg, to US Treasury bonds) in search of returns, resulting in compressed yields in other regions. The European Central Bank (ECB), however, has brought down the curtain on years of ultra-loose monetary policy and is instead launching an anti-fragmentation tool aimed at staving off the danger of a sovereign debt storm.[9] And in Japan, while the central bank has reiterated that the top priority is support economic activity with aggressive monetary easing centred on yield curve control,[10] it is coming under increasing pressure to change course. This as other major central banks continue to accelerate the pace of monetary tightening, the effects of which manifest in a sharply depreciating yen.

- Potential for "**reverse currency wars**" as interest rates in major economies are hiked aggressively to fight inflation. Today, policymakers welcome stronger currencies to tame inflation, and also to maintain purchasing power over imports. The Fed's hawkishness has driven the US dollar significantly higher with the euro falling back to parity in mid-July this year, the first time this has happened since the global financial crisis. The spectre of currency depreciation is exerting further pressure on other economies to keep pace with the Fed as weaker currencies experience additional inflationary pressures. It has been estimated that central banks in major advanced economies will need to raise interest rates on average by an extra 0.1 ppt to offset a 1% decline in their currencies.[11]

- **Central bank balance sheet reduction**: As central banks embark on quantitative tightening (QT) to reduce their balance sheets, the associated reversal of liquidity provisions should increase the cost of capital, pushing yields higher. This is especially true should QT be conducted through active sales of securities on central bank balance sheets, rather than letting the investment mature and subsequently decrease central bank reserves. In contrast to the last tightening cycle and QT episode, the Fed now has reverse repurchase operations through which it drains excess liquidity. As long as the US Treasury funds itself through bills and notes (the current baseline), the private sector does not need to absorb more duration. Hence mechanically higher yield levels are not a given.

[8] *Economic Insights – The green transition: inflation that we cannot afford not to bear*, Swiss Re Institute, 21 May 2022.
[9] The term refers to what officials see as an unjustified jump in the bond yields of weaker euro area governments relative to stronger ones. While the currency bloc's 19 economies differ by metrics like inflation, growth and debt, policymakers say some market moves do not reflect these fundamental factors and are too rapid.
[10] *The Bank's Thinking on Monetary Policy: Toward Achieving the Price Stability Target in a Sustainable and Stable Manner*, Bank of Japan Governor Kuroda Speech, June 2022.
[11] *Reverse currency wars*, Goldman Sachs, February 2022.

A new Bretton Woods?

Geopolitical developments could call into question the functioning of the global financial system...

The Bretton Woods system of global economic governance was created in the aftermath of World War II in the hope of bringing mutual prosperity, lasting peace and financial stability. While this was successfully achieved for the larger part of the last 74 years, the global system of governance and cooperation is unraveling. The world order has changed irreversibly. Political developments across the globe in recent years pose serious challenges to global multilateralism and its aspirations for order, peace and cooperation.

...such as a new Bretton Woods, or a Bretton Woods 3.0.

The geopolitical rivalries in play today and fragmentation into a multi-polar world as we envisage present rising risks to the financial and real economies. Further, nations are faced with collective long-term challenges such as climate change, widening wealth gaps and income inequality and health pandemics, all of which represent looming crises. This highlights the importance of introducing fundamental reforms to the Bretton Woods multilateral system that are fit for the challenges of the 21st century. As global crises converge, now is the time for a new and better-suited Bretton Woods, what we refer to as Bretton Woods 3.0. The goal of the new system should be a stable, equitable and low-carbon economy.

We identify three key principles for Bretton Woods 3.0:

- reinforce the system of international governance and cooperation in an increasingly multi-polar world (including increasing the pace and scale of global reforms to enable a more environmentally sound, sustainable, and inclusive future);
- expand the scale and scope of the Global Financial Safety Net (GFNS); and
- build fiscal policy space at a global level to be allocated to individual nations according to need and circumstance.

The system of international governance and cooperation in an increasingly multi-polar world needs to be reinforced...

Threats such as climate change and pandemics are not bound by man-made political and economic borders. Without urgent and concrete reforms to the Bretton Woods system, there is a risk that independent policies across the globe work against each other, creating only losers in the long-end game of achieving a sustainable future. As stated in the G20 Eminent Persons Group report of 2018: "a new multilateralism must make this decentralised system more resilient and much stronger than the sum of its parts".[12] This could include a global carbon tax, complemented by aggressive and immediate subsidies for research in renewable and other green technologies. In short, there should be global regulations that prevent destructive unilateral economic actions blocking all nations of the world from realising common goals.

...and the scale and scope of the Global Financial Safety Net should be expanded.

The GFSN has expanded substantially in recent years, but its coverage remains uneven. Although the GFSN proved an effective liquidity backstop during the COVID-19 crisis, the delivery of support during the recovery has been more challenging. Diverging recoveries have put disproportionate pressure on emerging economies. Furthermore, regional financing arrangements have to date ignored the threats of climate change. Bretton Woods institutions should therefore include climate risk analysis in their surveillance activities.

There should be fiscal policy space at a global level, to be allocated to individual nations according to need and circumstance.

The use of fiscal policy during times of crisis can help mitigate the depth of the economic and social impact. But governments also have a key role to play in securing higher macroeconomic resilience ahead of the next crisis by, for example, directing investments towards sustainable infrastructure. However, emerging economies face greater challenges given tightening financial conditions in pursuing their development agendas. This is not only a threat to these economies but can also have global repercussions. In a 2010 report, former Vice President and Chief Economist of the World Bank Joseph Stiglitz and co-author Bruce Greenwald recommended the broadening out of existing SDR arrangements.[13] Such a proposal would incentivise countries to not maintain high level surpluses that weigh on global aggregate demand and allow the funds to be used for the pursuit of global public good (such as development and climate change). This would guarantee reliable access to international public finance.

[12] *Making the global financial system work for all*, Report of the G20 Eminent Persons Group on Global Financial Governance, October 2018

[13] J. Stiglitz, B. Greenwald, "Towards a New Global Reserve System", *Journal of Globalisation and Development*, 2010.

Re/insurers have a key role to play in the new monetary and financial world order as institutional investors and shock absorbers.

For the institutional audience, a key goal of Bretton Woods 3.0 should be to better address today's needs by promoting green and inclusive prosperity. The monetary magnitude of the development challenge facing the world cannot be taken on by any single economic agent. The huge investments needed to reach net zero alone only reinforce that mobilising private capital will be key.[14] This further emphasises the need to introduce global standards for long-term sustainable investing (see *The changing nature of ESG investing*). This should reach beyond climate change and address all other Sustainable Development Goals set by the United Nations. Looking beyond a Bretton Woods 3.0 system, the re/insurance industry specifically has an important role to play by engaging in long-term scenario modelling and diversification of risk. The industry can make societies and economies more resilient by strengthening public-private partnerships (PPP) to tackle risks like natural catastrophes, cyber and pandemic events. It can look to fulfil the functions of both institutional investor and shock absorber.

The changing nature of ESG investing

The withdrawal of capital from Russia after its invasion of Ukraine is the largest ESG action ever.

ESG refers to the assessment of environmental, social and corporate governance issues in investment decision-making. The withdrawal of capital from Russia's economy after the latter's invasion of Ukraine is one of the largest collective actions ever taken on ESG priorities. As of August 2022, over 1000 major companies and financial institutions had withdrawn.[15]

Investments in sustainable projects has increased, but more can be done.

Increased shareholder activism and a focus on ESG considerations has pushed significant pools of capital towards more sustainable projects. In 2021, sustainable bond issuance reached more than USD 1 trillion. This growth was spearheaded by green bond issuance that doubled to USD 630 billion and saw more than 1000 bond issues.[16] While this represents a 20-fold rise from 2014, it accounts for only around 7% of global debt issuance and less than 3% of the overall bond market. As of the first half of this year, the total sustainable debt universe has now surpassed the USD 4 trillion mark, with the green bond market accounting for more than a third of that. However, global ESG debt issuance fell to 15% below year-ago levels.[17]

Investors need to be wary of "greenwashing".

At the same time, climate litigation is picking up amidst heightened fears of green-washing for opaque ESG-labelled financial products and strategies, and companies, governments and even multilateral development banks can and will be held liable for not taking enough action against climate change. For example in May 2022, environmental groups said they would the Canadian government after it approved the USD 12 billion Bay du Nord offshore oil project in the Atlantic Ocean.[18] And on 24 March 2021, the German Federal Constitutional Court ruled that the Federal Climate Protection Act is partially unconstitutional due to insufficient emission targets beyond 2030.[19] As of end-2021, citizens and NGOs filed further lawsuits against German states to improve climate policy. In the US, the Securities and Exchange Commission has proposed rules to enhance disclosure and standards for funds making ESG claims.

The E, S and G are interdependent: investors should avoid potential trade-offs between the three when choosing where to allocate capital.

With the push to further ramp up ESG investments, more attention is needed on issues surrounding the "S" and the "G", and how they relate to the "E". The war in Ukraine illustrates how near-term trade-offs can arise between the three. For example, this year governments are switching to coal (hampering the "E") to decouple from Russia (in favour of the "G") and deal with the immediate "cost-of-living" crisis (in favour of the "S"). The three letters in ESG should not be regarded as separate components.

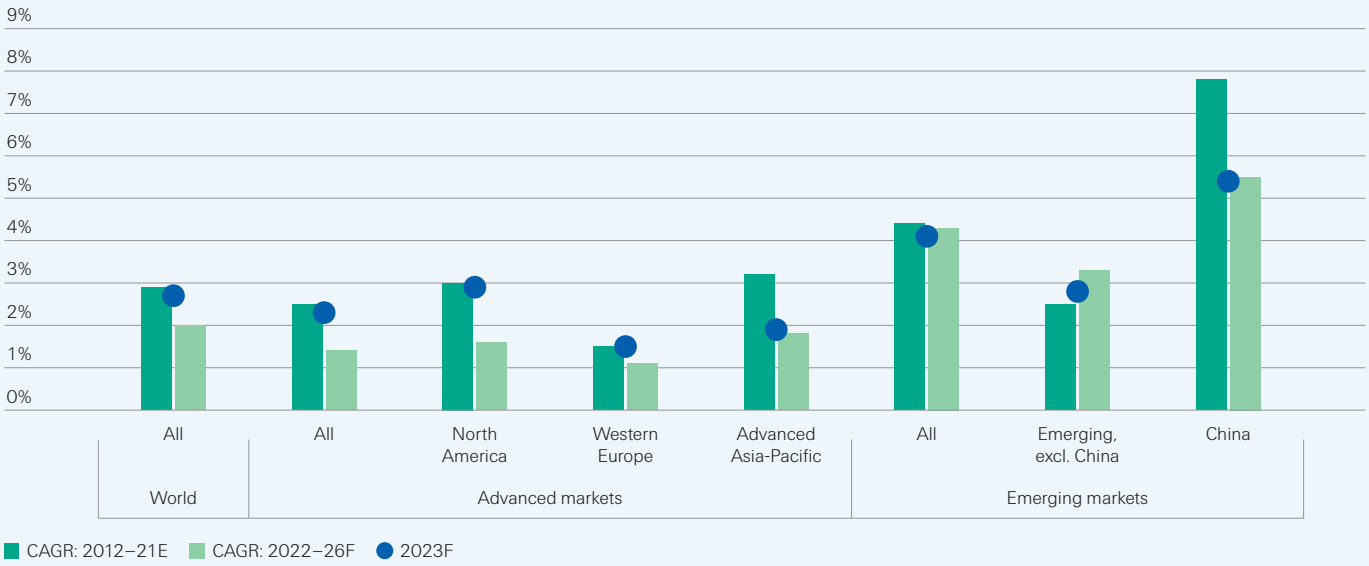
[14] Watch out for an upcoming Swiss Re Institute publication on the so-called "climate investment gap". Publication target currently October 2022.
[15] *Over 1,000 Companies Have Curtailed Operations in Russia – But Some Remain*, Yale School of Management, August 2022.
[16] Sustainability-linked loans and bonds also surged to more than triple their previous record of USD 586 billion. Based on data from Bloomberg New Energy Finance.
[17] *Sustainable Debt Universe Tops Record $4 Trillion in Q2*, Sustainable Debt Monitor, Institute of International Finance, 20 July 2022.
[18] "Environmental groups sue Canada over Bay du Nord oil project approval", *reuters.com*, 11 May 2022.
[19] *Constitutional complaints against the Federal Climate Change Act partially successful*, Bundesverfassungs-gericht, 29 April 2021.

Insurance: maintaining resilience in a multi-polar world

Global fragmentation will introduce operating complexities for insurers.

Insurers will remain agents of resilience in a multi-polar world. The operating environment may be more challenging, with geopolitical fragmentation translating into diverging operating and regulatory environments in different jurisdictions (see *Challenges insurers will face in the shift to a multi-polar world*). The risk landscape will change and commercial insurance most of all will remain a mainstay of resilience, for instance with solutions that help businesses manage cash flow volatilities as supply chains change.[20] For the P&C sector overall and in a no-change world, we currently forecast that global real premiums will grow by around 2.7% in 2023 and by on average by 2.0% annually from 2022 through to 2026 (see Figure 2). The advanced markets will contribute most of the global premium growth over the next five years (69%), with the emerging markets adding 31%. In a multi-polar world as we envisage, supply chain restructuring, the green economy and efforts to ensure global food security will likely generate new insurance demand, notably from advanced markets. That could change the status quo of many years of emerging markets being the main engine of global insurance market growth.

Figure 2
P&C premium growth forecasts in real terms (2022–2026)



Source: Swiss Re Institute

Insurers will face regulatory fragmentation and potentially also restricted access to markets, and reduce insurability.

Challenges insurers will face in the shift to a multi-polar world

Diversification is a fundamental part of how insurers create value and it ultimately provides efficient and effective cedant protection – a key aim of lawmakers and regulators. This can arise from different lines of business but also from different geographical locations. As a result, a loss event within one product line or a local market can be absorbed by the return on other policies not affected by that event. Geopolitical tensions and insular approaches to policymaking at national levels contribute to less international alignment. Instead, regulation and supervision are driven by national authorities in their respective jurisdictions. This leads to increased regulatory fragmentation and market access restrictions (eg, impacting outsourcing possibilities via data localisation requirements). This trend also affects new regulatory developments addressing global issues, such as sustainability/climate change or digitalisation, with regulators not always following a consistent approach, creating potentially unintended market entry barriers. The localised requirement on data and regulatory disparity in the field of digitalisation can also reduce insurability and the development of new insurance products.

[20] *sigma* 5/2017 – Commercial insurance: innovating to expand the scope of insurability, Swiss Re Institute.

There could also be restrictions on free flow of capital.

For international diversification to work, insurers also need to be able to reinsure and invest their premium income internationally, to pay local claims and to move their capital from one jurisdiction to another. Restrictions on the free flow of risk and capital curtail their ability to move funds to cover major events. Deposit or collateral requirements and limitations to intragroup reinsurance, which compel reinsurers to maintain specific funds within the country to cover their liabilities, may serve as an example of such restrictions. Such policies lead to a fragmentation of reinsurers' capital base and reduce global risk pooling, requiring companies to maintain larger capital funds than otherwise needed. The servicing of that capital adds to the cost of reinsurance, and this has to be reflected in reinsurance pricing.

A silver lining for insurers

Higher interest rates will support insurance sector profitability over the medium and longer terms by yielding higher investment returns.

Higher interest rates are a silver lining for the insurance industry. Insurers will, over time, benefit from improved investment returns as their bond portfolios gradually roll over into higher yields. Moreover for P&C insurers, the low-rate environment of the past decade has put underwriting results under pressure,[21] even though the sector profited from mark-to-market gains in risky assets and fixed income investments. For 2023, the anticipated increase in interest rates may help ease the pressure on underwriting results. For the G8 markets and on a median basis, we estimate that underwriting margins will need to rise by 4–5 percentage points (ppt) in order to meet ROE expectations, compared with an underwriting gap of 6–9 ppt previously.

The lag between government bond yield changes and combined ratios is less relevant for P&C insurers.

On a long term view, the P&C combined ratio[22] moves roughly in line with interest rates when adjusting for shorter-term underwriting and a lag of a few years. Over the past 100 years, the correlation between the combined ratio and lagged government bond yields has been about 70%. However, the relevance of these interactions becomes very small when looking at short-term (quarterly or annual) changes in interest rates and the impact on combined ratios of P&C insurance. This means that in contrast to a significant long-term relationship, interest rates play only a minor role in explaining short-term changes in underwriting metrics, as the underwriting cycle and claims event risks become more dominant. Additionally, given the much shorter-term nature of the liabilities, asset and liability matching is not as difficult for P&C as for life products. This lessens the balance sheet concerns that can arise from a mismatch.

[21] *Lower for even longer: what does the low interest rate economy mean for insurers?*, Swiss Re Institute, September 2020.

[22] The combined ratio combines the claims ratio (incurred losses divided by earned premiums) and the expense ratio (expenses divided by earned premiums), a metric for underwriting profitability.

Real economy driver 1: supply chains

Reshoring and friend-shoring by advanced markets are indicative of the shift to the multi-polar world we envisage. In our simulation exercise, despite reducing world trade flows, reshoring would boost annual global GDP by 0.2% over five years, with the US, UK and Germany benefitting most. Export-substitution countries with higher external trade dependency such as Mexico and Vietnam lose most in a reshoring scenario but, conversely, gain most from friend-shoring activity. China loses share of global trade in both scenarios, but we believe it will maintain sustainable growth with its "dual circulation" strategy. Reshoring activity would generate USD 30 billion in global commercial insurance premiums over the five years, mostly from engineering, property and liability covers. Marine and trade credit premiums would fall. Friend-shoring would generate USD 3 billion in premiums.

Reshoring and friend-shoring

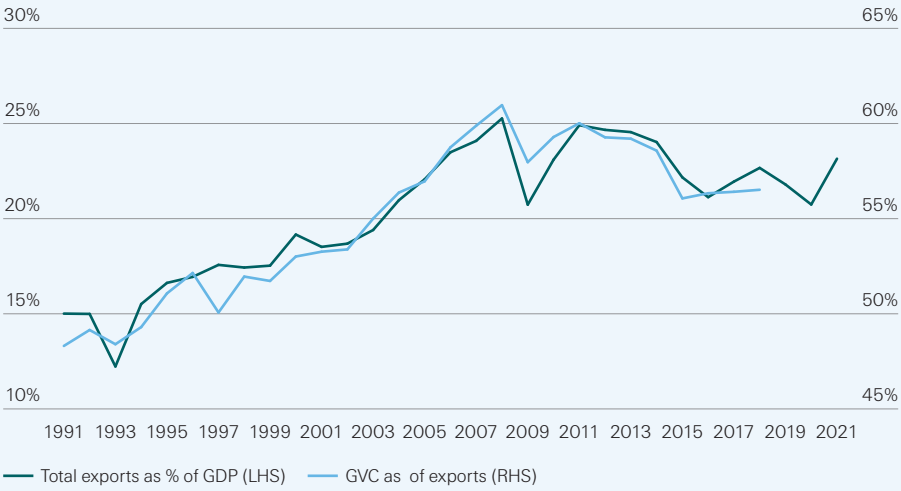
Global merchandise trade has been slowing since 2012.

Momentum in global trade has slowed in recent years, in part due to slowing global economic growth and rising protectionism – symptomatic, in our view, of rising deglobalisation sentiment. The impact has been compounded by a rising number of tariff and non-tariff barriers such as quotas, bailouts, state aid and trade defence measures. In addition, the shift in China's growth model from investment to domestic consumption-led has reduced its need for capital goods imports and also its export of intermediate goods.[23]

Restructuring of supply chains has contributed to the slowdown.

The total foreign value-added component embedded in exports, measured by the amount of global value chain (GVC) as percentage of gross exports, has also moderated (see Figure 3). At the core of the trade slowdown is a reconfiguration of the global supply chain. The comparative cost advantages that drove the formation of global supply chain in the first place had already peaked before COVID-19.[24] Going forward, we expect restructuring will be driven more by non-economic factors such as national security and geopolitical considerations.

Figure 3
Global trade and supply chain participation



Source: UNCTAD-Eora, WTO, Swiss Re Institute

[23] "Global trade: what's behind the slowdown?" in *World Economic Outlook*, IMF, October 2016; *The global trade slowdown and its implications for Emerging Asia,* Federal Reserve Bank of San Francisco, 18 November 2016

[24] *sigma* 6/2020: De-risking global supply chains: rebalancing to strengthen resilience, Swiss Re Institute.

The pandemic prompted advanced countries to consider "re-shoring" production activities.

The pandemic served as a wake-up call for advanced economies to become more supply-chain resilient, not least to mitigate hold-ups to delivery in key sectors such as healthcare and electronics. To strengthen supply chain resilience, many advanced countries have been discussing "re-shoring" part of overseas production activities back home, and raising local procurement rates. For example, the European Commission recently passed the "EU Chips Act" with the aim of strengthening the EU's technological sovereignty and doubling its global market share in semiconductors to 20% by 2030.[25] And in Japan, the prime minister has created a new cabinet post – Minister for Economic Security – indicative of the growing concern over increasing links between trade and security considerations.[26]

The concept of "friend-shoring" is gaining traction, rapidly.

The war in Ukraine has implications for supply chains beyond the sanctions imposed on Russia's energy exports. Earlier this year, US Treasury Secretary Janet Yellen spoke of the pivotal role of China in the global economic order.[27] She proposed the "friend-shoring" concept whereby the US, rather than being highly reliant on countries with which it has testy relations, should diversify its group of suppliers and "partner with countries that have strong adherence to a set of norms and values".[28] Two weeks later, President of the European Central Bank (ECB) Christine Lagarde echoed the friend-shoring framework as a policy goal in Europe's supply chain strategy.[29] Since then, more partnering initiatives under this new political philosophy have been formed, such as the newly-created US-EU Trade and Technology Council and the Indo-Pacific Economic Framework. Such moves indicate further progression towards the multi-polar world we envisage.

Economically speaking, supply chain restructuring may yield sub-optimal outcomes.

This restructuring of global supply chains comes at the price of less efficient production processes, as national governments impose more explicit and implicit non-tariff barriers on cross-border goods and service flows, and private sector firms are forced to adapt to these institutional hurdles. The outcomes can include, for instance, firms having to increase inventories, reduced labour force diversity, and restrictions on technological transfer, also within multinationals. There is also risk of technological fragmentation, as parallel supply chains give rise to different industrial standards in production processes, especially in the hi-tech space (eg, different standards on 6G).

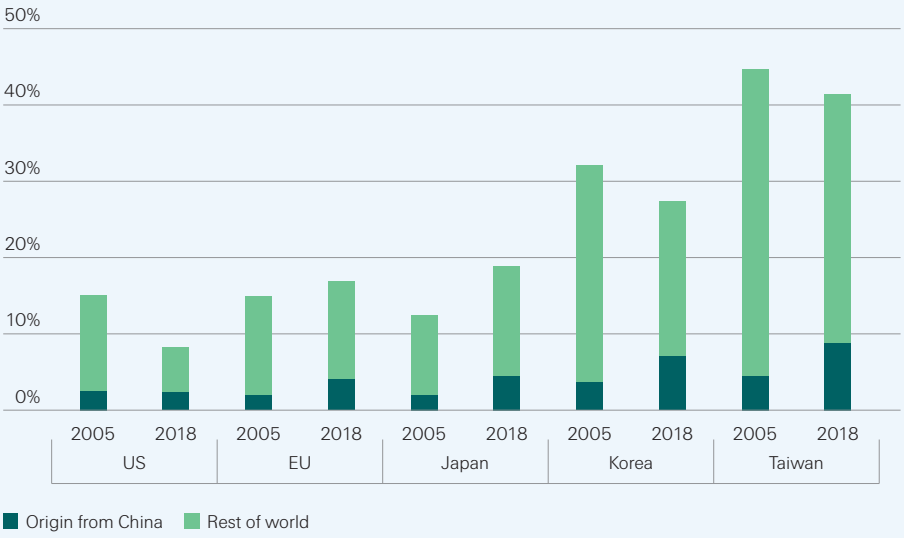
The semiconductor production process has proliferrated globally.

Semiconductors: complex supply chains with many interdependencies

One sector much impacted by the supply chain disruptions of recent years is semiconductors, which account for a significant share of intermediate goods trade flows across the global value chain. The fundamental rationale of globalisation in this sector has been manufacturers in advanced markets seeking to leverage regional comparative advantages, by locating labour-intensive, lower-value-add, and back-end assembly and test functions in countries with lower cost of labour, such as Malaysia, Taiwan and China. The capital saved, meanwhile, has been reallocated to higher value-add activities, such as R&D and front-end processing in home markets. This has supported the proliferation of semiconductor production globally. Only recently has the maturation of supply chains and wage catch-up in emerging markets led to a stabilisation of foreign value-added embeded in each economy's gross exports of electronic and electric equipment. That said, the share of foreign content originating from China has edged up across major exporting markets, except for the US (see Figure 4), demonstrating China's move up the manufacturing value chain.

[25] *European Chips Act,* European Commission, February 2022.
[26] "Cabinet approves bill to beef up Japan's economic security", *Japan Times*, 25 February 2022.
[27] *Transcript: US Treasury Secretary Janet Yellen on the next steps for Russia sanctions and 'friend-shoring' supply chains*, Atlantic Council, 13 April 2022.
[28] Ibid.
[29] *A new global map: European resilience in a changing world*, European Central Bank, 22 April 2022.

Figure 4
Foreign value added in gross exports of electronic and electrical equipments by country of origin



Source: OECD Trade in Value Added (TiVA) database, Swiss Re Institute

Many countries are looking to make the production process more home-grown and more secure.

Ever since trade relations between the US and China have become more strained, and also the outbreak of pandemic, policymakers in many countries have introduced a variety of incentives to increase domestic production and achieve more semiconductor self-sufficiency. However, building parallel supply chains takes time. The value chain for semiconductors is long and complex, including the production of chips, the technological inputs into equipment, materials, services and intellectual property.

However, building parallel supply chains takes time.

At each node of the production process, some companies have a dominant role. For example, ASML in the Netherlands is virtually the only producer in the world of the lithography machines required to produce advanced microchips.[30] And Tokyo Electron has significant market share of Wafer Fab Equipment (WFE) manufacturing.[31] China is making advances in the production of fabless and its foundry capacity in order to develop a more complete semiconductor production ecosystem at home. All in all, given the complexity of the production process, it will likely take many years for countries to develop the technologies to both build more self-sufficiency in semiconductors and make the production process cost competitive.

A fragmented multi-polar world could see development of multiple global technology standards.

In a multi-polar world, we believe advanced countries will seek to continue to diversify their supply chains, also in the semiconductor sector. This could result in multiple global technology standards, one for China (and some of its allies) and one for the rest of the world. For example, it could be that west and China pursue different standards for 6G telecommunications, which would result in two parallel supply chains. Some companies are already taking action to shield themselves from such fragmentation. For example, to eliminate the costs of substitution and nurture more standardisation, General Motors recently announced that it is developing three new families of microcontrollers that will reduce the number of unique chips on future vehicles by 95%.[32] Whether countries adopt a re- or friend-shoring strategy, manufacturers will face more challenges in technology transfer. The inherent inefficiencies will mean higher costs of production which, ultimately, may pass on to consumers.

Winners and losers

We simulate import and export "shocks" in a macro quantitative model.

To examine the relative winners and losers under the reshoring and friend-shoring scenarios, we make use of Oxford Economics' macro model,[33] and study the impact of imposing different export and import shock assumptions. We focus on five sectors that

[30] "ASML is the only company making the $200 million machines needed to print every advanced microchip", *CNBC*, 23 March 2022.
[31] *Top of Mind: Deglobalization ahead?*, Goldman Sachs, 28 April 2022.
[32] "GM aims to tackle chip shortage with new designs made in North America ", *Reuters*, 19 November 2021.
[33] Oxford Economics' macro model is a quantitative general equilibrium model that takes into consideration the monetary and fiscal policies within each economy, as well as the trade and financial linkages across countries. At this moment, its forecast horizon extends to the end of 2027.

are key to economic security and are also highly integrated into the GVC:[34] auto, electronics, machinery equipment, pharmaceuticals and medical equipment.[35] These sectors accounted for about 40–50% of advanced market imports in 2020.

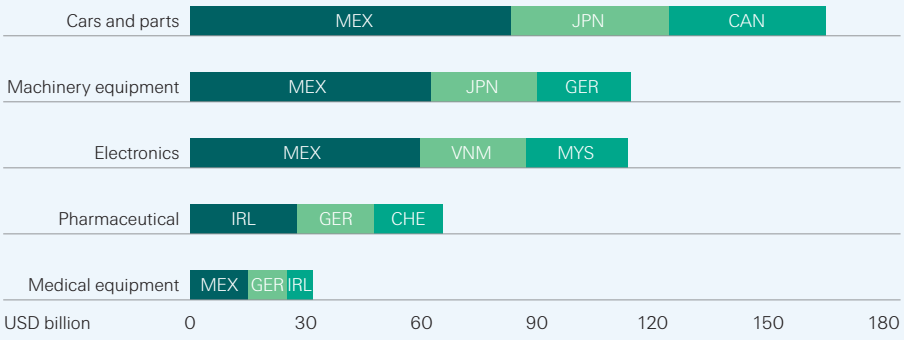
Reshoring assumption: advanced countries bring home 10% of their imports over five years

For the reshoring scenario, we assume major advanced countries including the US, UK, Germany and Japan bring home 10% of their real imports over a 5-year horizon, and increase domestic private investment (estimated by applying the respective long-term average capital-to-output ratios to capital stock).[36] The 10% import return is a plausible assumption given the highly integrated global supply chain and a likely maximum amount of manufacturing production that one country can reshore, which we see as being around 30%.[37]

Friend-shoring scenario model assumptions.

For the friend-shoring scenario, we estimate the relative gains of "friend" countries' exports by substituting China's exports to the US and EU,[38] as follows. First, we collect the data for US and EU imports by key sectors and source countries, and identify the Top 3 alternative source countries for each sector within each economy (see Figure 5 for the US example). Next, we assume the US and EU reduce their imports from China by 30% over a 5-year horizon and turn to the three alternatives to fill the production gap.[39, 40] Lastly, we aggregate these trade-diversion effects across sectors and calculate the trade effect on all substituting countries. Accompanying the shock assumption on exports, we apply the similar capital-to-output multipliers for respective countries as in the re-shoring scenario.

Figure 5
US imports from top alternative countries besides China, by sector (2020)



CAN: Canada, CHE: Switzerland, GER: Germany, IRL: Ireland, JPN: Japan, MYS: Malaysia, MEX: Mexico, VNM: Vietnam

Note: In 2020, China accounted for 33.3% of US final imports in electronics, 27.8% in machinery equipment, 13.9% in medical equipment, 5.4% in cars and parts and 1.6% in pharmaceuticals.
Source: UN Comtrade, Swiss Re Institute

[34] Industry categories are based on *Harmonised System* classification.
[35] "Global Trade and value chains during the pandemic", in *World Economic Outlook*, IMF, April 2022.
[36] A. Marquetti, "A cross-country non parametric estimation of the returns to factors of production and the elasticity of scale", Nova Economia, vol 17, 2007; R. Feenstra et al. "The Next Generation of the Penn World Table". *American Economic Review*, vol 105, 2015: C. Holz, *China's Investment Rate: Implications and Prospects*, CESifo Working Paper, No. 6496, 2017.
[37] *Trade and the global Value Chains: The Challenging Trade Environment and Changing Global Value Chain Landscape*, Asian Development Bank, 2021.
[38] We exclude Japan in the friend-shoring scenario, as we see complementary trade-facilitation mechanisms as further enhancing the trade links between Japan and China, such as the Regional Comprehensive Economic Partnership that came into effect on 1 January, 2022. For more details, see *The Regional Comprehensive Economic Partnership: a new mega trade bloc for Asia*, Swiss Re Institute, July 2022.
[39] We consider a 30% reduction in Chinese exports as a moderate assumption, as in some sectors such as electronics and machinery equipment, China's export volume outstrips the second-largest producer country by almost 100%. It takes time for the alternative trade substitution countries to build up the production capacity to fill in the gap.
[40] Our trade diversion assumption is focused on final goods, when US' true dependency on China's auto parts input, for example, is much higher than the observed final goods trade data, see "Trade conflict in the age of Covid-19", *VOXEU*, 22 May 2020. Also, as global supply chains get more complex, one final good may cross borders multiple times in its production process. As a result, we may miss the information on intermediate goods flow in the modelling.

Over the 5-year period, the model simulates that reshoring will boost global GDP by 0.18%. Friend-shoring yields a net loss.

Table 1 presents the average annualised percentage deviation of key macro variables from baseline, based on the shock assumptions on imports and exports as above. In the reshoring scenario, there is a global slump in trade activity as manufacturers in many advanced markets move production capacity back home. But, given the additional impetus in plants and equipment investment to expand production domestically, the real GDP growth effect within the reshoring countries over the assumed 5-year transition period is positive, and outweighs the growth loss in the rest of countries (including China). The result is an average annual 0.18% boost to world aggregate GDP. In contrast, in the friend-shoring scenario there is a net aggregate economic loss of 0.04% per year, as the "forced" shift of production from China to "friend" countries proves more costly on account of lost efficiencies (for instance on account of foregoing lower wages, availability of local industry clusters etc).

The US, UK and Germany benefit most in the reshoring scenario.

Across regions, import substitution countries under reshoring strategy and the export substitution countries under friend-shoring case will benefit most. China will lose share of global trade under both scenarios. The relatively robust GDP performance of the US, UK and Germany in the reshoring scenario despite drops in external trade is consistent with the recent findings of a World Bank working paper.[41] In terms of impact magnitude, countries with higher external trade dependency like Mexico and Vietnam, will win and/or lose more under either scenario. Some small countries like Switzerland are also sensitive to trade diversion flows as it is more difficult to diversify manufacturing capability across sectors locally.

Table 1
Annual average percentage trade deviations from our baseline under reshoring and friend–shoring scenarios, and investment and GDP impacts (2022–26)

	Reshoring				Friend–shoring			
	Exports	Imports	Private investment	Real GDP	Exports	Imports	Private investment	Real GDP
US	–1.43%	–3.67%	1.75%	1.18%	0.72%	0.30%	0.13%	0.09%
Japan	–1.95%	–3.39%	0.93%	0.61%	0.86%	0.52%	0.24%	0.16%
UK	–1.25%	–3.19%	2.07%	1.54%	1.43%	0.92%	0.58%	0.41%
Germany	–1.82%	–3.51%	2.36%	1.67%	0.24%	0.18%	0.14%	0.09%
China	–1.95%	–1.55%	–0.44%	–0.38%	–2.75%	–2.00%	–0.56%	–0.50%
Canada	–2.73%	–1.57%	–0.99%	–0.80%	0.09%	0.05%	0.02%	0.02%
Switzerland	–2.10%	–1.81%	–1.56%	–0.92%	0.16%	0.13%	0.10%	0.07%
Malaysia	–0.25%	–0.22%	–0.14%	–0.11%	1.29%	0.98%	0.59%	0.52%
Mexico	–3.62%	–3.04%	–1.27%	–0.92%	4.28%	3.56%	1.44%	1.06%
Turkey	–1.92%	–1.40%	–0.55%	–0.46%	0.28%	0.19%	0.08%	0.07%
Vietnam	–3.89%	–3.39%	–2.39%	–1.79%	4.76%	4.24%	2.74%	2.13%
World				**0.18%**				**–0.04%**

Source: Oxford Economics Macro Model, Swiss Re Institute

Both scenarios would render a loss in productivity over the long term.

Our simulation results do not include an estimation of the lower overall productivity growth beyond our forecast horizon that would likely result by shifting away from most efficient way of production. In the long run, we expect there would likely be a small negative effect on global growth. In addition, we expect a higher inflation impact in advanced economies in the reshoring as opposed to the friend-shoring scenario. This is because the new steady state of parallel supply chains is based on more capital-intensive production in the advanced and less labour-intensive production in emerging economies. Also the results above are based on GDP-level analysis, and could be quite different when on a gross national product (GNP) basis, as a large share of the external trade and investment in emerging markets are via foreign direct investments (FDI) and among multinationals. For example in 2021, foreign-invested enterprises accounted for 36% of China's total foreign trade volume.[42]

[41] *Pandemic, Climate Mitigation, and Reshoring: Impacts of a Changing Global Economy on Trade, Incomes, and Poverty*, Policy Research Working Paper, The World Bank, March 2022.
[42] *Review of China's Foreign Trade in 2021*, General Administration of Customs, January 2022.

The "China+1" strategy is another strategy firms are using to make supply chains more secure.

In the face of increasing trade frictions between China and the US, many firms have adopted a "China+1" strategy: supplementary overseas facilities to their main China production base.[43] This involves producing in China for the Chinese and non-US markets, and operating elsewhere to supply the US. The strategy does not represent wholesale relocation, but branching out to diversify and reduce reliance on China, and to take advantage of lower wages elsewhere.[44] That reshoring, friend-shoring or China +1 lead to more resilient supply chains is open to debate. Imposing trade barriers to force the global supply chain to fit into the new multi-polar world envisioned may risk losing comparative advantages and add exposure to supply and/or demand-side shocks, especially in the highly-GVC-interlinked sectors. To improve supply chain resilience, transparency and diversification are key.[45] On that front, in any new world configuration governments will have important role to play to facilitate information flow, invest in trade and digital infrastructure, reduce trade costs and minimise policy uncertainty.

China's response function: the dual circulation strategy

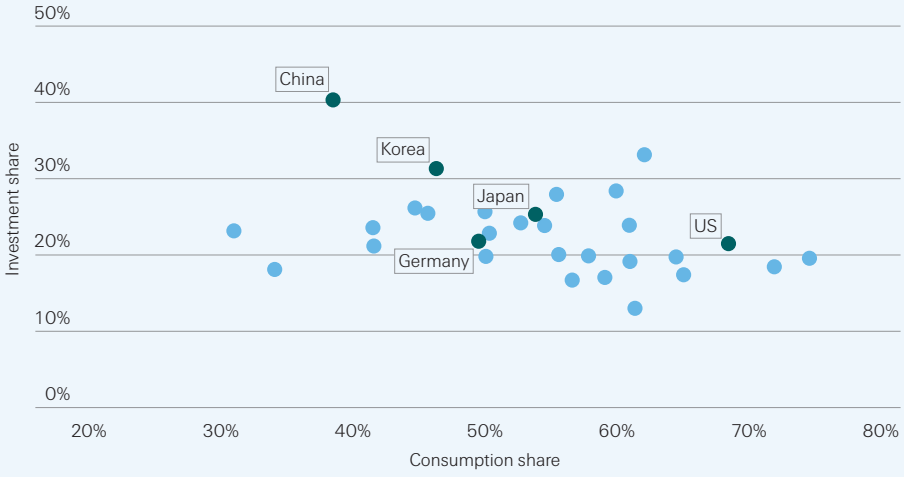
The dual circulation strategy will define China's growth strategy as world trade alliances evolve.

China's "dual circulation" strategy emphasizes a balance of self-sufficiency and internationalisation. It was introduced by President Xi in May 2020, the intention being to take advantage of China's large economy and market scale to facilitate "internal circulation" by increasing domestic demand and supply-side reform, while at the same time further opening up the economy. The government has been formalising dual circulation as a new, long-term growth strategy against the backdrop of US-China trade tensions and economic downturn brought about by the pandemic. Along with moderating outward investments in the Belt & Road participating countries[46] and expected supply chain restructuring actions by advanced countries, the strategy will be key to China's growth trajectory as new world order takes shape.

So far, progress in the shift to a domestic-consumption led growth has been mild.

Serving as the world's factory, China has relied heavily on global demand in the last decades. The government has been calling for a transition of its growth model from exports and investment-driven to one that is domestic consumption-led, but to date progress on this front has been mild. Since its RMB 4 trillion economic stimulus programme in the aftermath of the global financial crisis, the share of investment in total GDP remains high by global standards (see Figure 6) and has only recently started to taper off. A positive outcome is that as part of what has in effect been its own reshoring exercise, China has built a full spectrum of supply chain in many sectors and has become less reliant on imported capital goods.

Figure 6
Global comparison of the distribution between investment and consumption in GDP share (2021)



Source: Oxford Economics, Swiss Re Institute

[43] "Understanding the "China, Plus One" Strategy", *Procurement Bulletin*
[44] "A 'China-Plus-One' Strategy: The Best of Both Worlds?", *Human Systems Management*, vol. 30, 1 January 2011.
[45] IMF, April 2022, op. cit.
[46] *Belt and Road Initiative – 2H2020, Belt and Road Initiative – 1H2021*, Swiss Re Institute, 13 August 2021.

Demand- and supply-side reforms should support China's "internal circulation" strategy.

On the other hand, the contribution of consumption to GDP growth remains weak and China still has one of the highest savings rates in the world. To spur domestic consumption, there have been calls for increased government spending in healthcare, pensions and unemployment insurance to promote a safety net and reduce household savings, and also supply-side reform for more efficient allocation of labour, land and capital. We believe these measures will help China cushion the negative impact from shifting global trade dynamics/external pressures to achieve sustainable economic growth, albeit lower than in the past decade.

Keeping supply chains resilient

P&C insurers can help manufacturers mitigate the risks of supply chain restructuring.

In a multi-polar world in which advanced market manufacturers re- and/or friend-shore production, the advent of parallel and multiple supply chains with shifting suppliers and relocation of production facilities will make operational processes and trade in intermediate goods more complex. Insurers can help. A number of insurance solutions can help to smooth the functioning of business and commercial transactions, both nationally and internationally.[47] Along with the advances in technology such as Big Data analytics, we expect innovative P&C insurance covers will play increasingly important role in de-risking disruptions to supply chains (see Table 2).

Table 2
P&C solutions to mitigate risks in global supply chain restructuring

Insurance solution	Description
Business interruption (BI) insurance	Providing cover for risk of disruptions to production processes resulting from physical damage at the insured's manufacturing site.
Contingent business interruption (CBI) insurance	Reimbursing a company for extra expenses incurred and profits lost due to interruption of business operations at a third-party premise.
Supply chain insurance	Covering BI due to disruption or delay in the receipt of products or services from a named supplier, but where there is no physical damage to property is involved.
Non-damage business interruption (NDBI) insurance	Covering events such as pandemics, strike, civil unrest, or military action, and/or where regulatory actions, political risk or disaster events lead to significant delay or disruption in receipt of products or services from a supplier, even when there is no physical damage at an insured's own or a third-party location.
Political risk insurance	Mainly in two forms: ■ Investment insurance covers FDI against political interference and other risks such as expropriation and confiscation of assets, import/export embargos, selective discrimination and forced divestitures. It can also protect against inconvertibility of local into hard currency, and inability to transfer hard currency out of a country. ■ Sovereign non-payment covers protect firms that sell products or services to government.

Source: Swiss Re Institute

Reshoring to generate USD 30 billion in commercial insurance premiums
With the solutions outlined, commercial insurers will help mitigate the risks inherent in re- and friend-shoring activities. Tables 3 and 4 summarise our forecast premium impacts of the parallel supply chain scenario on different lines of business in the reshoring and friend-shoring scenarios, in a forecast period of 2022 to 2026. All numbers are estimated based on constant penetration assumption, while not taking potentially rising premiums rates into consideration. The estimates are at best tentative given the extreme uncertainties related to evolving geopolitical tensions.

[47] For more details of each insurance product covering supply chain risks, see *sigma* 6/2020, op. cit.

Table 3
Impact on insurance premiums from supply chain reshoring (cumulative between 2022–2026F)

	Incremental exports		Additional investment			Total
(USD billion)	**Marine**	**Credit & surety**	**Engineering**	**Liability**	**Commercial property**	
Advanced markets	–1.8	–1.3	1.3	20.1	16.0	34.4
Emerging markets ex China	–0.3	–0.2	–0.1	–0.1	–0.3	–1.0
China	–0.5	–1.6	–0.1	–0.5	–0.2	–2.9
Total	**–2.6**	**–3.0**	**1.1**	**19.5**	**15.5**	**30.5**

Note: total premiums impact numbers may be subject to rounding error in some lines of business calculation. Source: Swiss Re Institute

Table 4
Impact on insurance premiums from supply chain friend-shoring (cumulative between 2022–2026F)

	Incremental exports		Additional investment			Total
(USD billion)	**Marine**	**Credit & surety**	**Engineering**	**Liability**	**Commercial property**	
Advanced markets	1.1	0.5	0.1	2.2	1.8	5.8
Emerging markets ex China	0.4	0.2	0.1	0.1	0.3	1.1
China	–0.7	–2.2	–0.1	–0.7	–0.3	–3.9
Total	**0.8**	**–1.5**	**0.2**	**1.6**	**1.8**	**2.9**

Note: total premiums impact numbers may be subject to rounding error in some lines of business calculation. Source: Swiss Re Institute

Marine and credit premiums would decline in our re- and friend-shoring scenarios over the next five years.

Ocean marine and trade credit insurance

We estimate that demand for ocean marine and the accompanied trade credit insurance would, on aggregate, fall under constant penetration rate assumptions.[48] In the reshoring scenario, marine trade volumes would likely slow as a result of import substitution, while the relocation of manufacturing in friend-shoring, while not necessarily impacting trade intensity, would see a re-routing of the global trade map. Historically, there is a strong correlation between growth of global merchandise trade and marine insurance business and at a global level, we estimate a USD 2.6 billion decrease in marine premiums, and a USD 3.0 billion reduction in trade credits insurance premiums under the reshoring scenario.

Re- and friend-shoring will generate investment in new infrastructure and production facilities in home/host countries.

Engineering and property insurance

Along with the build-up of local manufacturing facilities among import substitution countries under reshoring and export substitution countries under friend-shoring, we expect there will be a flourish in new infrastructure and factories investment and hence demand for engineering insurance, as 80–90% of global engineering insurance business is driven by construction. The main coverages include delay in start-up; third-party liability; contractors' plant & equipment; existing assets; and construction, erection and builder's all risk.[49] And once the construction projects are completed, more property insurance premiums could potentially be generated through the operational phase, including from supply chain and BI covers.

Commercial property premiums would grow by USD 15.5 billion as a result of reshoring…

At the global level, and offsetting the premiums loss in China as part of its production facilities close down, we estimate a one-time insurance demand effect of USD 1.1 billion for engineering covers and USD 15.5 billion for commercial property insurance premiums over five years, when the main advanced countries re-shore 10% of their manufacturing capacity back home.[50] This is a result of the higher capital investments and higher insurance penetration in the import substitution countries. Under the friend-shoring strategy, the net premiums impact is more benign (a USD 0.2 billion- gain in

[48] Under such an assumption, we are using standard premium rates to gauge the impact on credit & surety insurance, while there could be significant improvement on firms' risk awareness as trade activities are increasingly challenged by trade barriers, tariffs and changing regulations.
[49] *sigma* 2/2018, Constructing the future: recent developments in engineering insurance, Swiss Re Institute.
[50] For each country's total property insurance business, we assume that in advanced markets, 50% of total premiums come from commercial property, and 80% in emerging markets.

engineering and USD 1.8 billion in commercial property premiums), as the trade diversion partially shifts to some lower-cost emerging countries.

Other commercial lines

...and there would be an additional USD 19.5 billion in liability premiums over the five years.

Manufacturing operations in new host countries will generate additional demand for liability and other lines of commercial insurance. The global supply chain is intricate and composed of dynamic markets with different laws and judicial systems, and we expect there will be increased demand for public liability, product liability and employer's liability insurance during both construction and operational phases. At the global level, we estimate there will be USD 19.5 billion of new liability premiums in the reshoring scenario, and USD 1.6 billion when advanced markets friend-shore. Meanwhile, with the rising geopolitical and further fragmentation of supply chains in certain technology sectors, there will likely be increasing demand for cyber risk covers, which will further expand the risk pool for insurability.[51]

China's response function matters

China will compensate for the loss in external trade by raising the manufacturing value chain at home and increased consumption.

The above analysis focuses on a few commercial insurance lines only, and assumes that China takes no counter measures to cushion the negative impact from reduced external trade. As outlined above, China has been engaged in reshoring activity for a couple of years already, by moving up the manufacturing value chain and building up industry clusters locally. In growth terms, the loss of external trade will be compensated for by a rise in domestic activity and the shift from investment to consumption-led growth model, which will over time boost domestic private consumption. The latter will increase demand for non-life and life personal insurance.

[51] *sigma* 1/2017, Cyber: getting to grips with a complex risk, Swiss Re Institute.

Real economy driver 2: going green

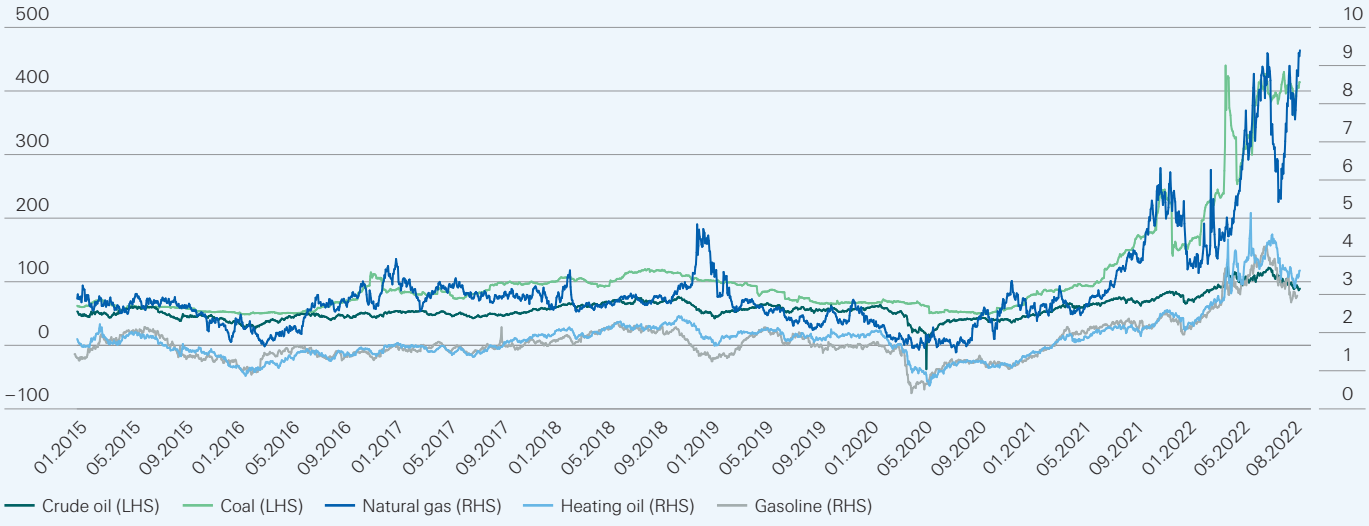
Heightened concerns over energy security after Russia's invasion of Ukraine has focussed attention on the need to accelerate the transition to green energy from fossil-fuel dependency. Many countries have targets for investments in renewable energy capacity and we estimate that meeting those targets would generate cumulative global insurance premiums of USD 237 billion by 2035 from, for example, construction and engineering all risk, delay in start-up, property damage and BI covers. However, renewables are just one component of the journey to net zero; to reach the Paris Agreement goal on temperature rise, all sectors of the economy must decarbonise. The fight against climate change requires global action and to this end, a multi-polar could be sub-optimal. Fragmentation based on geopolitical and security concerns could potentially impede the global coordinated action required to effect meaningful outcomes.

A focus on energy security, and climate change

The war in Ukraine has given rise to fears around energy security.

Russia's invasion of Ukraine has led to widespread energy national security concerns and a spike in energy prices, adding new urgency to progress the transition from fossil fuels to renewable sources of energy. In 2021, Russia was the first, second and third biggest exporter of natural gas, crude oil and condensates, and coal, respectively.[52] After the invasion, energy prices soared (see Figure 7) and supplies tightened as countries scramble to reduce dependence on Russian supplies.

Figure 7
Energy price developments (left, USD per unit crude oil and coal; right, USD per unit of natural gas, heating oil, and gasoline)



Source: Bloomberg

Green energy capacity is not yet at that level to be a reliable alternative to fossil fuels.

The war has triggered renew focus on energy security and the need for accelerated deployment of clean energy technologies. As of today, however, renewable energy supplies are not yet at the level to be a reliable alternative to fossil fuels. As a result, carbon emissions may well rise this year as governments turn to more polluting and cheaper forms of energy such as coal, both to secure energy independence/supplies and to alleviate the current "cost-of-living" crisis facing many households. Germany, for example, has announced a temporary recourse to coal to reduce gas consumption (and reliance on Russia), and to replenish energy reserves ahead of this winter.[53] And the

[52] *Europe is a key destination for Russia's energy exports*, US Energy Information Administration, 14 March 2022.
[53] R. Habaeck, *Wir stärken die Vorsorge weiter und ergreifen zusätzliche Maßnahmen für weniger Gasverbrauch"*, German Federal Ministry for Economic Affairs and Climate Action (BMWK), 19 June 2022.

REPowerEU plan entails an extended role for coal alongside growth in clean energy as the continent seeks to move away from reliance on natural gas.[54] Similarly, the International Energy Agency (IEA) estimates a 10% increase in investments in the global coal supply chain this year, mostly in India and China.[55] It also forecasts around USD 0.9 trillion of investment in oil, gas and coal for fuel supply in 2022.[56]

To meet the Paris Agreement target on temperature rise and net-zero by 2050 there needs to be coordinated global effort.

The fossil fuels that have driven economic development since the industrial revolution emit carbon, leading to global temperature rise. The current level of emissions needs to reduce dramatically if the world is to achieve the Paris Agreement goal of keeping the average temperature increase less than 2°C above pre-industrial levels, and also the target of net-zero emissions by 2050.[57] Many governments have committed to reducing carbon emissions. As of December 2021, more than 70 countries accounting for more than 80% of global carbon emissions and about 90% of global GDP have put net-zero commitments in place as part of the United Nations' Race to Zero campaign.[58] Projections suggest the majority of future growth in energy-related carbon emissions through 2050 will come from outside the OECD.[59] In other words, the transition to net zero requires global effort.

Many countries have invested in renewable energy capacity...

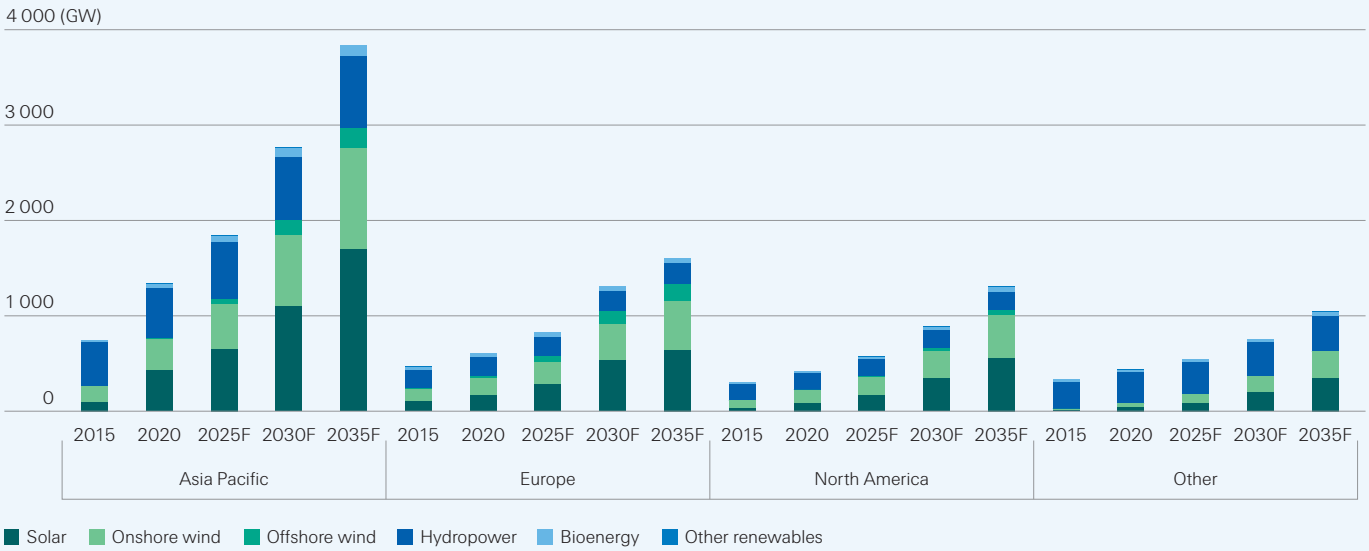
Transition to renewable energies is one element of the race to net zero and to reach the Paris Agreement target, and there has been a significant increase in renewable energy capacity in the last decade. Global capacity increased from 1.3 Terawatt (TW) in 2011 to 3.1 TW in 2021 (CAGR of 9%), driven mainly by solar (+776GW) and onshore wind (+553GW). Hydropower accounts for the largest share of total installed capacity (40%), but new capacity added during the decade was limited. If countries deliver on their commitments, globally 4.6 TW of renewable energy capacity will be added between 2022 and 2035, a compound annual growth rate (CAGR) of 7%.[60] Most of this will be in solar (2.3TW or 50% of total), which will grow by a CAGR of 10%, followed by onshore wind (1.5 TW or 32% of total; CAGR of 8.3%). Offshore wind will grow faster (16% CAGR) but it will account for only 8% of the additional capacity.

...and more is coming.

Most new global capacity (49%) will be added in Asia-Pacific, with more than half of that in China. Figure 8 shows added capacity by type and region. However, as forecast in the IEA's Sustainable Development Scenario, the total falls short of capacity needed to achieve the Paris Agreement target: based on announced targets, total capacity will be short of requirement by around 29% by 2030 and 32% by 2035.[61] The shortfall will be highest in solar (–39% and –41%, for 2030 and 2035, respectively) and wind (–20% and –22%).

[54] See *REPowerEU Plan*, European Commission,18 May 2022.
[55] *World Energy Investment*, IEA, June 2022.
[56] Ibid.
[57] The net zero transition, also called the green transition, refers to the transition to a world with net zero greenhouse gas (GHG) emissions. This is needed to adhere to the Paris agreement goal of limiting global warming to well below 2°C relative to pre-industrial levels.
[58] *The net zero transition: what it would cost, what it could bring,* McKinsey & Company, January 2022.
[59] *Energy and the environment explained: Outlook for future emissions*,12 April 2022; and *International Energy Outlook 2021*, 6 October 2021, both from US Energy Information Administration.
[60] Renewable energy capacity installations are forecast based on targets committed to by governments.
[61] *Sustainable Development Scenario*, IEA, October 2021.

Figure 8
Installed capacity by technology and region



Source: IRENA, IEA, Swiss Re Institute

To reach the Paris Agreement target on temperature rise, *all* sectors of the economy need to decarbonise.

Addition of renewable energy capacity alone will not achieve the Paris Agreement of global temperature rise, nor net-zero by 2050. To get there means decarbonising the whole economy, including the main carbon-emitting sectors beyond the energy sector including transport, industry (eg, steel, cement), and buildings. With a focus on sustainability objectives, this will entail investing in the shift to electric vehicles, using low carbon fuels such as hydrogen, technologies that improve energy-efficiency, process improvements, and ramping up investment in carbon capture technologies. However, many of these areas and the associated technologies are still in early stages of development. On an encouraging note, of late there has been growing attention on sustainable investing and the importance of sustainability concepts.

Making pledges in carbon emissions is different from meeting those targets.

Considerable progress is needed in the transition pathways of the sectors to meet the Paris Agreement targets. First, the pledges in place do not add up to what is needed. Assuming full implementation of the nationally determined contributions (NDCs) [62] submitted by all 193 Parties to the Paris Agreement as of mid-November 2021, global GHG emissions are forecast to increase by about 16% by 2030 relative to 2010, rather than reduce by the 25–45% needed.[63] Second, setting national net-zero targets and designing the necessary strategy is complex.[64] Achieving the targets can also be challenging. For example, many of the biggest GHG emitters including China, the US and India missed their targets for 2020.[65] Finally, so far only 50 countries (plus the EU) have communicated long-term (beyond 2030) low-emission development strategies.[66]

And lack of carbon pricing in many parts of the world is a fundamental barrier to reaching net zero.

To date a main barrier to deployment of carbon removal is lack of business case. In the absence of carbon pricing in many parts of the world, society disposes of carbon into the atmosphere at will.[67] According to the IMF, a global carbon price of at least USD 75 per metric ton is needed, but current pricing programmes cover only about one-fifth of global emissions, and the global average price is about USD 4.[68]

[62] NDCs form the basis for countries to achieve the objectives of the Paris Agreement, including national targets, and policies and measures for reducing emissions and adapting to climate impacts.
[63] Based on an analysis of all NDCs submitted up to 12 October 2021, see *Nationally determined contributions under the Paris Agreement* (revised synthesis report), UNFCCC, 17 September 2021.
[64] "CAT net zero target evaluations", *climateactiontracker.org*, 9 November 2021.
[65] *COP26 pledges: will the progress made be enough?*, Swiss Re Institute, November 2021.
[66] "Communication of long-term strategies", *unfccc.int*, 2022.
[67] *The insurance rationale for carbon removal solutions*, Swiss Re Institute, July 2021.
[68] *Fiscal Monitor: How to Mitigate Climate Change*, IMF, October 2019; *State and Trends of Carbon Pricing 2022*, The World Bank, May 2022.

Insuring renewable energy sector risks

Insurers can offer covers for the construction and operations phases of renewable energy plants and infrastructure.

Building and operating renewable energy assets involves a complex set of evolving risks that need to be managed to avoid what can be large associated revenue losses. Insurance can play a key role in assisting the expansion of renewable energy by providing risk protection covers for both the construction and operations phases of associated infrastructure.

- **Pre-project and/or construction risks**: Renewable energy is a capital-intensive industry. Physical damage to assets during transportation and construction can cause considerable financial losses. For example, damage can be incurred while transporting solar panels, wind turbines/blades. Damage can also happen during unpacking and handling of components by workers, and during construction such as when a turbine is raised into position. There is also risk of project delay.

- **Operational risks**
  - *Loss damage and failure*: Once operational, a renewable energy farm's physical assets remain exposed to risks from natural catastrophes, accidental damage, negligence, and wear and tear. For instance, even a thin layer of windblown sand or dust on the surface of a solar panel can compromise its efficiency. Operators use water to keep panels clean, but water is not easily available in every place. Similarly, wind farms, especially offshore ones, are vulnerable to earthquakes and hurricanes. For example, offshore wind turbines survived the Japan earthquake and tsunami in 2011, but one out of 10 sustained major damage due to soil liquefaction. The transformer system on the coast was also hit, leading to losses from grid failure.

  - *Business interruption*: A manufacturer's warranty may cover the cost of replacing damaged parts in renewable energy farms, but there are additional features that increase the cost of component replacement. For example, it is more difficult and expensive to access offshore sites and perform repairs, resulting in longer down time and disruption to business as usual. Also, as larger turbines generate higher revenues, the revenue losses are also larger when they are not operational.

Table 5
Risks inherent in energy infrastructure projects

Category	Risk type	Description
Pre-project and construction	Loss or damage	Breakage/theft of equipment in transit or during installation
	Start-up delays	Revenue losses arising from delays in project construction
	Construction defects	Revenue losses due to insufficient design or quality of construction/equipment
Operation	Loss damages, failure	Accident, theft, fire, natural catastrophes: equipment performs worse than anticipated, manufacturer unable to honour operation and maintenance agreements
	Business interruption	Revenue loss arising from failure, damage or extreme weather Body injury or property damage to third parties, due to an accident
	Weather	Variability in revenue due to weather resource volatility
	Curtailment	Regional grid oversupply where power output cannot be sold
	Market risk	Variation in revenue due to wholesale price volatility
	Counterparty	Default of counterparty in power purchase agreement

Source: Swiss Re Institute

Covers for renewable energy projects include CAR, DSU, construction liability and marine insurance...

Insurance covers available

For the construction phase, typical covers include Construction All Risk (CAR) or Erection All Risks (EAR) delay in start-up (DSU), construction liability and marine insurance. CAR insurance provides cover for risks related to the physical loss or damage to works during construction and EAR covers risks during erection of machinery, plant and steel structures of any kind. DSU provides broad protection against delays arising from physical damage caused by the agreed peril type stated in the policy. Construction liability insurance offers compensation for injury, damage and product-related claims. Marine insurance protects against cargo, hull, offshore exploration/production and liability exposures.

...and property and business interruption covers.

During the operational phase, key insurance covers include property damage and BI. Property damage insurance provides cover for asset exposure against various perils such as natural catastrophes, theft and accidental damage. BI insurance covers the loss of revenue if the functioning of a renewable energy farm is interrupted. Some of the other operational risks can be covered by traditional engineering policies, such as machinery breakdown, electronic equipment insurance, and machinery loss of profits policies.

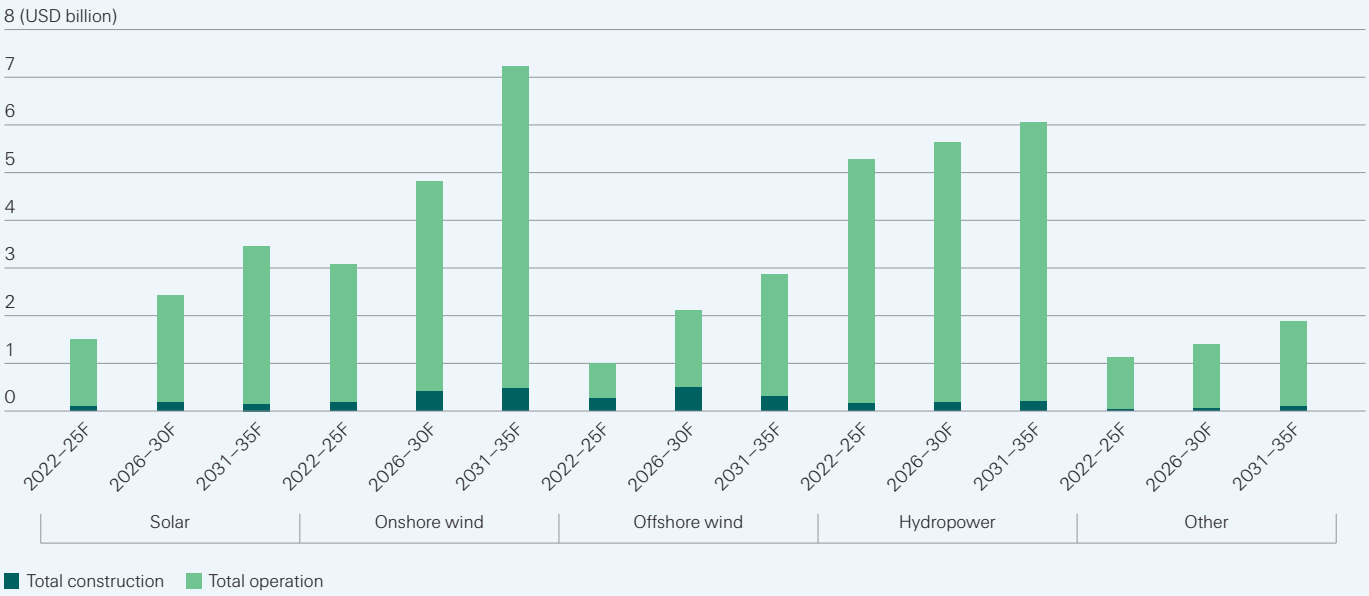
We estimate that the to-date targeted investments in the renewable energy would generate global cumulative premiums of USD 237 billion between 2022–2035.

Premium opportunity from investments in renewable energy

Risks related to renewable energy need insurance cover. We estimate that based on announced targets, global investments in renewable energy will generate total cumulative premiums of USD 237 billion between 2022–2035 (CAGR of 6.2%), assuming all government installation targets are met. Most of the growth will likely come from operations-phase premiums (around USD 222 billion, CAGR of 6.1%), while construction premiums will add USD 15 billion (CAGR of 7.1%) during the period. Within the two phases, wind will generate most premium income, about an estimated USD 100 billion (43% of total) during 2022–2035. Of this, onshore will account for 72% (USD 72 billion, CAGR of 9.0%). Offshore wind will register strong average annual 12% growth, albeit from a low base, generating estimated cumulative premiums of USD 28 billion by 2035. Solar will generate cumulative premiums of USD 35 billion (CAGR of 8.8%), with most coming in the 2020s. We estimate that hydropower will generate cumulative premiums of USD 80 billion during the period (CAGR of 1.5%) with almost all (97%) of the premiums coming from the operational phase. (see Figure 9).

Figure 9

Estimates of average annual premium volumes by technology (USD billion)

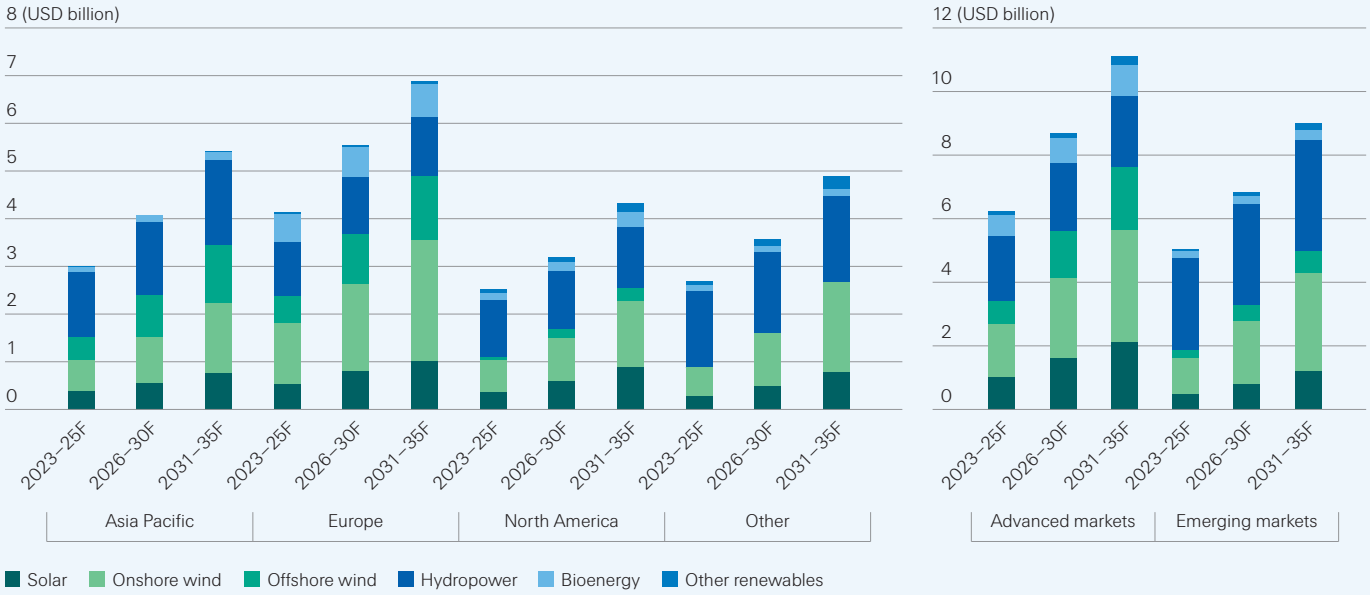


Source: Swiss Re Institute

Europe will generate about one-third of cumulative global premiums; 25% of that from Germany.

By region, Europe will generate the most cumulative premiums from renewable energy, of an estimated USD 78 billion during 2022–2035 (33% of global, CAGR of 5.5%, see Figure 10). This will be driven by wind (USD 41 billion, 52% of total), mainly onshore (USD 27 billion). Offshore and solar will contribute USD 14 billion and USD 11 billion, respectively. Although hydropower will generate around 21% of total renewable premiums in Europe (USD 17 billion), its growth potential is limited (CAGR of 0.6%). We forecast that Germany will account for close to 25% of renewable premiums from Europe (USD 19 billion during 2022–2035, followed by UK (USD 11 billion), France (USD 6.5 billion) and Spain (USD 4.7 billion). Onshore wind will account for a major part of premiums in these markets, except for the UK, where offshore wind will make up more than half of the renewable premiums in the period.

Figure 10
Average annual premium by technology and region



Source: Swiss Re Institute

Asia will generate around a quarter of global premiums, more than a third of that coming from China.

Asia-Pacific will generate around a quarter of the estimated cumulative global insurance premiums during 2022–2035 (USD 59 billion, CAGR of 6.7%), driven by wind (USD 27 billion), mainly onshore (USD 14 billion). Offshore wind and solar will add around USD 12 billion and USD 8 billion, respectively. China will account for more than a third (39%) of Asia's cumulative renewable energy premiums during 2022–2035 (USD 23 billion, 9.6% of global) mainly driven by wind (USD 15 billion). India (USD 9.6 billion) and Japan (USD 6.4 billion) are other key markets in region. North America will add an estimated USD 47 billion to global premiums, mainly driven by the US (USD 37 billion), the largest market globally. Here premiums will mainly come from new onshore wind capacity (35% of total), while solar and hydropower will add around a quarter each of the total. For other regions, we estimate that renewable energy projects will generate cumulative premiums of around USD 30 billion (CAGR of 4%) in Latin America during 2022–2035, in Africa USD 8.7 billion (CAGR of 12%) and the Middle East USD 6.7 billion (CAGR of 19%).

A multi-polar world could hinder climate cooperation

There are signs of a move to a multi-polar global energy sector.

A switch to renewables is currently the only viable option to ensure domestic energy security over the longer term. From the insurance industry perspective, over time premiums from renewable energies will replace those derived from fossil-fuel business as insurers withdraw from underwriting traditional forms of energy. The peak in globalisation is past us and the war in Ukraine is adding impetus to the geopolitical shift towards a multi-polar world that we envisage. This is evidenced by reshoring and friend-shoring activity of energy supply lines also.

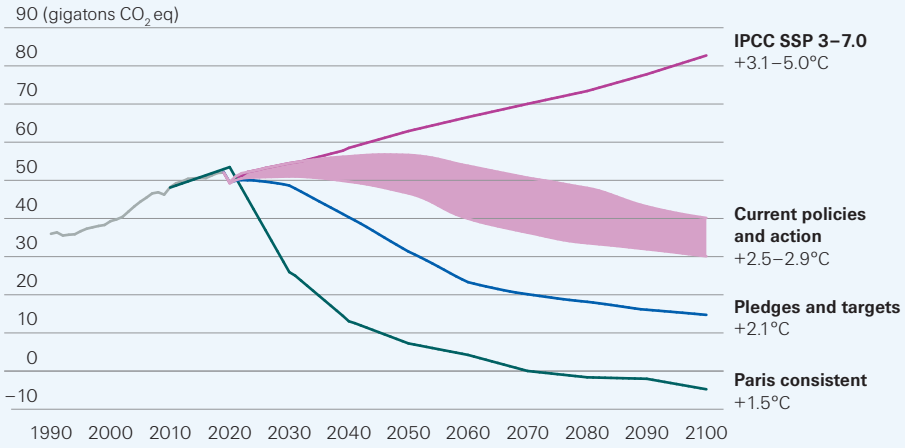
Reduced global cooperation could lead to sub-optimal outcomes in the fight against climate change.

The shift to a multi-polar world, however, could lead to sub-optimal outcomes in relation to the green transition, by impeding global climate cooperation and mitigation momentum. We use the IPCC's "regional rivalry" scenario "SSP3-7.0" to approximate the future state of the world under such a shift.[69] The narrative of SSP3-7.0 is conceptually close to the multi-polar future we envision. It is a scenario of resurgent nationalism and fragmentation of the international order, concerns about competitiveness and security, and regional conflicts that push countries to increasingly focus on domestic or, at most, regional issues, including achieving local and at best regional energy (and food) security at the expense of broader-based global development.

In the multi-polar world scenario, the Paris Agreement target of limiting temperature to less than 2°C by 2050 would not be met.

In this scenario, carbon emissions rise steadily to almost double current levels by 2100 (see Figure 11). The move to a multi-polar world would see a warming trajectory of 2.1°C by mid-century, above the Paris Agreement target. Under warming of this magnitude and according to Swiss Re Institute research, global GDP could be up to 7–10% lower by 2050 than if the Paris agreement target were met.[70] Thereafter the trajectory would see temperatures warm by 3.6°C between 2081 and 2100. In contrast, policies and actions presently in place are projected to result in about a 2.7°C rise by end-century, while meeting all current pledges and targets could further limit warming to 2.1°C.

Figure 11
Future global greenhouse gas emissions (in gigatons of carbon dioxide equivalents) and associated warming by 2100 (in °C, relative to pre-industrial levels) in the SSP3-7.0 versus other scenarios



Note: Pre-industrial = 1850–1900
Source: IIASA, Sixth Assessment Report of the IPCC Working Group 1, 2021; Climate Action Tracker; Swiss Re Institute

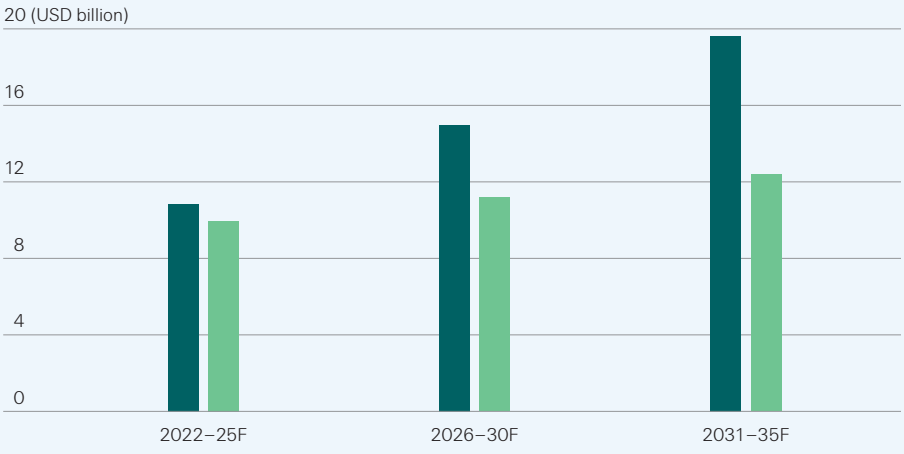
[69] The 6th Assessment Report of the UN Intergovernmental Panel on Climate Change (IPCC) presented five scenarios, known as the shared socio-economic pathways (SSPs), to portray possible evolutions of the climate up to 2100 as a function of GHG emissions and of the evolution of human societies. These scenarios explore different social, economic, political, and technological developments, and the implications for the climate. They are combined with the IPCCs representative concentration pathway (RCP) scenarios – capturing different GHG concentration trajectories – to yield nine emission scenarios with different climate forcing outcomes and socioeconomic development assumptions.

[70] *The economics of climate change: no action not an option*, Swiss Re Institute, April 2021.

The outcome could be sub-optimal for the insurance sector also.

The green transition in a multi-polar world could be sub-optimal for insurers also. We estimate potential premiums from renewable energy investments in a multi-polar world under the IPCC's SSP3-7.0 scenario, in which renewable energy capacity installations would grow at a lower rate than projected above. We take the 2021 actual installed capacity data for solar, wind and hydropower (accounting for ~95% of total renewable energy capacity) and use the corresponding SSP3-7.0 growth rates to project future capacity installations. We then estimate premium potential using premium rate and exposure assumptions.

Figure 12
Annual average premiums in USD billion, under announced targets and in the multi-polar world scenario



Source: Swiss Re Institute

Global insurance premiums would be 30% less than under currently announced targets on renewable energy capacity installations.

According to our estimates, under the IPCC's SSP3-7.0, global cumulative premiums from solar, wind and hydropower would be around USD 150 billion by 2035, around 30% lower than the USD 216 billion based on announced targets for these three technologies specifically. Wind will be the most affected with premiums estimated to be around 44% lower. Cumulative premiums from solar will be lower by around 33%. Hydropower will be the least affected (~3% lower), as this technology is already mature and has limited growth potential.

Real economy driver 3: food insecurity

The pandemic and war in Ukraine have left many countries, mostly low-income ones, facing acute food security issues. Deglobalisation, the second-order effects from high energy prices and climate change impacts will likely keep food prices elevated. In a multi-polar world of more fragmented trade flows, countries highly dependent on food imports (many low-income countries) are most exposed to disruptions to supply chains. Agricultural insurance can be a key tool in maintaining food security. We forecast that global agriculture insurance premiums will reach USD 80 billion by 2030. However, overall penetration remains low, particularly in emerging markets. We see public private partnerships as an effective tool to extend insurance reach.

Higher and volatile food prices: a new normal?

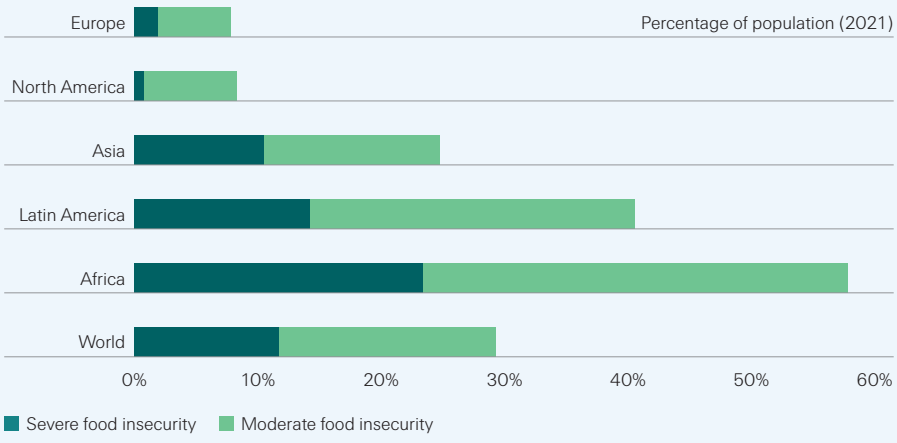
We expect food prices will remain volatile, and high.

The world is going through a food crisis. Prices soared in the first half of this year and supply chain disruptions on account of the war in Ukraine have led to food shortages in many countries. The global food price index peaked in March at its highest level since 1974.[71] The war has hit trade in agricultural commodities directly as Ukraine and Russia are major exporters of grains and vegetable oils. They account for 12% of all calories traded globally.[72] The price impact also extends to livestock as most grains are used as animal feed. Prices have fallen back from this year's highs. Nevertheless, we expect prices will remain volatile and higher than pre-pandemic levels and that in a multi-polar world, such food "insecurity" could become more common, particularly in countries highly dependent on food imports.

Currently around 30% of the world's population is vulnerable to food insecurity.

Populations in low-income countries are most impacted by current high prices and food shortages. These countries, predominantly in Africa and Latin America, rely heavily on food imports and in a multi-polar world of more fragmented trade routes and new dynamics in geopolitical tensions, would be most vulnerable to supply chain interruptions and the associated high prices. Spikes in food prices eat into households' purchasing power, affecting real disposable incomes of low-income households as they spend relatively more on food than higher income groups. In Brazil, for example, households in the lowest income quintile spend almost 4x more on food than households in the highest quintile.[73] Starting with the pandemic, the food crisis has caused a surge in severe malnutrition and even starvation. Around 2.3 billion people (almost 30% of the global population), were moderately or severely food insecure in 2021, an increase of about 350 million since the start of the pandemic (see Figure 12).[74]

Figure 13
Percent of the population moderately or severely food insecure (2021)



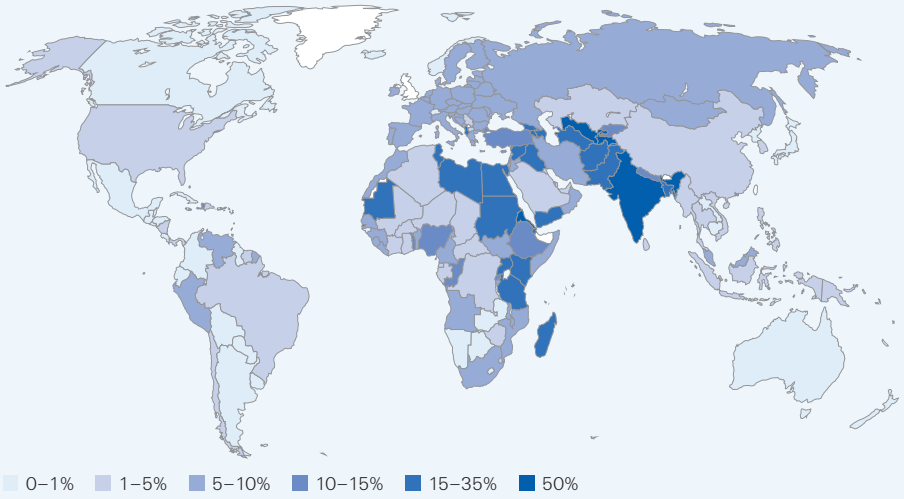
Source: Food and Agriculture Organization of the United Nations, Swiss Re Institute

[71] See *FAO Food Price Index*
[72] *How will Russia's invasion of Ukraine affect global food security?* International Food Policy Research Institute, 24 February 2022.
[73] *sigma* 3/2022: Insurance and its role in reducing income inequality, Swiss Re Institute.
[74] *The State of Food Security and Nutrition in the World*, FAO, 2022.

We expect food prices will remain high and volatile in the coming years, alongside ongoing vulnerabilities in agriculture commodity supply chains, for the following reasons.

- **De-globalisation and protectionism**: In less than three months following the begin of the war in Ukraine, countries accounting for 17% of calories traded globally restricted exports of main agricultural products[75] (see Figure 14). India, for example, banned exports of wheat, which was considered a possible replacement of Ukrainian exports, and limited shipments of sugar in May. With globally interconnected food supply chains, shifts towards deglobalisation and protectionist measures in the name of domestic security can drive prices higher and raise the likelihood that more countries will limit food exports. The same applies to fertilisers. Previous research shows that restrictions on trade contributed to a 13% increase in global food prices during the 2008–2011 food crisis.[76]

Figure 14
Share of agricultural imports affected by export restrictions (2022)

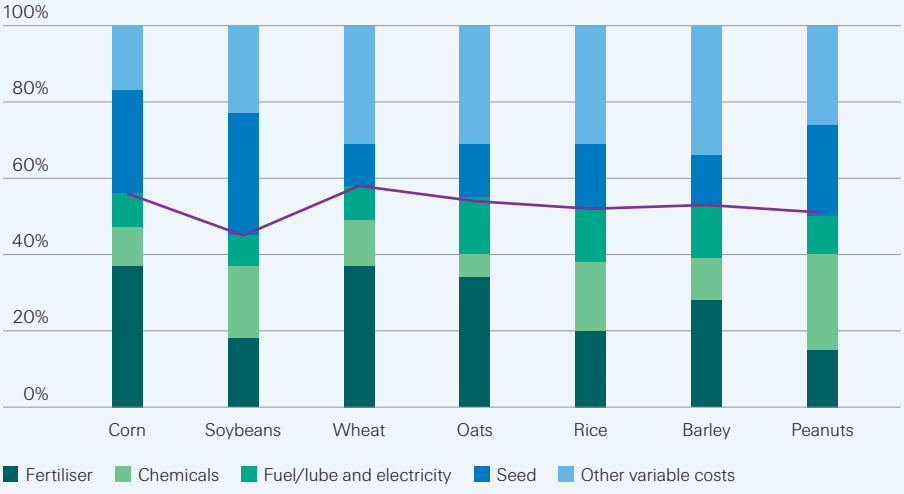


Note: Data is calculated on a caloric basis for distinct economies up to 12 April 2022.
Source: International Food Policy Research Institute

- **High energy prices**: High energy prices have second-order effects on food prices, as energy is a major input for most agricultural commodities. It is used to automate irrigation, as fuel for farm machinery, and in various stages of food processing, packaging, transport and distribution. Estimates for the US show that depending on crop type, energy costs can account for 40–50% of variable costs of harvesting (see Figure 15). Higher energy prices also affect pesticide and fertiliser costs. For example, natural gas makes up 70–80% of the cost to produce ammonia and urea, the most used nitrogen-based fertilisers globally.[77]

[75] "Food Export Bans Will Make the World's Hunger Crisis Worse", *bloomberg.com*, 13 May 2022.
[76] "Widespread food insecurity is not inevitable: Avoid escalating food export curbs", *VOXEU*, 4 May 2022.
[77] *How the energy crisis is exacerbating the food crisis*, IEA,14 June 2022.

Figure 15
Proportion of key operating costs of selected crops in the US (2022)

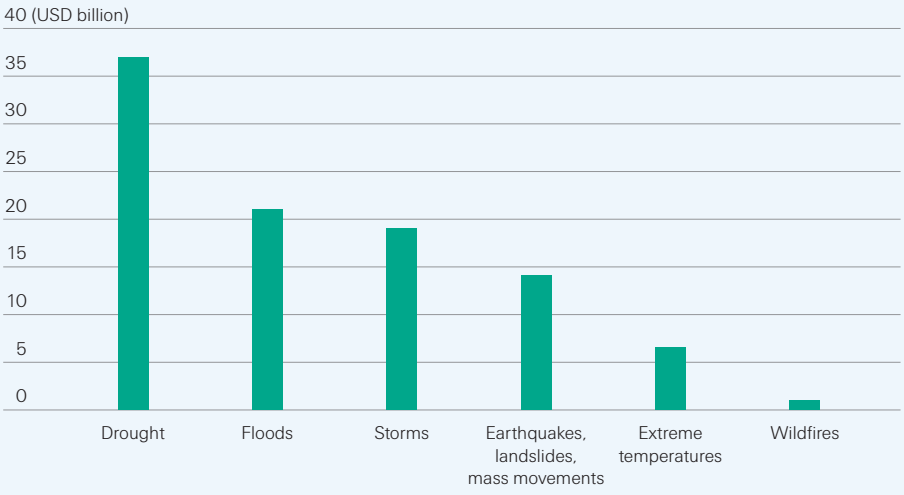


Source: IEA, Swiss Re Institute

- **Climate change**: A main driver of recent increases in food price have been extreme weather events. Droughts in major agricultural producing countries such as Brazil, the US and Canada have led to crop losses, as have heavy rains in China and hot weather in India. Higher temperatures also can lead to changing exposures to pests, disease vectors and pollinators, while extreme weather-related events can cause losses to livestock and damage infrastructure.

  Disasters accounted for the majority of crop and livestock production losses of an estimated USD 108.5 billion in low and medium-income countries between 2008 and 2018 (see Figure 15).[78] Given rising likelihood of extreme weather events due to climate change, such losses will likely occur more frequently, hitting low and medium-income countries hardest, more so in a more fragmented multi-polar world.

Figure 16
Total crop and livestock production loss in low and medium-income countries per disaster type (2008–2018)



Source: Food and Agriculture Organization of the United Nations, Swiss Re Institute

Food insecurity can lead to social tensions and conflict.

Food insecurity is not only a humanitarian crisis: it can also spark social tensions and conflicts, as has been the case in many developing countries this year. In Sri Lanka, increased food prices contributed to mass protests and led to the resignation of its prime minister and president. High food prices have also triggered protests in Chile, Peru,

[78] *The impact of disasters and crises on agriculture and food security*, FAO, 2021.

Tunisia, Iran, Kenya and Indonesia.[79] This year is not the first time in recent years that food price increases have caused social unrest. For instance, the spike in food prices in 2007 to 2008 caused unrest in several African countries, Haiti and Yemen. And a surge in food prices from 2010 to 2011 was followed by a wave of social upheaval known as the Arab Spring leading in some cases the collapse of a government (Egypt, Tunisia) and/or civil war (Syria, Yemen).[80]

Agricultural insurance: a tool to improve food security

Agricultural insurance helps manage risks across the food-production value chain.

With the global population forecast to reach almost 10 billion over the next three decades, and the prospect of increased economic and geopolitical fragmentation in a multi-polar world, the need to secure food production has become more vital than ever. Agriculture insurance has emerged to play a key role in helping to manage the risks in the agricultural food value chain, stabilise farming income and promote investment. It contributes to the United Nations' Sustainable Development Goals (SDGs) related to no poverty, zero hunger and climate action. Specifically, agriculture insurance can help farmers maintain income levels and continue to farm even in the case of a lost harvest, thereby reducing uncertainty. It can help to mitigate periods of elevated input (fertiliser, energy) and output prices, and can facilitate access to credit market finance by reducing the risk of loan default in the event of large production losses.

Agriculture coverage can be bought privately. Many countries also have public-sector agriculture insurance programmes

Agriculture insurance systems take two forms. First market-based models, which are geared to commercial agriculture, and are typically purchased by medium- to large-scale farming operations. The types of products on offer are varied and reflect the nature of the risk exposures. Outside traditional lines, there are also other covers such as "rural" credit, property, liability and life for businesses and workers in agriculture. Many countries also have also public-sector agriculture insurance programmes, which by serving a safety-net function, offer producers a minimum level of security. They mainly target traditional subsistence (small- to medium sized) farms that do not generate sufficient income to pay for commercial insurance, and which lack access to formal credit and insurance markets. Such smallholdings are common in low and medium-income countries.

Climate change-related risks are set to increase; multi-peril crop insurance through PPPs can play an increasingly important role.

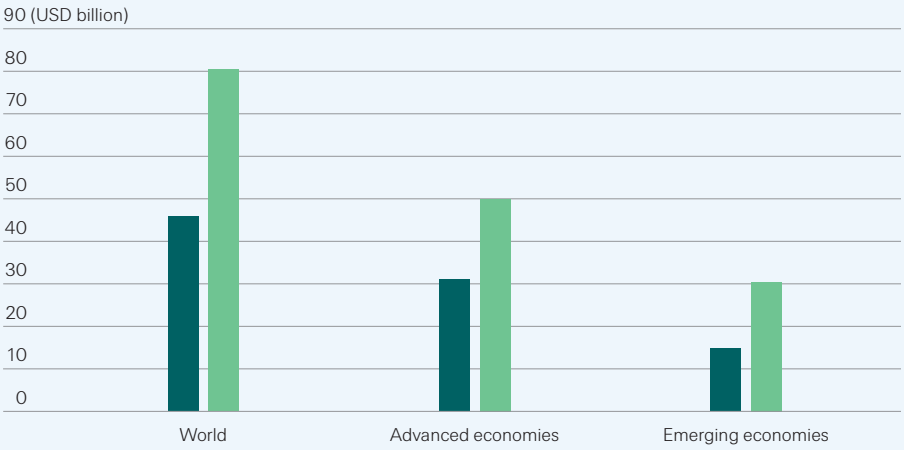
The array of insurance schemes varies, from more market-oriented approaches adopted by Germany and Argentina, for example, to public-private partnerships (PPPs) in the US and Brazil. There is much variation within these categories as well, notably in the degree of public support. Governments can offer premium subsidies, such as in the US, where the Federal Crop Insurance Program is heavily subsidised by taxpayers. The program covers 60% of premiums, while farmers pay the remaining 40%.[81] And with climate change and rising likelihood of production-loss from extreme weather events, multi-peril crop insurance (MCPI) as PPPs could become increasingly important. There was strong growth in MCPI schemes in developing markets (particularly in Latin America and in Asia) the period 1950–1990. Since the 1990s, governments have promoted commercial sector provision, often as PPPs.[82]

We forecast a near doubling of the agriculture insurance markets by 2030.

We estimate global agriculture premiums written by insurance companies reached almost USD 46 billion in 2020, with the size of the market in advanced economies twice as large as that of emerging economies. The US and China are among the largest agriculture insurance markets, with annual premium volumes of USD 15 billion and USD 12 billion, respectively. In terms of share of agricultural output, however, insurance penetration is low, varying between 7% in the US and less than 2% in emerging economies, according to *sigma* data. This reflects a host of demand- and supply-side constraints, such as high operating cost structures and the more limited incomes of small- and medium-sized farms in emerging economies. On current trends, we forecast that the global market will reach more than USD 80 billion in premiums by 2030.

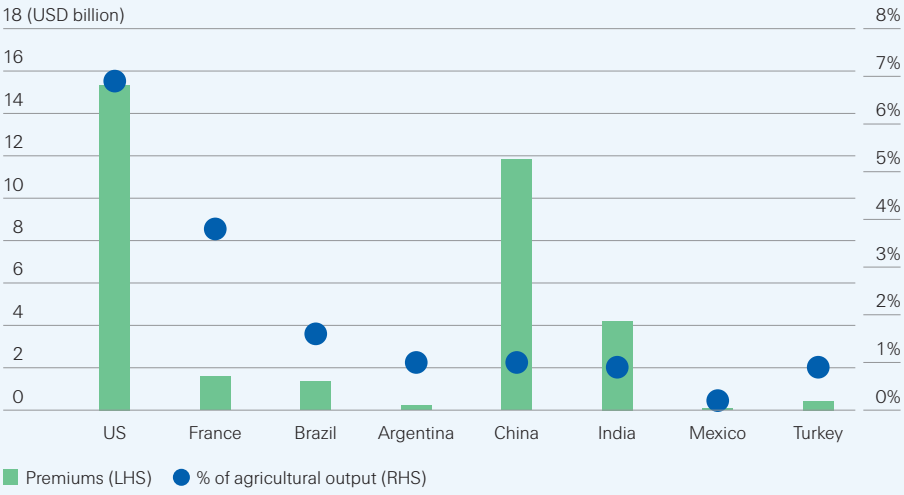
[79] "Factbox: Surging food prices fuel protests across developing world", *reuters.com*, 9 June 2022.
[80] "Food price spikes and social unrest: The dark side of the Fed's crisis-fighting", *Foreign Policy Magazine*, 20 May 2020.
[81] *Crop insurance in the United States*, EWG's Farm Subsidy Database.
[82] *Government Support to Agricultural Insurance: Challenges and Options for Developing Countries*, The World Bank, 2010.

Figure 17
Global agriculture insurance premiums)



Source: Swiss Re Institute

Figure 18
Agriculture insurance premiums and penetration as a percentage of agricultural output by selected markets (2020)



Note. Premium data includes agriculture insurance government programmes run through insurance companies and covers related to life and property policies (not only the traditional agriculture insurance covers) when available. Source: Swiss Re Institute

There are a number of challenges in extending the reach of agriculture insurance globally.

Challenges to agriculture insurance sector growth

Demand and supply-side constraints have had a discernible impact on agriculture insurance growth. The underlying reasons for the levels of insurance penetration differ per country, but there are some common factors. On the demand side these include: affordability; accessing distribution channels; limited understanding of insurance; upfront premium payments at the beginning of the crop season; and lack of suitable insurance products that meet farmers' needs. On the supply side, high cost of insuring many frequent and high severity risks; limited, sparse and poor-quality data for designing and pricing insurance policies; limited data and knowledge about farmers' needs; managing the problem of moral hazard and adverse selection whereby only farmers with marginal riskier lands sign up driving up costs for everyone in the insurance pool; and regulatory hurdles and costly government policies.

Insurance offerings that work for large-scale farming in advanced markets are not suitable for emerging economies.

Agriculture insurance as currently exists for major crops in advanced countries is not feasible nor efficient for low and medium-income countries. That is because they require a vast network of agents to verify ground damage. This introduces the possibility of fraud and corruption as well as high costs to maintain. Furthermore, distribution channels for providing insurance on a large scale to small, dispersed farms are costly. We believe technology and developments in product design, distribution channels, policy and institutions will help address these challenges. The appendix details the features of individual lines of agriculture insurance.

Table 6
Areas for improvements to overcome challenges to agriculture insurance growth

		Addressing the challenges to agriculture insurance growth
Areas for improvements	**Innovation**	■ Product innovation can facilitate the diffusion of agricultural insurance in hard-to reach areas and underserved populations. Microinsurance and index-based products have been key innovations in this regard. ■ Microinsurance can provide income-constrained farmers with affordable insurance solutions, efficient distribution and claims management processes. ■ Index-based agricultural insurance instruments are at the forefront of product innovation. By paying claims according to local weather parameters rather than damages, they reduce the costs of underwriting and processing claims. ■ Product bundling aids distribution. Agricultural insurance can be combined with, for example, credit or surety products through banks or microfinance institutions.
	Access	■ The ability to access remote regions is key to extending of insurance reach, especially low-income countries where many small farmers operate in hard-to-reach areas. ■ Mobile technology and the internet are key tools in bringing insurance to remote areas.
	Cost effectiveness	■ Agricultural insurers make distribution networks more efficient and increase use of technology to minimize admin and claims settlement costs. Remote sensing and crop modelling support index-based insurance. These advances will lower operating costs by simplifying risk assessment and expanding pools of insurability, enabling cover in regions still dependent on ground-based data systems ■ Actuarially sound pricing and fair loss assessments often depend on the objectivity, accuracy and timeliness of weather and yield data
	Infrastructure support	■ Lack of infrastructure is a major challenge, particularly in low and medium-income countries. Financial services such as credit and banking, logistics, transportation, storage, road networks are critical for effective risk management and agricultural insurance and farming to function.
	Government support	■ Governments need to create enabling environments for growth through PPPs and regulatory reform, especially as it pertains to microinsurance and index-based insurance. Through premium subsidies, they can stimulate higher agricultural risk protection uptake from low-income farmers. ■ The regulatory/legal frameworks (eg, licensing conditions for insurers, agents and loss adjusters) need to be aligned to further progress agriculture insurance sector growth

Source: Swiss Re Institute

Conclusion

A multi-polar world could yield mixed outcomes, such as economic inefficiencies…

A multi-polar world will bring with it mixed nuances. For instance, more reshoring and friend-shoring of production activities can help manufacturers diversify and make their supply chains more secure. On the flipside, globalisation yields a cost-efficient solution, with labour-intensive manufacturing taking place in low-wage countries. Re- and friend-shoring could entail less cost-efficient production, higher prices for final products and lower corporate profits.

…but also new risk pools of insurability, improved insurance sector profitability and investment opportunities.

For insurers, the supply chain restructuring and green transition that we see as main tenets shaping the multi-polar world economy, will yield new risk pool opportunities. This includes in advanced markets where penetration is already high, implying less industry dependency on emerging markets as the engine of growth. Further, a future with higher interest rates, which will be a defining feature of the coming years, will support insurance sector profitability through improved investment returns. Higher interest rates will also make investment opportunities more attractive for investors. The world needs more investment in green technology and infrastructure if the Paris Agreement target on temperature rise and net zero ambitions are to be met. This is an area where insurers can further contribute to building a sustainable future.

A main danger could be that a multi-polar world holds back global action in the fight against climate change and food insecurity.

To do so in a multi-polar world could be more challenging however, with more stringent and divergent regulatory requirements for cross-border insurance and investment flows in the different economic blocs. A potentially most fundamental and detrimental outcome of a multi-polar world is that fragmentation, based on geopolitical and security tensions, could interfere with the global coordinated action needed to secure food security for all, and to achieve reach our climate goals.

Appendix

Details of agriculture insurance lines of business

Crops & horticulture	Privately.provided insurance cover is available for all types of crops, fruits, flowers and vegetables, in following formats: ■ Named-peril crop insurance – indemnifies owners of certain crops, or tenant farmers having an interest in such crops, for loss or damage due to a specific peril named in the policy. ■ Multi-peril crop insurance (MPCI) – provides crop insurance protection for growers of certain kinds of crops. Coverage is written on specific cause-of-loss or all risk basis. ■ Revenue coverage (price and yield) – revenue protection for an insurable crop when low prices, low yields or a combination of both cause a producer's revenues to fall below a guaranteed level. ■ Parametric or index covers, including weather derivates – covers yield losses due to a readily observable variable that is highly correlated with the particular crop yield, normally rainfall, irrigation water flow, or number of days with temperatures above/below a certain threshold. Could also be determined by the performance of an insurance-related index (eg. on claims development for certain risks related to specific weather conditions). ■ Quality guarantee – covers commercial standards established by the reference markets.
Greenhouse	Comprehensive coverage for material damage to structure, glass, equipment and plants due to fire, windstorms, snow weight and equipment failure.
Livestock	Generally protects the owner against losses resulting from death or involuntary destruction of livestock due to disease or accidental injury. Business interruption covers have been developed for large-scale cattle, pig and poultry operations.
Horses, bloodstock and pets	Covers individual animals of the most varied species, but in most cases equines, whether pleasure horses or bloodstock. The cover is triggered by disease or accident causing death or permanent disability.
Forestry	Insurance for timber and plantations, most importantly for fire and windstorms. Extended covers are becoming increasingly popular and may include flood, hail, snow weight, insect infestation, and damage caused by domestic and wild animals.
Aquaculture	Insurance cover for the breeding and raising of aquatic animals, whether in inland ponds or offshore. It covers mortality or loss of fish stock due to meteorological events, disease, pollution, algae blooms and escape from damaged installations.

Source: Swiss Re Institute

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