GENEVA ASSOCIATION

Addressing Growing Protection Gaps through Better Public-Private Insurance Programmes

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Hélène Schernberg
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Geneva Association

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The conclusions and positions presented in this report nonetheless represent the views of the Geneva Association.

Foreword

In recent decades, societies have grown more prosperous, more interconnected, and, paradoxically, more vulnerable. Natural and man-made disasters now unfold against a backdrop of dense economic activity, stretched public finances, and rising expectations of protection. In this environment, insurance is a cornerstone of resilience, helping households, businesses, and governments absorb shocks and recover more quickly. Yet the frequency, scale, and sometimes systemic nature of today's risks – and urgent need to address insurance availability and affordability challenges – are testing the limits of existing mechanisms and forcing a reassessment of how risk is reduced, shared, and ultimately borne.

This report examines widening protection gaps, and the role that public-private insurance programmes (PPIPs) can play in addressing them. Our comparative analysis of 14 programmes across countries and perils shows that many PPIPs have succeeded in restoring or increasing coverage where private markets alone could not. However, too frequently, they have functioned as passive shock absorbers rather than as part of a broader strategy to reduce risk. The analysis highlights the fiscal, market, social, and operational guardrails within which PPIPs must operate, and documents how pressures on these guardrails are mounting as risks grow and losses accumulate.

Maximising protection for society over time requires a shift from financing disasters to proactively managing risk. Governments must prioritise investment in risk reduction, strengthen private insurance markets, and deploy PPIPs strategically where private capacity is missing, rather than viewing them as substitutes for prevention. PPIPs, when well designed and aligned with national resilience strategies, can do more than share losses after disasters: they can reinforce incentives to reduce risk, protect public finances, and support faster, fairer recoveries. The recommendations set out here aim to support policymakers in making that transition, at a moment when the growing cost of inaction is becoming ever clearer.

Jad Ariss
Managing Director

Executive summary

To keep disasters insurable over time, public-private insurance programmes (PPIPs) need to shift from being passive shock absorbers to active drivers of risk reduction.

The disaster protection gap – the uninsured share of economic losses from natural and man-made disasters – is widening. Global natural catastrophe (Nat Cat) losses reached USD 327 billion in 2024, with 57% uninsured. Between 1980–2024, Nat Cats caused an estimated USD 6.9 trillion in property losses, of which two thirds were uninsured. These uninsured losses act as a drag on economic recovery and push governments into slow, unpredictable, and budget-destabilising post-disaster relief.

Sharing losses is only part of the answer. Investing in risk reduction – measures that prevent or mitigate losses and support recovery and adaptation – is often more cost-effective than rebuilding. Insurance can complement these efforts by spreading remaining losses and providing rapid, pre-arranged liquidity that keeps firms open, preserves jobs, and reduces the need for ex-post fiscal support.

However, private-market mechanisms often do not, on their own, generate sufficient risk reduction or insurance coverage. Individuals underinvest in protection and insurance due to limited budgets, behavioural biases, and expectations of government aid. Insurers may be unable or unwilling to cover large, uncertain, and correlated risks at prices customers can afford. This creates a clear economic and fiscal rationale for government intervention to narrow the disaster protection gap to an efficient and socially acceptable level.

A three-pillar strategy

This report proposes a proactive, three-pillar strategy to narrow disaster protection gaps:

1. **Pillar 1: Invest in risk reduction.** While only governments can lead infrastructure investment, they can also create incentives for individuals and businesses to reduce their own risks through, for example, land use planning and building codes, as well as by providing financial support and encouraging increased risk awareness.
2. **Pillar 2: Enhance private insurance markets.** Governments can initiate targeted policy actions, such as awareness campaigns, insurance mandates, or supportive regulation to help private capacity and demand grow without distorting markets.
3. **Pillar 3: Develop public-private risk-sharing mechanisms.** In some regions and for some perils, collaboration between the re/insurance industry and the public sector – often implemented as a public-private insurance programme (PPIP) – can lead to more efficient risk-sharing.

PPIPs: Successes and challenges

PPIPs are already a prominent feature of the global insurance landscape. This report analyses fourteen existing PPIPs across natural and man-made perils. Many have delivered on their core mission. France's Caisse Centrale de Réassurance (CCR), Spain's Consorcio de Compensación de Seguros (CCS), and New Zealand's Natural Hazards Commission (NHC) achieve near-universal coverage for key perils. Pool Re (UK) and the Terrorism Risk Insurance Program (TRIP, US) restored capacity after major terrorist attacks when private markets withdrew.

Yet, PPIPs involve significant design challenges. This report's analysis revolves around the four guardrails that a PPIP must navigate, reflecting fiscal, market, social, and operational constraints:

- **Fiscal guardrail:** Limit long-term burdens on public finances and avoid open-ended state guarantees.
- **Market guardrail:** Avoid crowding out private capacity, competition, and innovation.
- **Social guardrail:** Ensure affordability and an acceptable distribution of costs and benefits, especially for vulnerable groups.
- **Operational guardrail:** Pay claims quickly and adapt to risk and market changes.

Our analysis shows that many current PPIPs have stretched one or more of these guardrails. Several have experienced severe financial strain, including the US National Flood Insurance Program's (NFIP) enormous debt burden; capital losses at France's CCR after recent droughts; and New Zealand's NHC drawing heavily on private capital and Treasury support after major earthquakes. Market distortions arise when state-backed reinsurance crowds out private capacity, as in France, where CCR covers most catastrophe reinsurance; or when solidarity pricing dulls risk signals and sustains development in high-risk areas, as in the cases of Flood Re (UK) and the NFIP in the US. Broad risk pools can favour higher-income households in exposed areas, exacerbating economic inequalities, while attempts to reintroduce risk-based pricing in the NFIP have triggered political backlash. Operationally, some schemes pay quickly, but others face disputes over claims, processing delays, and some exhibit high loss ratios, as seen in Australia's recent Cyclone Reinsurance Pool.

From sharing risks to supporting risk reduction

In many countries, Pillar 3 interventions have preceded strong Pillar 1 initiatives, making coverage available and affordable before, and often instead of, effective risk reduction strategies. This approach is reaching its limits: while PPIPs can slow the widening of protection gaps, they cannot narrow them if risk itself continues to increase.

This report calls for policymakers to treat PPIPs as part of a broader resilience strategy, not as standalone financial tools. PPIPs must not only share disaster losses but also support – or at least not undermine – public and private initiatives to reduce risk. Their legitimacy will increasingly depend on how their Pillar 3 functions reinforce Pillar 1 objectives.

Decision-process and design principles

Because PPIPs are costly and complex, the report proposes a four-step process to assess the need for and potential role of a PPIP:

1. Substantiate the protection gap and the underlying drivers on the risk, supply, and demand sides.
2. Prioritise risk-reduction measures (Pillar 1) and strengthen private insurance markets (Pillar 2) through targeted, market-enhancing measures. This minimises the residual risk a PPIP needs to absorb.
3. Agree on the perils and exposures a PPIP should cover, ensuring that remaining protection gaps are societally acceptable.
4. Make a clear fiscal case for state intervention.

Based on the comparative analysis, the report outlines key principles for designing or reforming PPIPs to remain within fiscal, market, social, and operational guardrails and contribute to resilience. These principles relate to:

- **Strategic alignment and governance:** embed PPIPs in national risk-reduction strategies; define clear objectives and guardrails; ensure effective, multi-stakeholder governance; invest in risk data and modelling; and plan for regular adaptation.
- **Financial mechanics and market discipline:** keep the state as reinsurer of last resort, covering only loss layers that private markets cannot bear; structure layers, triggers, and capital to crowd in, not crowd out, private capacity; and use compulsion strategically, mainly where high coverage is essential.
- **Pricing and incentives:** use risk-based pricing as the default to signal risk and encourage mitigation; address affordability through targeted, transparent subsidies rather than broad price controls; and leverage product features and claims practices to reward risk reduction.

Emerging risks: Cyber and pandemic-related business interruption

Applying this framework to two emerging risks in which new PPIPs are being actively considered suggests some important lessons:

- **Cyber risk.** There is significant scope to strengthen cybersecurity and incident response (Pillar 1) and to enable private cyber insurance market growth (Pillar 2). However, the scale and/or uncertainty of accumulated losses from a systemic cyber event mean that there is a lack of private capacity to absorb extreme tail risk. In this case, a state-backed PPIP (Pillar 3) could prove beneficial. In practice, however, designing such a scheme faces serious challenges, largely due to the ambiguity surrounding peak cyber risks and concerns about overstepping both the fiscal and market guardrails.

- **Pandemic-related business interruption risk.** Such risks remain uninsurable in a traditional sense. At best, a pandemic PPIP could provide a narrow, state-backed liquidity facility, particularly for small and medium-sized enterprises (SMEs), with limits on how long the support lasts and how much is provided. Insurers would serve as distributors and administrators, only bearing a small share of the risk. Such a PPIP cannot replace fiscal support and a broader economic resilience strategy.

Conclusion

PPIPs are often essential tools for maintaining insurability of disaster risks. To ensure viability in a world of rising, increasingly systemic risks, their design and operations need to be part of a proactive risk management strategy that prioritises risk reduction, preserves market discipline, protects public finances, and maintains social legitimacy.

1 Introduction

Introduction

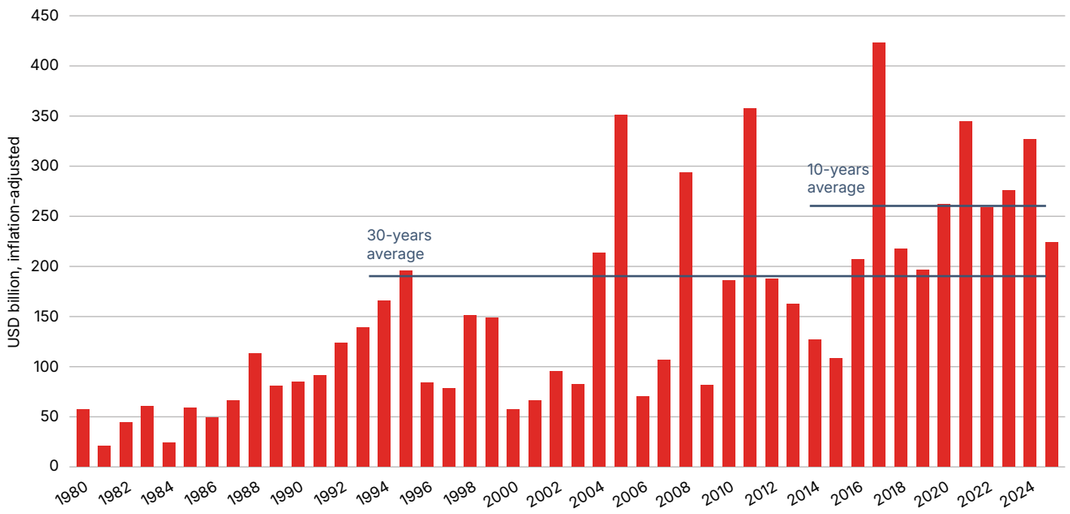
There is a case for policymakers to proactively support risk-reduction measures together with efficient risk-sharing mechanisms for residual losses.

Economic losses from disasters are increasing, leaving a large and widening protection gap that represents the uninsured share of economic losses. This section shows how protection gaps and the costs of post-disaster relief strain public finances and slow economic recovery. It argues for a proactive strategy that prioritises risk reduction and implements efficient risk-sharing mechanisms for residual losses. The rest of the report focuses on public-private insurance programmes (PPIPs) as a key, but complex, component of this strategy.

1.1 A widening disaster protection gap

The United Nations defines disaster as "serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources." Economic losses from disasters have increased over recent decades (see Figure 1), mainly attributable to rising natural catastrophe (Nat Cat) losses. Nat Cat losses totalled USD 277 in 2023, USD 327 billion in 2024, and around USD 224 billion in 2025, with a 10-year average of USD 262 billion and a 30-year average of USD 190 billion (inflation-adjusted).[1]

FIGURE 1: TOTAL ECONOMIC LOSSES FROM NATURAL DISASTERS (EXCLUDING DROUGHT AND HEATWAVE) IN USD AS OF 2025, INFLATION-ADJUSTED TO 2025, BETWEEN 1980 AND 2024



Source: Munich Re, NatCatSERVICE, May 2025[2], and Munich Re[3]

1 Munich Re 2025a.
2 Munich Re. NatCatService is a gobal database containing loss data from 1980 onward for all types of natural disasters excluding drought and heatwaves.
3 Munich Re 2026.

Record-breaking events are the new norm. Natural disasters, terrorist attacks, or pandemics can hit economies as hard as wars or financial crises.[4] Although difficult to measure, the disaster protection gaps are significant. For example, Nat Cats caused an estimated USD 6.9 trillion in property losses from 1980 to 2024 (inflation-adjusted), 67% of which were uninsured.[5] Disaster protection gaps will likely continue to widen across all perils, including cyber, through 2030.[6]

The consequences of disasters reach well beyond direct asset damage.[7] The IMF estimates that, on average, disasters cut annual gross domestic product (GDP) by 1.3% in affected countries.[8,9] These losses reflect not only destroyed assets but also indirect impacts, such as supply chain disruption.[10] Although reconstruction may briefly lift GDP, national or regional economies with low financial buffers often suffer lasting losses.[11,12] They struggle to absorb immediate income shocks and to rebuild quickly, often due to credit and fiscal constraints, institutional weaknesses, or production linkages that transmit shocks across sectors.

1.2 Why governments intervene to narrow disaster protection gaps

When disaster losses are uninsured or underinsured, governments often step in to provide relief to households and firms. Such aid, however, is typically slow, insufficient, and unpredictable.[13] It can also destabilise public finances if it strains budgets and debt service obligations.

By providing rapid, pre-committed liquidity to disaster victims, insurance eases cash flow and borrowing constraints.

Ex-ante risk-sharing mechanisms, such as insurance, can offer a more efficient alternative by spreading potential losses across many actors so that no single participant bears the full cost of an event. By providing rapid, pre-committed liquidity to disaster victims, insurance eases cash flow and borrowing constraints. This allows businesses to stay open, preserving employment, enabling output to rebound sooner, and reducing the need for taxpayer-funded aid.[14] As a result, research suggests insured disasters are more likely to have temporary rather than permanent macroeconomic effects, a hallmark of resilience.[15,16]

However, sharing losses is only part of the solution. Investing in risk reduction measures (through actions that prevent or mitigate losses and foster recovery and adaptation) can save up to USD 4–15 in future losses for every dollar spent.[17] A proactive strategy that combines risk reduction measures with the risk-sharing mechanisms of insurance can provide significant macroeconomic benefits.

A proactive strategy that combines risk-reduction measures with the risk-sharing mechanisms of insurance can provide significant macroeconomic benefits.

While individuals and businesses would undoubtedly prefer to avoid or minimise losses, private markets alone, such as property or insurance markets, may be unable to both reduce risks sufficiently or share risks at scale. This creates the economic and fiscal case for government intervention to narrow the disaster protection gap to an economically efficient and societally desirable level.[18]

4 Von Peter et al. 2024.
5 Munich Re.
6 Bain & Company 2025.
7 Disasters also threaten financial stability (European Central Bank (ECB) 2021; ECB and European Insurance and Occupational Pensions Authority (EIOPA) 2024. Nat Cats increase the risk of mortgage default and reduce collateral value, thereby increasing banks' exposure to physical climate risk (The Geneva Association 2025).
8 International Monetary Fund (IMF) 2025.
9 GDP imperfectly measures disaster impacts. It is sensitive to country size, ignores nonmarket losses such as casualties, counts reconstruction as a gain, and excludes lost physical capital from losses.
10 Cambridge Centre for Risk Studies and AXA XL 2020.
11 World Bank 2015; IMF 2025
12 Disasters may spur long-term output gains via 'creative destruction,' e.g. through modernised capital, but only for moderate events in countries with strong institutions (Schumpeter 1942; Skidmore and Toya 2002).
13 Clarke and Derkon 2016.
14 Cavallo and Noy 2011; You and Kousky 2024; Cambridge Centre for Risk Studies and AXA XL 2020.
15 Von Peter et al. 2024.
16 Resilience refers to the ability of individuals, households, firms, and economies to absorb, recover from, and adapt to disasters without lasting loss of welfare or productive capacity.
17 Natural disasters: World Bank 2006a; Cambridge Centre for Risk Studies and AXA XL 2020; United Nations Office for Disaster Risk Reduction. Earthquakes: de Hoop and Ruben 2010. Floods: Allstate and the U.S. Chamber of Commerce Foundation 2024; Swiss Re 2024.
18 Protection gaps typically do not need to be closed. For example, it is economically efficient for households and businesses to retain a share of risk (e.g. through deductibles). Moreover, core public infrastructure, such as roads and railways, will typically remain self-insured by the government.

1.3 A growing interest in public-private insurance programmes (PPIPs)

PPIPs share risks and costs across public and private stakeholders – households, firms, re/insurers, governments, and potentially capital markets – to make insurance more available, more affordable, and to boost uptake in a way that neither public nor private sector could on its own. Such partnerships are not new; many countries have long-standing schemes, such as New Zealand's 80-year-old earthquake programme. Historically, these schemes were founded reactively, often in the aftermath of a major disaster. However, persistent protection gaps are now prompting many jurisdictions to explore PPIPs proactively, rather than waiting for a crisis to force action:

- Since 2022, Australia's Cyclone Reinsurance Pool has addressed chronic affordability and availability issues for cyclone protection. In Italy, where fewer than 6% of businesses were insured against natural disasters, a 2025 bilateral mandate requires businesses to purchase coverage and insurers to offer it, with a state-backed 50% reinsurance quota.[19]

- Debates are ongoing in other jurisdictions around creating PPIPs addressing specific risks: cyber and pandemic risks in the US.; flood coverage in Canada and Germany; and natural disasters in India and at the EU level.[20]

Persistent protection gaps are now prompting many jurisdictions to explore PPIPs proactively, rather than waiting for a crisis to force action.

1.4 Structure of the report

A shift to proactive risk management requires more than financial or technical tools; it requires a social contract in which societies explicitly decide who invests in risk reduction and how losses are shared among households, businesses, re/insurers, and the state.[21,22] This report explores the role PPIPs play in such a social contract. Insurability becomes a political choice, not just a technical issue, shaped by public investment in resilience, market-enhancing policies, and public-private risk-sharing mechanisms.[23]

Establishing PPIPs involves complex trade-offs with significant implications for public finances, markets, and social equity. This report, therefore, seeks to understand when such partnerships are viewed as necessary and how they operate.

- Section 2 details the root causes of persistent protection gaps; introduces how a proactive strategy can address these causes; and suggests how PPIPs can serve as one of three core pillars in forming this strategy.

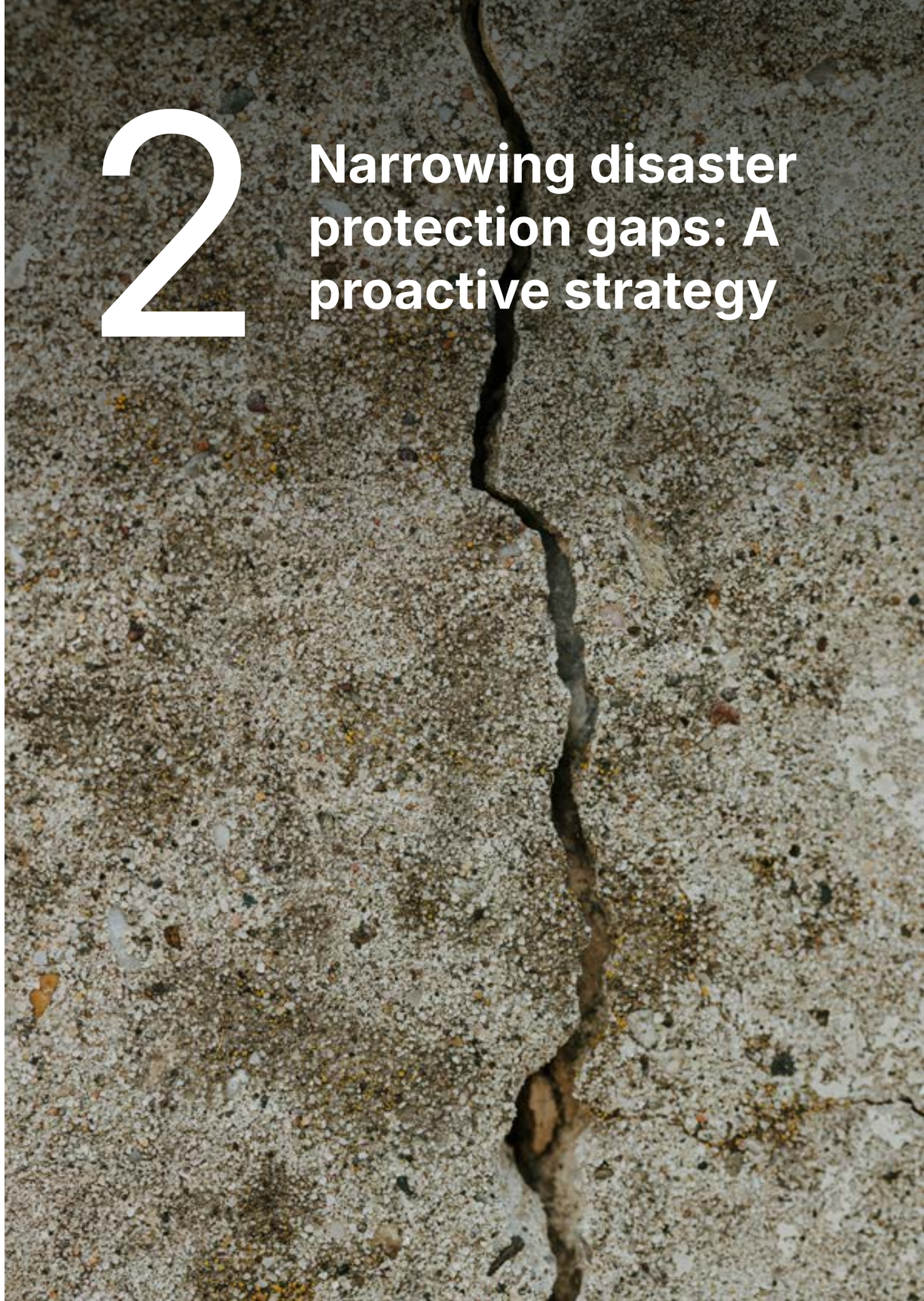
- Next, we analyse the mechanics of this intervention. Section 3 presents the conceptual framework for navigating a PPIP's complex policy trade-offs; and Section 4 lays out the core design components of the PPIP.

- Section 5 tests the aims and designs of PPIPs against their performance identifying common strengths and weaknesses of fourteen existing PPIPs.

- Section 6 diagnoses a growing challenge common to many PPIPs: rising losses threaten the viability of established risk-sharing models. Many PPIPs will need to align with and support risk reduction measures – a challenging role some already seek to fulfil within their capacity to do so.

Finally, Section 7 synthesises these findings into concrete recommendations for designing sustainable PPIPs that are fit for an era of growing and emerging risks.

19 Iannitti and Bonato 2025.
20 Insurance Bureau of Canada; CMS Law-Now 2025; The Insurer 2025; ECB and EIOPA 2024; ESM 2024.
21 Crosweller and Tschakert 2021; European Commission 2024.
22 Governments widely view counterterrorism as a core function of state security. By contrast, in the case of natural catastrophes, responsibility for risk reduction often appears ambiguous.
23 Keucheyan 2023.



2 Narrowing disaster protection gaps: A proactive strategy

Narrowing disaster protection gaps: A proactive strategy

A three-pillar strategy invests in risk reduction; enhances private insurance; and establishes public-private risk sharing mechanisms.

Section 1 shows why disaster protection gaps may require state intervention. An effective strategy must address the root causes of these gaps. Understanding these causes is therefore crucial for developing adequate policy responses to reduce risk and increase risk coverage. This section describes the underlying causes of disaster protection gaps and outlines a three-pillar proactive approach to tackle them.

2.1 Root causes of disaster protection gaps

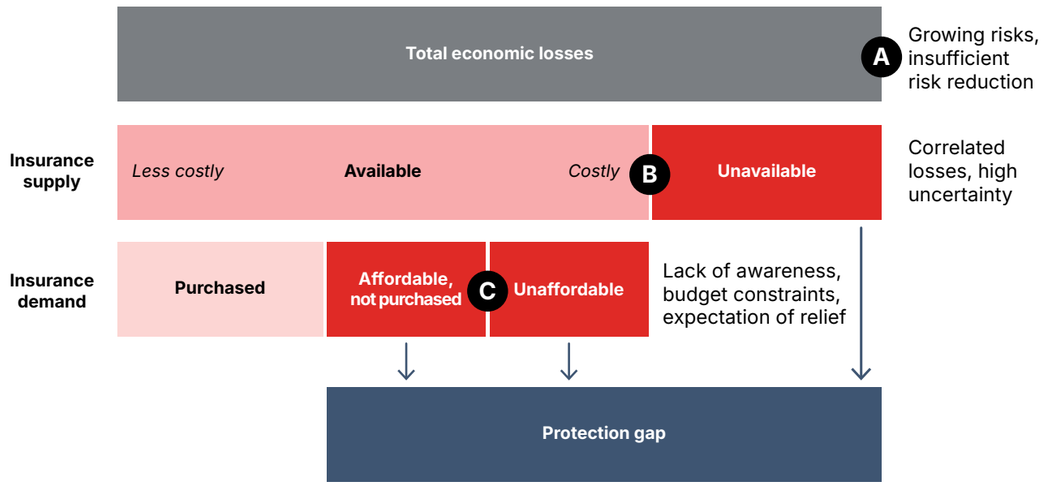
Persistent protection gaps reflect structural frictions in both insurance markets and public policy. This report identifies three root causes (see Figure 2):

A. **On the economic-loss side,** risk reduction strategies may not keep pace with rising hazards, exposures, and vulnerabilities.

B. **On the insurance-supply side,** the potential for significant losses and their uncertainty – defined as the difficulty of quantifying the likelihood and severity of losses – may lead to coverage being either unavailable or available but unaffordable.

C. **On the insurance-demand side,** households and businesses may fail to purchase sufficient insurance due to unaffordability, insufficient risk awareness, or expectations of government relief.

FIGURE 2: CAUSES OF PROTECTION GAPS: A. GROWING RISKS AND UNDERINVESTMENT IN RISK REDUCTION; B. COSTLY OR UNAVAILABLE COVERAGE; C. INSUFFICIENT COVERAGE DEMAND. BLOCK SIZES ARE FOR ILLUSTRATION PURPOSES.



Source: Geneva Association

2.1.1 Growing risks and insufficient risk reduction

Risk is rising as its three components increase: hazard (event frequency/severity), exposure (people/assets in danger), and vulnerability (ease of damage).[24] New hazards are emerging (e.g. cyberattacks and chemical, biological, radiological, and nuclear – or CBRN – terrorism), while existing risks, such as climate extremes, are intensifying.[25] Exposures are growing as urbanisation concentrates assets in potentially high-risk areas, economies increasingly depend on intangible assets such as supply chains, and digitalisation expands cyberattack surfaces. Vulnerability is also increasing in some areas due to weak land-use planning, building codes, and cybersecurity.

Many households and firms face new and worsening risks, including weather-related events, cyberattacks, and pandemics.

As a result, many households and firms face new and worsening risks, including weather-related events, cyberattacks, and pandemics. Many of these risks have systemic potential: a single disruption in energy, transport, or digital infrastructure can cascade across sectors and regions through disrupted supply chains, amplifying losses. At the same time, uncertainty is growing due to limited historical data about new or changing risks. Consequently, some risks grow or evolve faster than societies can respond to them.[26]

Risk reduction occurs at the individual level (e.g. home retrofits) to protect single properties and at the community level (e.g. flood barriers or land-use rules) to protect entire areas. Even though risks are rising, both forms of risk reduction remain underfunded:

- **Individual investments** often fall short as individuals underestimate risk, face budget constraints, or expect government help after disasters.
- **Large-scale projects** require public funding. However, authorities may face fiscal constraints or lack long term policy goals, failing to sufficiently anticipate future returns on investment relative to current costs.[27] Investment may also require blended finance structures, which combine public and private funding. These instruments are often difficult to access because they involve complex risk-sharing arrangements, large minimum investment sizes, and long lock-in periods that exclude most investors.

In addition, individuals and public entities alike often lack robust risk-reduction cost-benefit data, hindering the effective prioritisation and financing of interventions.[28]

2.1.2 Costly or unavailable re/insurance coverage

Business lines, such as motor insurance, rely on diversification: pooling many independent risks reduces the volatility of the average claim, as the law of large numbers predicts. Pooling thus lowers required capital per policy, bringing diversification benefits. This actuarial logic breaks down for disasters, as dependencies lead to simultaneous losses across individual and business lines, undermining diversification. Average claims' volatility subsequently remains high or might increase with pooling, leading to a surge in re/insurers' capital needs, thus inflating premiums.[29] On top of this, uncertainty increases the capital costs re/insurers must pay to compensate investors for absorbing unpredictable future losses.

Simultaneous losses and heightened uncertainty have two consequences:

- **Costly insurance coverage:** As catastrophic losses or high uncertainty increase premiums, additional pressures outside re/insurers' control, such as insurance taxes, inflation, or litigation costs in disputed claims, compound the issue.[30] Low insurance uptake means smaller pools, less diversification benefits, and fixed costs spread over fewer customers, keeping premiums high.
- **Unavailable insurance coverage**: When risks become too concentrated or uncertain, insurers may limit the amount of coverage they offer, impose stricter terms, increase exclusions, or withdraw from some high-risk regions or perils altogether, redeploying their capital to cover other risks. Capital also disappears when the price needed to make a profit is higher than what customers will pay or what regulators will allow.[31]

Reinsurers provide additional capacity by spreading exposures globally, absorbing insurers' tail risk. Capital markets, through insurance-linked securities (ILS), can further increase available capital by tapping into

24 Geneva Association 2023a.
25 For example, an unusual combination of climate change-driven drought and hurricane-force winds reportedly triggered California's January 2025 wildfires (Munich Re 2025c).
26 International Risk Governance Center 2015, 2018.
27 Insurance For Good 2025.
28 World Bank 2024.
29 Ibragimov and Walden 2007; Ibragimov et al. 2009.
30 Kousky and Cooke 2012; Global Federation of Insurance Associations 2025.
31 Feinman 2025.

diversified investor portfolios. However, even these mechanisms hit structural limits to diversification.[32]

2.1.3 Low disaster insurance uptake

Even when disaster insurance is available, uptake may be low. The reasons are frequently similar to the ones that lead to under-investment in risk reduction. These factors include:

- **Cognitive biases:** Individuals frequently exhibit optimism bias, leading them to underestimate the likelihood of rare events such as disasters; only react to recent events; or see insurance as a poor investment due to its uncertain payoff.[33]
- **Institutional factors:** The expectation that governments will step in, or will be obliged, to provide post-disaster relief may suppress demand for insurance.
- **Affordability:** Low-income households or small businesses in high-risk areas may struggle to afford coverage.[34,35]
- **Other factors:** Culture, risk awareness and literacy, personal experience, and emotions all affect risk perception and demand. Abstract contract wording, exclusions, benefits that do not match actual losses (basis risk), and complex or confusing purchase processes also deter buyers.[36]

2.2 A three-step proactive risk-management strategy

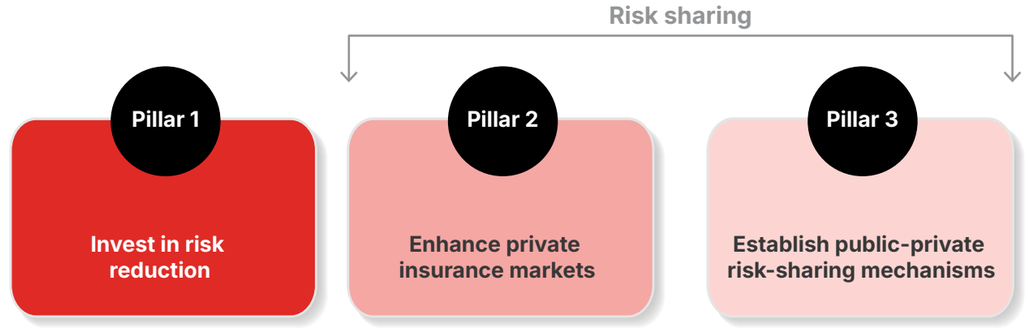
A proactive risk-management strategy must address the causes of the protection gap. This strategy rests on three pillars: one based on risk reduction; and the other two on risk-sharing (see Figure 3).[37]

- **Pillar 1: Investing in risk reduction.** This addresses the first root cause of the protection gap: the risk itself. It is both a responsibility of private individuals (potentially incentivised by legislation or fiscal policy) and public authorities.
- **Pillar 2: Enhancing private insurance markets.** On the demand side, light-touch policy initiatives can include risk awareness campaigns, financial incentives to purchase insurance, or insurance mandates. On the supply side, examples include regulatory frameworks that support capacity-building, such as removing constraints on risk-based pricing or measures to encourage risk transfer to capital markets. These tools help private capacity and support demand without distorting insurance markets.
- **Pillar 3: Establishing public-private risk-sharing mechanisms.** In some regions and for some perils, the demand- or supply-side causes of the disaster protection gap may be better addressed jointly by the re/insurance industry and the public sector. This pillar, often a PPIP, fundamentally interferes with market operations by introducing tools such as state guarantees or by regulating underwriting and pricing. Therefore, it is an instrument that requires careful design.

In some regions and for some perils, the demand- or supply-side causes of the disaster protection gap may be better addressed jointly by the re/insurance industry and the public sector.

32 A 'reinsurance protection gap' also exists. In 2023, for example, only 10% of global Nat Cat losses were reinsured (Ito and McCauley 2022; International Association of Insurance Supervisors (IAIS) and Bank of International Settlements (BIS) 2025).
33 Kunreuther and Pauly 2004; Coatsa and Bajtelsmita 2021; Kunreuther et al. 2013; EIOPA 2024.
34 Sastry et al. 2025.
35 Budget constraints explain why awareness campaigns can fail to increase insurance uptake (Osberghaus and Hinrichs 2021).
36 Lerner et al. 2003; EIOPA 2024.
37 This framework is adapted from Zurich Insurance Group 2025.

FIGURE 3: A PROACTIVE THREE-PILLAR STRATEGY FOR GOVERNMENTS TO REDUCE AND SHARE RISKS



Source: Geneva Association, adapted from Zurich Insurance Group

These three pillars, ordered from least to most market-distorting, represent an ideal order of priority. Risk reduction (Pillar 1) takes precedence whenever it is the most cost-effective option. Ideally, societies would invest in prevention and adaptation until the additional costs of further risk reduction outweigh the benefits. Only then should any remaining residual risk be transferred via private markets and, potentially, PPIPs.

Ideally, societies would invest in prevention and adaptation until the additional costs of further risk reduction outweigh the benefits.

This framework relies on a clear understanding of shared responsibilities, with the government orchestrating a national risk-management strategy:

- **Pillar 1** indicates that while households and businesses are responsible for their private risk reduction, such as retrofitting a property, some risk components, such as the likelihood of a flood, are beyond their control. Then, the government's role in Pillar 1 is twofold: funding and building risk-reduction infrastructure (such as flood defences); and using its legislative authority to set rules (such as land-use regulation or building codes) that incentivise or mandate private action.
- **Pillar 2** is fundamentally a government and regulatory function; only the government can legislate insurance mandates, create tax incentives, or adapt regulatory frameworks.
- **Pillar 3** is also a state responsibility. While it involves a public-private partnership that the re/insurance industry may initiate, only the government can legislate state guarantees or override market practices such as risk-based pricing to address availability and affordability issues.

3 Conceptual framework for PPIP analysis

Conceptual framework for PPIP analysis

State guarantees within guardrails can make disasters more insurable.

Section 2 introduces the rationale for PPIPs (Pillar 3) as state interventions that alter market operations to improve risk-sharing. Economic theory and practice show that attempts to correct a particular market distortion can introduce new distortions, potentially reducing rather than improving overall market efficiency.[38] Moreover, PPIPs have significant impacts beyond re/insurance markets: they typically expose the state to fiscal risk and may involve redistributive mechanisms with implications for social equity. The successful design of a PPIP therefore requires a conceptual framework that captures these implications.

PPIPs have significant impacts beyond re/insurance markets: they typically expose the state to fiscal risk and may involve redistributive mechanisms with implications for social equity.

Designing a PPIP is a complex policy optimisation problem that seeks to maximise societal well-being and market efficiency. This problem has three core components (see Figure 4):

1. **Desired coverage outcomes:** Maximise coverage availability, affordability, and uptake.[39]

2. **Policy tools:** To achieve desired coverage outcomes, policymakers use two main tools:[40]

   - **State guarantees:** Formal commitments by the state to absorb losses for which private capacity is unavailable or prohibitively expensive.

   - **Cost redistribution:** Mechanisms to spread losses and costs across a large pool of policyholders.

3. **Guardrails:** PPIPs are constrained by four practical, potentially competing, imperatives:

   - **Fiscal:** Preserving fiscal space to cope with future shocks to governments' balance sheets.

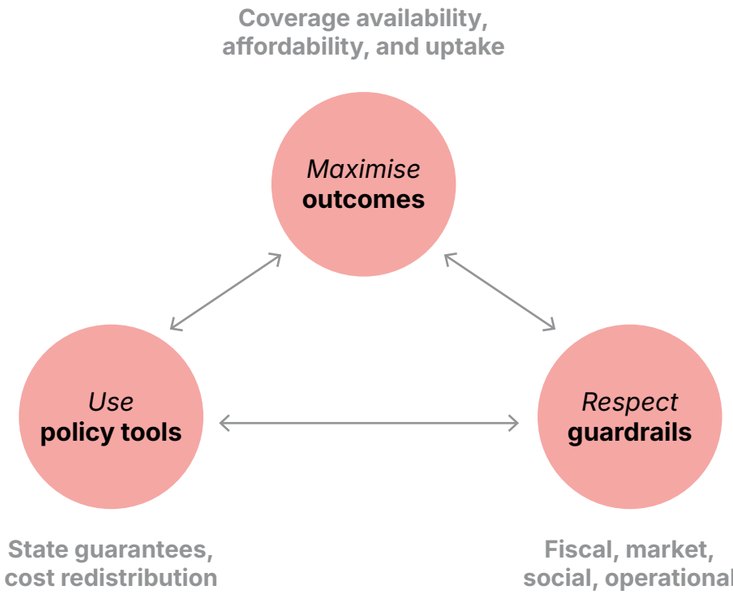
   - **Market:** Not crowding out private markets; ensuring re/insurers carry a sustainable level of risk; fostering market discipline, such as through risk-based prices; and promoting innovation.

   - **Social:** Ensuring vulnerable groups can access coverage at a price they can afford and that benefits are distributed in a way that is considered fair.

   - **Operational:** Delivering predictable, fast claims-paying ability and being adaptable to a changing risk landscape, all while remaining relevant to individual claimants and wider societies.[41]

38 The 'Second Best Theory' by economists Lipsey and Lancaster (1956) suggests that when multiple market distortions exist, attempts to correct only one of them can lead to unintended, negative consequences and move the economy further from efficiency, not closer.
39 Insurance coverage objectives reflect objective 3.1 of G7 Italia (2024) and Section 3.4 of IAIS (2023).
40 Jarzabkowski et al. 2018.
41 Fiscal guardrails reflect objective 3.3 of G7 Italia (2024). Market guardrails reflect objective 3.2 of G7 Italia (2024). Operational guardrails reflect the implementation need 3.11 of G7 Italia (2024).

FIGURE 4: DESIGNING A PPIP IS AN OPTIMISATION PROBLEM



Source: Geneva Association

Policymakers face a challenge: deploying each policy tool to achieve coverage outcomes may collide with or even overstep guardrails. This requires policymakers to evaluate trade-offs:

- State guarantees improve availability and affordability. State backing is cheaper than private capital, lowering prices. When governments absorb tail risk, the remaining risk becomes insurable. Insurers thus face lower capital needs, freeing up capital to underwrite more policies (see Box 1). Ultimately, a well-designed state guarantee can stimulate private market growth. Conversely, one that absorbs otherwise privately insurable risks will stifle competition, testing the market guardrail. Moreover, as explicit contingent liabilities, state guarantees test the fiscal guardrail by reducing budgetary space, even if never used.

- Cost redistribution uses two mechanisms. First, compulsion (mandates to purchase or sell coverage), which increases uptake, creating a larger, more stable pool. It spreads fixed costs and prevents adverse selection (where only high-risk parties buy insurance), thus keeping coverage more affordable. Solidarity pricing, which lowers premiums for high-risk policies, can further boost affordability for those most at risk.[42] Secondly, cost-redistribution, which requires choices in a trade-off between market efficiency and social equity.[43] For example, using solidarity pricing for affordability purposes supports the social guardrail but impacts against the market guardrail by blunting risk signals and undermining competition.

When governments absorb tail risk, the remaining risk becomes insurable.

Each PPIP must secure its social license – broad societal acceptance – by delivering expected outcomes and navigating guardrails in line with societal norms. How PPIPs seek to achieve their objectives while remaining within their guardrails reflects societal expectations and preferences, which explains why schemes differ across countries and perils.

42 While economic theory suggests combining risk-based pricing with targeted taxes or subsidies to support affordability, these solutions require granular data and administrative capacity. This often leads policymakers to regulate prices instead.
43 Rothschild 2024.

Box 1: How state guarantees make disasters more insurable

Efficient risk-sharing relies on loss layering, allocating risk based on frequency and severity (see Figure 5, left):[44]

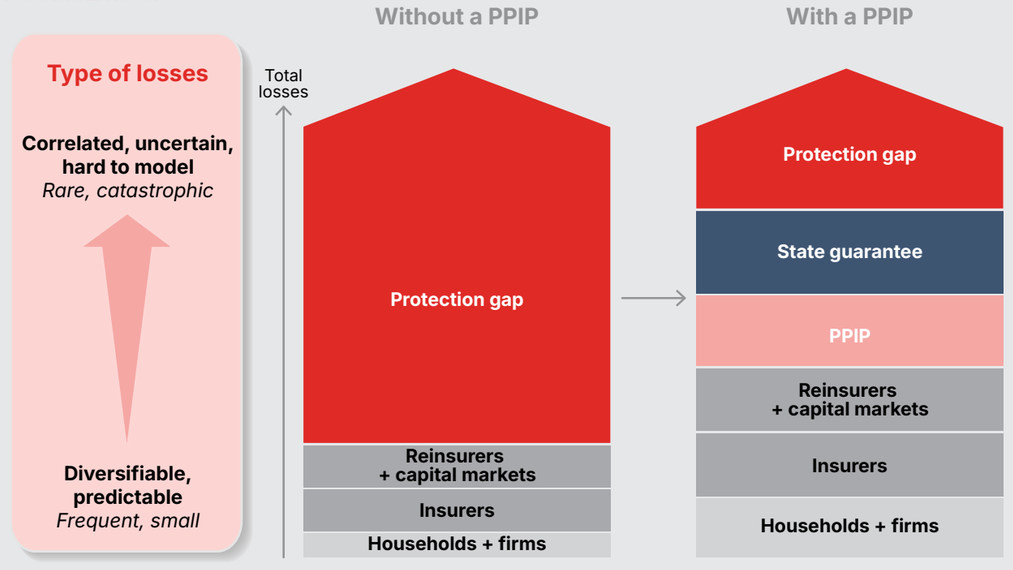
- The smallest, most frequent losses stay with policyholders through deductibles.
- Routine losses (diversifiable, predictable), which entail a low cost of capital, stay with policyholders (deductibles) and primary insurers (up to their retentions). Insurers handle frequent claims at a low operational cost, given their comparative advantage in underwriting and risk management.
- For rare and large losses (correlated, uncertain, hard to model), the cost of capital rises steeply. This makes them best suited for reinsurers or capital markets. These can better diversify risks globally and across business lines, lowering capital needs. Moreover, low claims frequency offsets higher operational costs associated with greater distance from the underlying policyholders.
- For the most catastrophic, correlated, and uncertain events, capacity may be unavailable or unaffordable.

A state-backed PPIP introduces a new financing structure in which the state acts as reinsurer of last resort (see Figure 5, right):

- **State guarantees cover the catastrophic loss layers.**
- **The PPIP's own funds sit below.** Built from retained earnings (accumulated premiums) in low-loss years – thus leveraging time diversification – and, being backed by the state, held at a lower cost than private capital, these funds further improve affordability.[45]
- **Private re/insurers cover the lower layers of risk.** Not bearing extreme losses reduces capital burdens, enabling insurers to offer more coverage at prices customers can afford, boosting availability and uptake.[46]

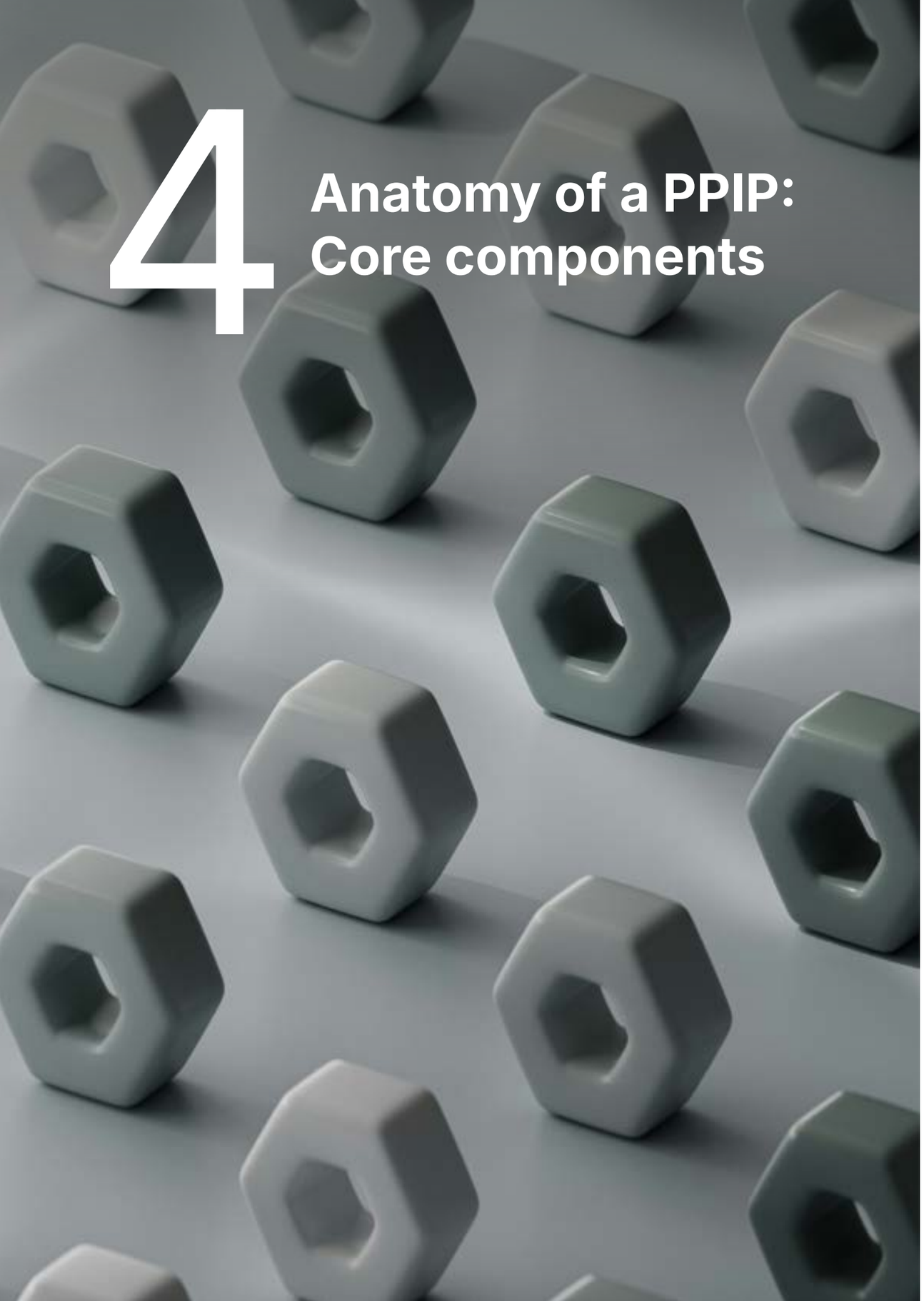
Therefore, state guarantees make disasters more insurable by catalysing capital accumulation.[47] As private and PPIP capacity grow, the state guarantee can move up to cover increasingly less frequent losses, lowering fiscal risk.

FIGURE 5: HOW STATE GUARANTEES MAKE RISKS MORE INSURABLE BY CATALYSING CAPITAL ACCUMULATION



Source: Geneva Association

44 Boyer and Nyce 2013
45 A PPIP's capital does not belong to shareholders. It is solely built from retained earnings
46 For example, capital requirements may be reduced because regulators treat the state guarantee as a sovereign-equivalent risk with a near-zero credit charge.
47 Though state guarantees may be criticised as 'unfair' for transferring disaster costs to taxpayers, this also applies to state relief. The issue is which setup is more economically efficient.



4 Anatomy of a PPIP: Core components

Anatomy of a PPIP: Core components

In increasing insurance availability, affordability and uptake, PPIPs have to navigate a number of different trade-offs.

Drawing on findings from the analysis of fourteen PPIPs across five peril classes (see Table 1), this section explores the specific design choices used to implement state guarantees and cost redistribution while respecting agreed guardrails. Readers interested in the specific features of individual schemes can refer to the detailed table in the appendix.[48]

TABLE 1: THE PPIPs ANALYSED IN THIS REPORT

Name	Peril[49]	Country
Australian Reinsurance Pool Corporation, Terrorism Pool (ARPC-Cyclone)	Terrorism	Australia
Gestion de l'Assurance et de la Réassurance des Risques Attentats et Actes de Terrorisme (GAREAT)		France
Extremus		Germany
Pool Re		UK
Terrorism Risk Insurance Program (TRIP)		US
Japan Earthquake Reinsurance Company (JER)	Earthquakes	Japan
Natural Hazards Commission – Toka Tū Ake (NHC)		New Zealand
Turkish Catastrophe Insurance Pool (TCIP)		Türkyie
California Earthquake Authority (CEA)		US
Caisse Centrale de Réassurance (CCR)	Nat Cats	France
Consorcio de Compensación de Seguros (CCS)		Spain
Flood Re	Floods	UK
National Flood Insurance Program (NFIP)		US
Australian Reinsurance Pool Corporation, Terrorism Pool (ARPC-Cyclone)	Cyclones	Australia

Source: Geneva Association

48 This report does not examine sovereign risk pools in emerging economies, which directly transfer pooled risks to global reinsurance and capital markets.

49 NHC (New Zealand) also covers losses from volcanic eruptions, landslides, hydrothermal activity, tsunamis, and fires resulting from these events. CCR (France) and CCS (Spain) also cover terrorism and earthquake risks, with CCR providing unlimited reinsurance to GAREAT.

The sample covers a range of natural and man-made hazards, mostly in developed countries. While they serve comparable policy objectives, these PPIPs differ widely in how they navigate trade-offs between fiscal, market, social, and operational guardrails. This shows that there is no unique blueprint: each design reflects the conditions – societal, economic, political, or regional – under which the PPIP formed. Moreover, some PPIPs in our sample have operated for decades (e.g. France's CCR) and others for a few years (e.g. Australia's ARPC-Cyclone), shedding light on long-term challenges and illustrating recent trends.

PPIPs differ widely in how they navigate trade-offs between fiscal, market, social, and operational guardrails.

4.1 Implementing the state guarantee

Implementing the state guarantee involves design choices: its scope (risks covered), how it enters the market (e.g. via a PPIP operating as insurer or reinsurer), its payout structure (when it is triggered), the role of capital (private or the PPIP's own) in buffering the state guarantee, and how the state's commitment is priced.

A. Scope of coverage: What does the guarantee cover?

A PPIP's scope defines the specific protection gap that the state guarantee addresses.

Key choices:

- **Eligible perils:** Schemes can be peril-specific or multi-peril. Event definition can be narrow (conventional terrorism only for Germany's Extremus) or broad (including CBRN risks such as in the UK or France). Payouts may also depend on official state recognition of the event (e.g. France's CCR and most terror PPIPs).
- **Eligible exposures:** Terror PPIPs typically insure commercial properties, sometimes focusing on large businesses (e.g. Germany's Extremus, France's GAREAT).[50] Natural disaster schemes usually focus on residential properties, though some include SMEs (e.g. NFIP in the US, ARPC-Cyclone in Australia). Some schemes also cover damage-related business interruption (e.g. France's CCR and the U.K.'s Pool Re).
- **Coverage limits:** Several insurer-PPIPs cover losses only up to a cap (e.g. NHC in New Zealand, TCIP in Türkyie, or NFIP in the US). Reinsurer-PPIPs typically align with property insurance terms, potentially covering all insured losses (e.g. France's CCR) or a regulated, capped loss (e.g. Japan's JER).

Trade-offs:
A narrow scope keeps premiums affordable and limits the chance of hitting fiscal constraints. In fact, a well-calibrated cap can absorb most losses, stabilising livelihoods after a disaster.[51] Moreover, it can stimulate private markets into providing top-up coverage, aligning with the market guardrail. Conversely, a broad scope better reduces protection gaps and brings diversification benefits and economies of scale.[52] However, this may expose the state to larger losses and crowd out private capacity, testing the fiscal and market guardrails.

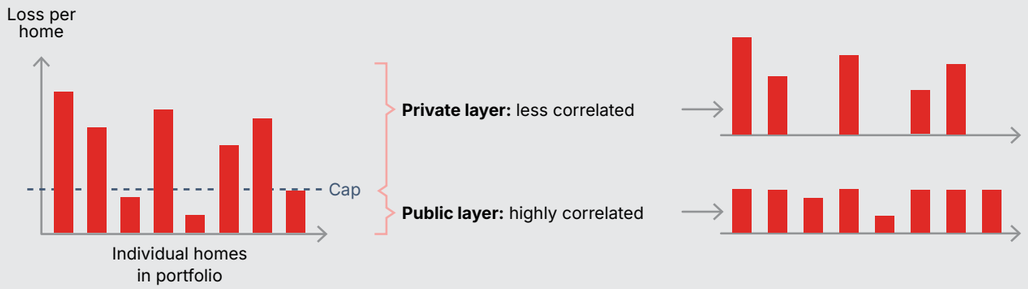
Box 2: How New Zealand's NHC balances public and private shares of risk

Designing PPIPs is a balancing act: the state should absorb some risk, but not too much. New Zealand's NHC provides a real-world example of this optimisation.

The NHC state-backed cover acts as a public deductible (currently NZD 300,000 per property). This cap is designed to solve an insurability problem for private markets, as illustrated in Figure 6. Losses below the cap represent the small-to-medium first loss damages from an earthquake. The key issue for insurers is that these losses can occur simultaneously across all exposed properties. As discussed in Section 2.1.3, highly correlated losses cannot be diversified away, driving up capital costs. Losses above the cap, however, correspond to rarer types of damage. These top-up losses are also more independent from home to home.

By absorbing correlated first losses, the NHC leaves private insurers not only with lower expected losses to cover, but also with a risk that is more diversifiable and thus more insurable.[53] This enables the private market to offer top-up policies at risk-based yet affordable prices. NHC regularly adjusts the cap as construction costs climb, aiming to "keep private top-up cover affordable and attractive."[54] Each cap increase further challenges the fiscal guardrail but supports affordability and private coverage uptake, illustrating the trade-offs PPIPs face.

FIGURE 6 HOW THE NHC'S CAP ABSORBS THE MOST CORRELATED PART OF DISASTER LOSSES



Source: Geneva Association

B. Market role: Insurer, reinsurer, or backstop?

The most visible aspect of state guarantees is how they interface with the insurance market (see Figure 7).

Key choices:

- **Insurer-PPIPs** provide direct insurance to policyholders.[55] An insurer-PPIP pays claims directly from its own reserves and capital (PPIP layer in Figure 7). If those funds are exhausted, the state guarantee covers the excess (state guarantee layer in Figure 7). This model affords the government greater control over policy terms and pricing.[56]
- **Reinsurer-PPIPs** provide reinsurance to private insurers. This lowers insurers' capital costs and preserves market discipline at the direct insurance level. Private insurers retain initial losses (insurers layer in Figure 7), underwrite and manage claims, and cede higher loss layers to the PPIP. The PPIP's reserves and capital are used first, then the state guarantee.
- **Backstops** consist only of a state guarantee triggered above significant private sector retention, with minimal operational structure (e.g. TRIP in the US). A backstop does not collect premiums and therefore does not accumulate capital.

Trade-offs:
Insurer-PPIPs arise when insurance penetration is very low, or coverage is unavailable, as the government assumes direct financial risk – essentially replacing the private market for eligible perils and exposures. Reinsurer-PPIPs or backstops typically arise when private capital is unavailable for disaster-level losses (e.g. Pool Re in the UK or TRIP in the US) or when regulation mandates that insurers offer disaster coverage (e.g. Japan's JER, France's CCR). Insurer-PPIPs are more likely to strain fiscal guardrails, as they assume all eligible losses. Conversely, reinsurer-PPIPs help maintain market discipline at the direct insurance level.

50 Insurers can choose to cede any terrorism policy to GAREAT, but they are required to do so for any policy valued over EUR 20 million. Extremus only focuses on policies with sums insured above EUR 25 million.
51 OECD 2021a.
52 Economies of scale are cost advantages that arise when a larger pool or scheme lowers average costs per unit of coverage, for example, through shared administration or reinsurance purchasing.
53 Berliner 1982.
54 New Zealand's Treasury 2021.
55 Most insurer PPIPs, however, rely on private insurers to distribute coverage and process claims.
56 Organization for Economic Co-operation and Development (OECD) 2021a.

C. Payout structure: Triggers and liability limits

The mechanics of the state guarantee clarify how much capital is available when disaster strikes and what share the private sector provides.

Key choices:

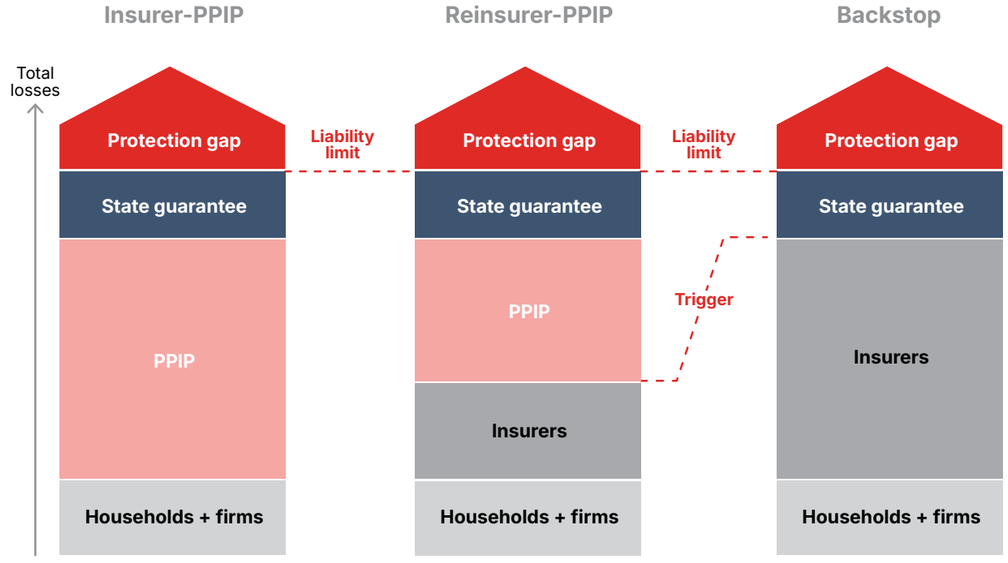
- **Liability limits:** They define the maximum payout, including public and private payouts, per event or annually.
- **Triggers:** For reinsurer-PPIPs and backstops, triggers are the loss threshold at which private insurers' liability ends, and a reinsurer-PPIP or a backstop starts paying claims.[57]

Figure 7 illustrates how liability limits cap total payouts, while triggers mark the transition from private insurer liabilities (including those ceded to private reinsurers) to reinsurer-PPIP or backstop liabilities. For reinsurer-PPIPs, the trigger corresponds to the sum of insurers' retentions. In TRIP (US), a backstop, the trigger defines the losses insurers must bear before fiscal support kicks in.[58]

Trade-offs:
If the trigger is set too low, the reinsurer-PPIP or backstop crowds out private insurers by covering insurable losses, straining the market guardrail; if set too high, a protection gap remains. Calibrating liability limits and triggers, thus, ideally relies on robust risk data and modelling. However, where uncertainty is high, calibration focuses on determining the maximum level of risk the private market's capital base can sustainably retain, ensuring the state acts strictly as a reinsurer of last resort.

The state's fiscal commitment varies, reflecting different approaches to managing the fiscal guardrail. In Japan, the state guarantee accounts for 97.2% of JER's JPY 12 trillion liability limit, while in the US, the state bears around 33% of TRIP's USD 100 billion liability limit. Some schemes benefit from unlimited state guarantees and, therefore, have no liability limits. They cover all eligible losses above the trigger, further narrowing protection gaps but creating open-ended fiscal liabilities that push the fiscal guardrail.

FIGURE 7: LOSS ALLOCATION ACROSS THREE TIERS: 1) INSURERS, 2) PPIP (OWN CAPACITY), AND 3) STATE GUARANTEE
Liability limits cap total payouts, while triggers determine the threshold at which private insurers' liabilities end.



Source: Geneva Association

57 An insurer-PPIP acts as a primary insurer. Therefore, this model does not have insurer retentions (see Figure 7).
58 For insurer-PPIPs, private insurers bear no risk, hence no trigger.

Finally, two PPIPs rely on industry levies instead of state guarantees. These are mandatory post-event contributions collected from insurers or policyholders. This removes fiscal exposure, shifting the cost of disasters onto insurers and policyholders. For example, should available funds run out, Flood Re can impose an unlimited Levy 2 on all UK home insurers. Similarly, California's CEA can levy USD 1 billion from policyholders and USD 1.6 billion from participating insurers. While protecting public finances, post-disaster levies can lead to premium increases or delays in claims payments, potentially straining social and operational guardrails.

If the trigger is set too low, the reinsurer-PPIP or backstop crowds out private insurers by covering insurable losses, straining the market guardrail; if set too high, a protection gap remains.

D. Capital strategy: Buffering the state guarantee

Capital strategies determine how PPIPs manage the risk on their own balance sheet (in Figure 7, PPIP layers).

Key choices:

- **Own capital:** Most PPIPs build capital through retained earnings: in years with few or no major disasters, premium income accumulates to absorb future losses.[59] This capital serves as a first buffer before the state guarantee is called.[60]
- **Private capital:** Many PPIPs also purchase reinsurance and issue ILS – particularly those with smaller or no state guarantees.

Trade-offs:
Own capital accumulation works best for low-frequency perils such as earthquakes or terrorism, with long return periods. In the face of such perils, capital accumulation is essential for managing the fiscal guardrail, creating a buffer – as in the UK's Pool Re, with GBP 7 billion in accumulated funds – that ensures the state guarantee is triggered only rarely. A capital mix that includes reinsurance and ILS, however, helps maintain the market guardrail by shifting more risk to private markets and connecting PPIPs to private pricing and risk signals. This also provides PPIPs with renewable capital and leverages global diversification, but exposes them to pricing volatility, potentially straining the operational guardrail.

A capital mix that includes reinsurance and ILS supports the market guardrail.

E. The cost of the state guarantee

Unlike post-disaster aid, which often is a non-repayable transfer, governments can charge for state guarantees.

Key choices:

- **Upfront fees:** The PPIP compensates the government for its state guarantee, as in the UK's Pool Re.[61]
- **Post-event repayments:** Governments recoup some or all fiscal outlay in the years following a disaster (e.g. New Zealand's NHC or TRIP and NFIP in the US).

Trade-offs:
Upfront fees, which act as a premium to compensate the state for its risk-bearing capacity, monetise the state's commitment. For example, Pool Re (UK) has transferred over GBP 2 billion to the Treasury since its inception, in return for a state guarantee that has never been triggered. Upfront fees help maintain financial discipline in a PPIP by reflecting the cost of fiscal risk. They also provide predictability. This also raises the technical challenge of setting a price for risks that are difficult to quantify. Post-event recoupment, on the other hand, avoids immediate costs for the PPIP but may further strain its finances after major disasters and lead to premium increases, potentially straining the social and operational guardrails.

4.2 Implementing cost redistribution

While state guarantees lower premiums, some PPIPs rely on cost redistribution to further boost coverage affordability and uptake.

Upfront fees help maintain financial discpline in a PPIP by reflecting the cost of fiscal risk.

59 Some jurisdictions also allow or require insurers to set aside additional funds to smooth claim volatility across years (e.g. France and Japan). GAREAT (France) relies solely on insurers' funds rather than building its own.
60 When a PPIP accumulates significant capital, political pressures can arise for it to absorb more risk than is adequate. It may also tempt governments to reconsider the need for a state guarantee.
61 Pool Re (UK) pays 50% of premiums and 25% of profits; CCR (France) pays 1.8% of reinsurance premiums.

A. Compulsion

To overcome low uptake, selling or purchasing insurance coverage may be required by law or regulation.

Key choices:

- **Supply-side mandates** (insurers must offer coverage) mean insurers must include a disaster add-on to specific policies, but policyholders can opt out.
- **Demand-side mandates** (policyholders must buy coverage) are rare, usually targeting specific segments. For example, French tenants must have household insurance (which includes natural catastrophe cover). Türkyie mandates TCIP cover for all eligible properties.
- **Compulsory bundling mandates** both supply and demand. Insurers who sell basic policies must also offer the disaster component, and policyholders who buy basic policies cannot opt out. For example, in France and Spain, Nat Cats and terrorism coverage are bundled with property coverage.

Compulsion also exists in reinsurer-PPIPs. ARPC (Australia) and GAREAT (France) require all insurers to cede all eligible policies to the PPIP. While cession is voluntary, insurers who choose to cede policies to Pool Re (UK) or ARPC-Terrorism (Australia) must cede all their eligible policies. Such mandates lessen adverse selection.

Compared to voluntary systems, compulsion ensures higher uptake, larger and more stable re/insurance pools and thus lower prices.

Trade-offs:
Demand-side mandates or compulsory bundling, which impose costs on consumers, are politically sensitive. Thus, PPIPs often combine them with solidarity pricing (New Zealand's NHC, France's CCR) or a low coverage cap (Türkiye's TCIP) to keep prices down. Conversely, compulsion may be necessary to implement solidarity pricing, ensuring a diversified pool and avoiding adverse selection.

Compared to voluntary systems, compulsion ensures higher uptake, larger and more stable re/insurance pools, and thus lower prices, potentially aligning with social guardrails. However, compulsion restricts choice, weakens underwriting practices, and raises fiscal commitments, weakening both market and fiscal guardrails. It also requires enforcement to be effective, an operational constraint.

B. Pricing approach

In our sample, a PPIP's pricing of disaster risk ranges from risk based (premiums match actual risk levels) to solidarity based (lowering premiums for high-risk groups).[62]

Key choices:

- **Prices at the policyholder level:** Insurer PPIPs set premiums directly. For reinsurer-PPIPs or backstops, direct insurers typically set risk-based rates, with some reinsurer-PPIPs introducing solidarity pricing at the reinsurance level. For JER (Japan) and CCR (France), however, direct insurance premiums are regulated and subsequently ceded to the reinsurer-PPIP.
- **Who finances the subsidies:**
  - **Internal subsidies** come from within the PPIP's own risk pool. This can happen through flat rates, where low-risk policies subsidise high-risk ones (France's CCR); through pricing models that use broad risk zones that do not reflect risk at a granular level (Japan's JER); or through rates that depend on sums insured (France's GAREAT) or council tax bands (Flood Re in the UK). In Australia's ARPC-Cyclone, a state guarantee lowers the PPIP's overall costs. These savings are then used exclusively to lower reinsurance premiums for high-risk policies.
  - **External subsidies** are financed by parties outside the pool. For example, Flood Re (UK) relies on Levy 1, an annual charge on all UK home insurers.

Solidarity pricing improves affordability and uptake but weakens risk-reduction incentives and market discipline.

Trade-offs:
Risk-based pricing creates economic signals that direct investment toward risk reduction, which respects the market guardrail. However, it is data-intensive and can entrench unaffordability in high-risk areas, potentially straining the social guardrail. Conversely, solidarity pricing improves affordability and uptake but weakens risk-reduction incentives and market discipline. It may also raise fairness concerns when subsidies do not benefit the most vulnerable.

62 Note that TRIP, a backstop, does not price its coverage. However, should any federal outlay occur, the US Treasury will recoup some or all of it post disaster via a surcharge on all commercial property and casualty policies covered by TRIP.

5 PPIPs in practice: From creation to performance

PPIPs in practice: From creation to performance

While PPIPs have stimulated insurance availability, affordability and uptake, they have frequently run against guardrails.

This section discusses the drivers behind the creation of featured PPIPs; before assessing their real-world performance and how they navigate fiscal, market, social, and operational guardrails. Most PPIPs have succeeded in improving insurance availability, affordability, and uptake. Yet many struggle to stay within one or more guardrails. Some schemes have stifled private insurance markets while others have exposed the state to rising fiscal risk. Moreover, new or growing risks drive up loss volatility, testing the limits of even well-designed PPIPs, highlighting the need for greater risk reduction (Pillar 1), an issue explored in the next section.

5.1 How crises catalyse PPIP creation

The history of existing PPIPs shows that a crisis often triggers their creation (see Box 3 and Figure 8):

- **A costly disaster is often a catalyst.** In some cases, a major loss event led re/insurers to sharply increase their prices or withdraw cover altogether. This prompted governments to introduce PPIPs to restore capacity and stabilise markets (including all five terror schemes and California's CEA). In markets with low insurance uptake, however, the (sometimes repeated) cost of state relief led to the creation of a PPIP – often an insurer-PPIP – to increase coverage uptake and relieve governments of some future disaster losses.[63]
- **For the more recent schemes, availability and affordability pressures act as a catalyst.** For Flood Re (UK), an industry-government agreement ended, leading to a sudden withdrawal of private insurance for homes in flood-prone areas, amid rapidly rising flood losses that were already straining coverage affordability.[64] Similarly, the creation of the ARPC-Cyclone (Australia) in 2022 was prompted by a chronic affordability and availability crisis for cyclone protection in Northern Australia. In both cases, the PPIP acts as a reinsurer, providing additional capacity to direct insurers.

Some PPIPs addressed severe reinsurance shortfalls when terrorism risk, previously underestimated, became largely uninsurable.

63 Noy and Uher 2024.
64 Guy Carpenter 2020; OECD 2016.

Box 3: When a disaster triggers action

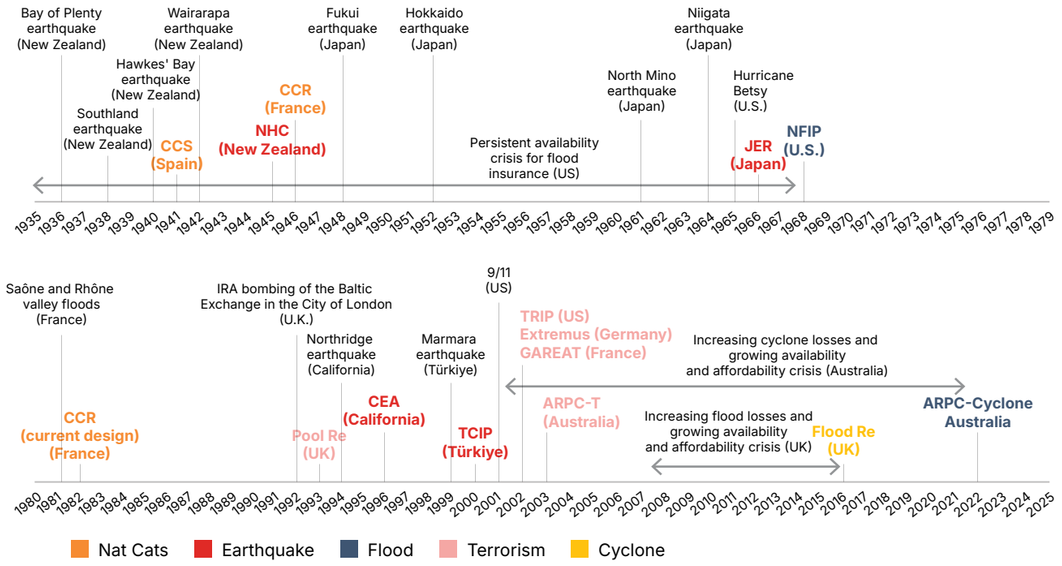
Four of the five terrorism-related schemes analysed – TRIP (US), GAREAT (France), Extremus (Germany), and ARPC-Terrorism (Australia) – emerged in the aftermath of the 9/11 attacks. The UK's Pool Re was established in 1993 after the IRA bombing of London's Baltic Exchange. These PPIPs addressed severe reinsurance shortfalls when terrorism risk, previously underestimated, became largely uninsurable, affecting critical sectors such as aviation, tourism, and commercial real estate lending.

Similarly, the four earthquake PPIPs were triggered by major earthquakes, often after private insurers had already withdrawn from the market (Japan, New Zealand) or where insurance penetration was minimal (Türkyie), following decades of costly losses. In California, home insurers are mandated to offer earthquake insurance alongside basic coverage, meaning that insurers cannot selectively withdraw capacity for earthquake risk. The CEA aimed to stabilise the homeowners' market after insurer withdrawals following the 1994 Northridge quake, due to previously underestimated losses.

Finally, France's CCR was implemented in 1982 after a series of severe floods between late 1981 and early 1982 revealed a significant protection gap, insurance being either too costly or unavailable.

Source: Geneva Association

FIGURE 8: TIMELINE CREATION OF PPIPS



Source: Geneva Association

5.2 PPIP archetypes: Two ways of balancing policy trade-offs

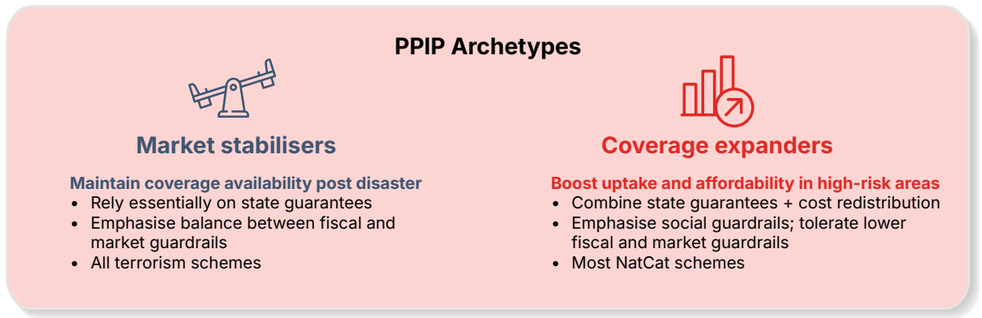
When examining the performance of existing PPIPs, two archetypes emerge, reflecting different objectives and choices made regarding the policy trade-offs discussed earlier. Understanding these archetypes helps frame the assessment of their successes and challenges (Figure 9).

- **Market stabilisers:** Primarily created to restore insurance capacity after a market disruption (e.g. the 9/11 attacks, see Box 3). This archetype relies on state guarantees to help capacity grow back, including through the PPIP's own capital. Market stabilisers often use voluntary participation and risk-based pricing, thus maintaining a balance between fiscal and market guardrails. This prevents a crunch in private-insurance availability from impacting other critical economic sectors, such as aviation or real-estate lending.

Market stabilisers often use voluntary participation and risk-based pricing, thus maintaining a balance between fiscal and market guardrails.

- **Coverage expanders:** Primarily focused on broadening insurance coverage, particularly in high-risk areas where uptake is chronically low (e.g. France's CCR, New Zealand's NHC) or – for more recent schemes – where rising losses erode availability and affordability (e.g. the UK's Flood Re, Australia's ARPC-Cyclone). This archetype typically combines state guarantees with cost redistribution, placing greater emphasis on social guardrails (affordability, access), sometimes at the expense of fiscal or market discipline.

FIGURE 9: TWO PPIP ARCHETYPES

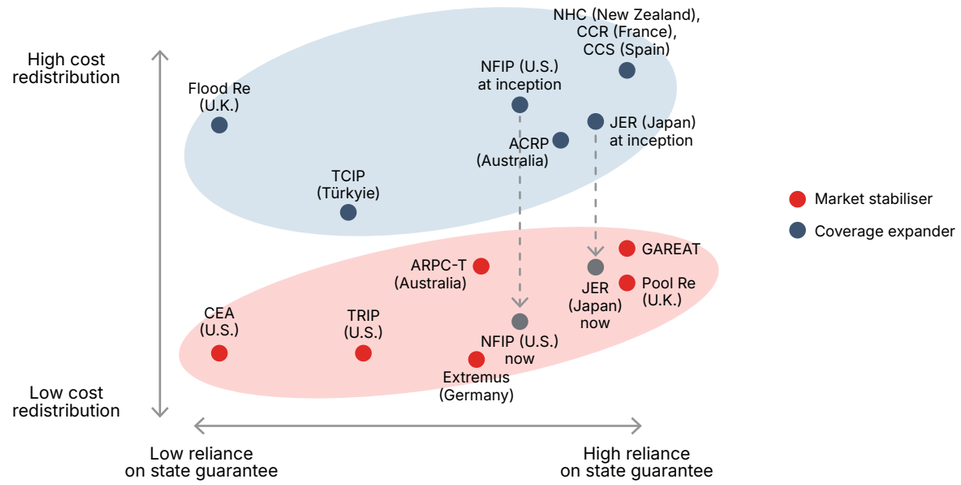


Source: Geneva Association

In our sample, all terrorism PPIPs, as well as California's CEA (earthquakes), are market stabilisers (Figure 10).

FIGURE 10: STATE GUARANTEES VS. COST REDISTRIBUTION AND PPIP ARCHETYPES

This mapping is intended to facilitate comparison based on a qualitative review of each PPIP's structure.



- The horizontal axis reflects the state guarantee's importance in a PPIP's total claims-paying capacity. It is highest when state guarantees are unlimited.
- The vertical axis represents expert judgement about the degree of cost redistribution achieved through compulsion and solidarity pricing. Coverage expanders (blue cluster) exhibit significantly more cost redistribution than market stabilisers (red cluster). Note that NFIP (US) and JER (Japan) – two coverage expanders – have moved towards more risk-based pricing (NFIP since 2022, JER gradually since 1980), which is reflected in their changing positions.

Source: Geneva Association

5.3 Coverage outcomes: Successes and shortfalls

PPIPs with a market-stabiliser archetype have restored availability and price stability in markets experiencing reinsurance shortfalls or pricing spikes. Reviews of TRIP (US), ARPC-Terrorism (Australia), and Pool Re (UK) consistently highlight their role in preventing market failure.[65] However, because most market stabilisers rely on voluntary coverage and risk-based pricing, protection gaps remain where coverage is expensive or potential customers lack awareness. For example, only 4% of UK SMEs carry terrorism cover.[66] CEA (California) reaches fewer than 15% of homeowners.

Coverage expanders that combine compulsion and solidarity pricing achieve the highest coverage and improve affordability the most. NHC (New Zealand, CCR (France), and CCS (Spain), which use compulsory bundling and solidarity pricing, achieve uptake of around 90–95%.[67] ARPC-Cyclone reduced cyclone premiums in high-risk areas by around one-third and raised quote success rates from 66% to 84% in its first year. Before Flood Re (UK), only 8% of high-risk households could obtain more than two quotes; now 99% can get fifteen or more.[68]

Conversely, coverage expanders that rely on voluntary participation struggle to increase insurance uptake. In the US, NFIP take-up is around 30% in flood zones. In California, 89% of policyholders opt out of the CEA's earthquake coverage. In Japan, only 35% of households have fire insurance, although the earthquake add-on rate rose from 33% in 2001 to 70% in 2023, indicating increased risk awareness. Despite a purchase mandate, Türkiye's TCIP's weak enforcement leaves 40% of eligible households uninsured.

For both market-stabiliser and coverage-expander archetypes, moreover, protection gaps persist for perils and exposures outside scheme mandates. These include CBRN or cyber risks for some terrorism PPIPs, commercial property in earthquake schemes, or post-2009 homes and dwellings of over three units in Flood Re (UK). Likewise, because ARPC-Cyclone (Australia) only covers cyclone-related losses, property insurance prices keep rising or remain unaffordable in regions exposed to other types of flooding.[69]

Finally, these PPIPs were established to cover physical property damage and, in some cases, resulting business interruptions.[70] Yet, corporate value has shifted to intangible assets and global supply chains.[71] While property damage remains an important issue, new exposures, such as data loss and contingent business interruption, which are not tied to physical property damage, may require dedicated solutions.

5.4 Guardrails: Navigating trade-offs in practice

This subsection examines how PPIPs have navigated the four guardrails outlined in Section 3. Examining their performance through the lens of the guardrails reveals both successes and areas of strain. This often suggests a need for reform, a discussion that is ongoing for several PPIPs.

Fiscal guardrail: Preserving fiscal space

Well-designed PPIPs protect public finances by building capacity for routine losses and making the state a reinsurer of last resort. Across PPIPs, four patterns stand out:

1. **Some guarantees are rarely drawn upon.** Terror PPIPs, which are market stabilisers, as well as several coverage expanders such as TCIP (Türkyie) and CCS (Spain), have never drawn on state guarantees. Their success rests on accumulated funds or strong private reinsurance programmes that effectively buffer the state guarantee.[72] France's CCR used its unlimited state guarantee once (in 1999, after the Lothar/Martin storm).

Terrorism PPIPs have never drawn on state guarantees.

2. **Peril frequency and pricing drive fiscal risk.** Where hazard frequency is lower, private and PPIP capacity grows, and triggering the state guarantee becomes less likely (e.g. terrorism PPIPs, New Zealand's NHC until the 2010–11 Canterbury earthquakes, TCIP in Türkyie). Conversely, high-frequency or clustered events can drain a PPIP's capital. For example, NHC required state support after the 2016 Kaikōura quake, following reserve depletion in the 2010–11 Canterbury sequence. France's CCR has been running on low funds since 2023 after a particularly costly drought in 2022, and in a context of increasing losses (Box 4).

65 Federal Insurance Office, U.S. Department of the Treasury 2024; The Treasury, Australian Government 2021; HM Treasury 2022.
66 Pool Re 2025a.
67 In France, almost 100% of SMEs purchase commercial property insurance (OECD 2021b).
68 Australian Reinsurance Pool Corporation 2025; Flood Re 2025.
69 Australian Competition & Consumer Commission 2025.
70 The UK's Pool Re, which offers reinsurance for non-damage business interruption (NDBI), is a notable exception.
71 Swiss Re, 2018.
72 ACRP is young; future events will test its calibration.

3. **When guarantees are over-relied upon, reform follows.** Solidarity pricing in the coverage-expander archetype can generate financial losses or even deficits for PPIPs facing the growing strain of high-frequency perils, such as floods and droughts, thereby increasing fiscal exposure (e.g. CCR in France, NFIP in the US). After significant losses, PPIPs rebuild capital through higher premiums or levies (e.g. Japan's JER after the 2011 Tohoku earthquake) and boost their claims-paying capacity by transferring more risk to private markets. Both New Zealand's NHC and the US NFIP have turned to reinsurance and ILS in the past decade, once their debt burdens became unsustainable.[73] Despite a USD 16 billion debt cancellation in 2017, however, the NFIP still owes over USD 20 billion, underscoring the need for structural reform.

4. **Temporary state guarantees often become permanent.** For example, the NFIP (US) has been continually extended since 1968.[74] Moreover, market uncertainty over a PPIP's continuation may create industry pressure for repeated extensions (e.g. TRIP in the US).[75]

Market guardrail: Not crowding out private markets, ensuring insurers bear a sustainable level of risk, fostering market discipline and innovation

Successful PPIPs crowd in private capital without hollowing out market discipline. Four lessons emerge:

1. **Diversified pools attract private reinsurance.** PPIPs that build large, diversified pools are more attractive to reinsurers and ILS investors. In Türkyie, TCIP's growing pool size enabled it to cut reinsurance costs by 35% within five years.[76]

Some coverage expanders stimulate private markets, while others can crowd them out.

2. **Capped public cover can stimulate private top-up markets.** In New Zealand, after the Canterbury earthquakes, private insurer claims were double those of the NHC, showing how a capped PPIP coverage can help anchor a robust private market for top-up insurance.[77] Where demand is chronically low, however, complementary markets struggle to appear (e.g. Türkiye's TCIP, NFIP in the US).[78]

3. **Coverage expanders can crowd out private markets.** CCR, with its cheap, state-backed capacity, covers about 90% of France's Nat Cat reinsurance market (Box 4).[79] Similarly, Spain's CCS is the de facto sole insurer for what it considers as extraordinary risks. This limits room for innovation or alternative pricing.

4. **Solidarity pricing in the coverage-expander archetype masks risk signals in high-risk areas.** In New Zealand and in France, solidarity has sustained property values in high-risk areas.[80] In the UK, Flood Re's introduction in 2016 increased property values in high-risk zones, reduced risk awareness, encouraged new real estate development, and depressed homeowners' uptake of government resilience programmes.[81] In the US, the NFIP's subsidised coverage supported renewed development in high-risk floodplains, attracting or retaining residents in these areas.[82]

Social guardrail: Ensuring vulnerable groups can access coverage at a price they can afford and that costs and benefits are distributed in a way that is considered fair

PPIPs, especially those with a coverage-expander archetype, derive much of their social license from how they address affordability. Successful schemes manage to broaden participation and protect vulnerable groups.

1. **Solidarity anchors legitimacy for coverage expanders.** The CCR's flat pricing reflects France's constitutional principle of equality. In other contexts, the legitimacy of solidarity pricing rests on it being a temporary fix. In the US, NFIP subsidies were meant to be temporary while floodplain regulations took effect, yet they persist nearly sixty years later. Similarly, Flood Re (UK) offers time-limited subsidies until 2039 to enable risk reduction to lower economic losses before a managed transition back to risk-based pricing.

73 Artemis 2016; Reinsurance News 2018; Reinsurance News 2019; Artemis 2023.
74 Most coverage expanders, such as France's CCR, were designed as permanent interventions from the start.
75 TRIP's brief 2015 lapse disrupted the insurance market, underscoring ongoing dependence on federal support (Insurance Journal 2014).
76 World Bank 2006b.
77 Insurance Council of New Zealand. See also Box 2.
78 Private appetite for flood risk in the U.S. is limited but growing (Insurance Information Institute 2025; Fitch Ratings 2025).
79 Keucheyan 2023.
80 Owen and Noy 2019; Charpentier et al. 2022.
81 Garbarino et al. 2024; Pearce 2025.
82 Peralta and Scott 2024.

2. **Social choices are politically sticky.** Once solidarity pricing is in place, it is difficult to unwind. In the US, the 2012 Biggert-Waters reform – an attempt to restore risk-based pricing in the NFIP – was rolled back after political backlash. The transition to risk-based pricing took nearly a decade and is still incomplete.

Social choices are politically sticky. Once solidarity pricing is in place, it is difficult to unwind.

3. **Risk-based pricing strengthens incentives, but those most at risk may remain uninsured.** By clearly signalling hazard levels, risk-based pricing can stimulate investment in risk reduction. Yet without subsidies, low-income households and SMEs can face high insurance costs, as seen in California's CEA (a market stabiliser).[83]

4. **Solidarity pricing in coverage expanders can have unintended impacts.** It expands affordability and uptake, but its benefits may flow disproportionately to wealthier households in high-risk areas (e.g. France's CCR).[84] There is also some evidence that the US NFIP disproportionately benefits the wealthy in high-risk coastal areas.[85]

Operational guardrail: Delivering fast claims-paying ability and adaptability while remaining relevant

Effective PPIPs gain credibility through efficient operations, predictability, and adaptability:

1. **Efficient claims management fosters trust.** While schemes like CCR (France) and Pool Re (UK) have demonstrated fast payouts, others, such as the US NFIP, have faced criticism for delays, disputes, or fraud following major events. NHC (New Zealand) experienced delays due to complex joint-claim processes.[86]

PPIPs needing regular budget approval or reauthorisation face instability.

2. **Periodic reauthorisation creates uncertainty.** PPIPs needing regular budget approval or reauthorisation face instability. The US NFIP, with around 4.7 million policies, has been reauthorised 30 times since 2017.[87] It temporarily lapsed in October 2025 due to congressional deadlock, disrupting housing markets.[88]

3. **Adaptability is key.** Several market stabilisers have shifted risk back to private markets by raising insurer retentions (e.g., TRIP in the US, Pool Re in the UK).[89] Other PPIPs have evolved to extend coverage to emerging disaster risks – for example, cyber terrorism and non-damage business interruption for Pool Re, or by raising caps when risk increases (e.g., New Zealand's NHC).

Increasing claims from climate change and inflation create balance-sheet pressures for many PPIPs with a coverage-expander archetype.

4. **Rising risks strain existing mechanisms.** Increasing claims from climate change and inflation create balance-sheet pressures for many PPIPs with a coverage-expander archetype, forcing operational changes. Australia's ARPC-Cyclone experienced a 237% loss ratio in its third year of existence.[90] In 2024, Flood Re (UK) raised levies and liability limits amid rising reinsurance costs and growing risks.[91] The scheme, designed as a residual reinsurance mechanism to support high-risk homes, saw a 20% increase in uptake in 2024, signalling a decline in private capacity in the UK[92] In the US, NFIP began shifting to risk-based pricing in 2021 amid debt and climate pressures. With depleted funds, France's CCR raised its surcharge in 2025. However, growing costs threaten the viability of the entire system (Box 4).

83 Los Angeles Times 2019.
84 Charpentier et al. 2022.
85 Congressional Budget Office 2024.
86 Lauer 2016; The Washington Post 2022.
87 Insurance Journal 2025.
88 AM Best 2025.
89 Pool Re 2025b.
90 Reinsurance News 2025.
91 Reinsurance News 2025.
92 Prevention Web 2025.

Box 4: Case study: France's CCR – The erosion of guardrails under rising climate risk

France's CCR exemplifies the complex balancing act facing PPIPs. The choices it makes in prioritising certain guardrails may stretch others, leading to financial strain and contestation.

Solidarity foundation (social guardrail): Created in 1946 to support post-war economic stabilisation, CCR became central to France's disaster risk management with the 1982 Natural Disaster Insurance Reform. Driven by the French constitutional principle of solidarity in the face of national calamities, this reform made disaster coverage mandatory for property insurance policies. Critically, it mandated flat-rate pricing (a surcharge on property policies regardless of individual risk) and backed insurers with reinsurance from CCR, which benefits from an unlimited state guarantee.

Contestation (market guardrail): While enjoying broad support, the combination of flat pricing and an unlimited state guarantee means CCR offers reinsurance at below-market prices, stifling competition. In 2012, reinsurer SCOR contested the state guarantee before the European Commission, arguing it distorted competition. Although the E.U. General Court upheld CCR's legality in 2016, the case underscores the tension between the solidarity-based model and market efficiency principles.[93]

Strain from growing risks (fiscal and operational guardrails): Today, the CCR faces significant strain, primarily due to drought-related clay shrink-swell (retrait-gonflement des argiles or RGA) – a peril ill-suited to the scheme's original design. RGA involves slow, repeated ground movements, causing costly structural damage. It is gradual, predictable, and non-random, violating key insurability conditions and differing vastly from the acute disasters the 1982 rules envisioned.

- **Fiscal strain:** RGA risk affects nearly half of mainland France (10.4 million homes). Losses have surged, exceeding EUR 1 billion annually (2017–2020) and reaching EUR 2.9 billion for the 2022 drought alone, compared to a long-term average of EUR 445 million.[94] This dramatic increase puts severe pressure on the fiscal guardrail, forcing a 66% premium surcharge increase in 2025 to shore up finances.

- **Operational strain:** Rules designed for sudden events struggle with this chronic peril, leading to high rates of claim refusal (around 50%) and disputes, testing the operational guardrail. In response, the government eased eligibility criteria in 2024, further increasing the CCR's share of RGA losses.

Experts agree that current prevention measures cannot stop rising RGA losses, prompting debate over reforms ranging from stronger prevention mandates to removing RGA from the scheme and to entirely socialising disaster insurance.[95] This mounting pressure highlights the need to adapt designs to remain within agreed guardrails as risks evolve.

Source: Geneva Association

93 Keucheyan 2023.
94 French Senate 2023.
95 Haut Commissariat à la Stratégie et au Plan 2025.

6 The risk-reduction imperative

The risk-reduction imperative

The challenge is not just balancing outcomes and guardrails, but ensuring that the PPIP serves as a resilience accelerator.

For many PPIPs, particularly those with a coverage-expander archetype, the strains detailed in Section 5 – from the US NFIP's chronic debt and the UK's Flood Re rising costs to capital depletion in France's CCR or New Zealand's NHC – highlight how rising risks stretch current designs. This reflects a political reality: PPIPs (Pillar 3) are almost always established before meaningful risk-reduction measures (Pillar 1) are in place.

This section examines how existing PPIPs aim to reduce economic losses from disasters. It points out the limitations of methods that focus solely on changing individual policyholders' behaviour, before advocating for a fundamental shift in how PPIPs are designed, prioritising measures that also alter risk and behaviour at a collective level.

6.1 When risk-sharing hinders risk reduction

In an ideal world, risk-sharing measures (Pillars 2 and 3) address the protection gaps that remain after cost-effective risk-reduction measures (Pillar 1) have been exhausted. In practice, however, the urgency of addressing growing availability and affordability pressures, as well as real-world timelines, often means PPIPs (Pillar 3) are implemented before meaningful efforts in Pillar 1 and 2:

The urgency of addressing growing availability and affordability pressures often means PPIPs (Pillar 3) are implemented before meaningful efforts in Pillars 1 and 2.

- A PPIP can be legislated quickly: most of those in our sample were enacted within 2 years.[96] By contrast, Pillar 1 involves large-scale infrastructure projects, building codes, and land-use planning changes that take years or decades to fully mature.[97] Pillar 2 also involves slow processes, such as changing public perception and behaviours or building risk literacy.[98] Adapting laws or regulations is a deliberative process that also typically takes years.
- Unlike risk reduction, which requires immediate fiscal expenditure, state guarantees act as contingent liabilities that are off the fiscal balance sheet. A PPIP thus provides an immediate, visible financial safety net to soothe markets and voters, while costs are deferred to future budgets.[99] Furthermore, successful risk reduction results in more non-events (e.g. floods that do not happen), generating little political credit. By contrast, a PPIP is a visible action that demonstrates responsiveness.[100]

96 This rapid timeframe pertains to the execution phase of the PPIP, such as legislation and operational implementation, once all stakeholders agree on the need for a PPIP and its design. In some cases, however, reaching such a consensus is a decades-long process that a disaster will often precipitate. In Japan, discussions about an insurance scheme started as early as 1878 (General Insurance Rating Organization of Japan 2022). JER was implemented two years after the 1964 Niigata earthquake, which eventually prompted consensus across government and insurers.
97 Because building codes and land-use plans only affect new buildings, resilience improves only as new, compliant structures replace older ones, a process taking decades.
98 Appleby-Arnold et al. 2021.
99 Williams 2011.
100 Healy and Malhotra 2009.

- Risk-reduction measures concentrate costs on groups such as property developers, at-risk homeowners, and local governments, who can be highly motivated to organise and oppose them.[101] In contrast, a PPIP's costs are distributed among taxpayers, making PPIPs the option with the least political resistance.[102]

Unlike risk reduction, which requires immediate fiscal expenditure, state guarantees act as contingent liabilities that are off the fiscal balance sheet.

When a PPIP relying on solidarity pricing is implemented first, market signals diminish or disappear. Consequently, risk awareness diminishes among policyholders, decreasing incentives to invest in risk mitigation and artificially maintaining property values and population growth in high-risk areas (see Section 5.4).

Moreover, solidarity pricing can trigger public sector moral hazard. By making coverage affordable and available through a PPIP, local authorities can postpone necessary investments or politically difficult adaptation measures, such as relocation. For example, Flood Re (UK) has faced criticism for potentially enabling the deferral of crucial flood defence investments.[103] The Association of British Insurers (ABI) has urged for more investment, and Flood Re itself warns that low public investment, climate change, and floodplain development threaten its intended 2039 sunset.[104]

Similarly, through NFIP, some US states and local governments have benefited from population growth in high-risk areas, for example, through tax revenue, by allowing "two or three times more construction in these risky areas than in safer regions".[105] States receive the benefits of economic development through the NFIP, while the federal government bears the financial costs of flooding. A similar disconnect exists in France, where experts highlight that local authorities tend to support development in high-risk areas, expecting the state-funded CCR to cover the insurance costs.[106]

6.2 Retrofitting PPIPs: Adding risk-reduction features

The US NFIP is the only solidarity-based PPIP in our sample that supported risk reduction from the outset. Today, however, many other PPIPs have incorporated risk-reduction measures into their core design, aiming to align their risk-sharing function (Pillar 3) with risk-reduction objectives (Pillar 1). While some schemes, such as France's CCR and the US NFIP, support collective prevention measures, most focus on reducing their own loss experience by incentivising policyholders to strengthen their properties. Additionally, or instead, some invest in the sharing of risk models and data, together with education programmes, to support public and private risk-reduction efforts.

Many PPIPs have incorporated risk-reduction measures into their core design to help align their risk-sharing function with risk-reduction objectives.

A. Integrating with public-policy and community action

PPIPs connect essential stakeholders: policyholders, re/insurers, and various levels of government. Leveraging these connections can facilitate coordinated approaches in which PPIPs support national strategies:

- **Community standards:** From its inception in 1968, the US NFIP required communities to enforce minimum floodplain regulations to access coverage. Furthermore, its Community Rating System offers premium discounts to residents in towns that adopt flood risk reduction measures exceeding these minimums, rewarding collective action.[107] In 2001, France's CCR (established in 1982) began implementing higher deductibles in municipalities without an approved Risk Prevention Plan (RPP) – which establishes zoning maps and regulates construction based on risk levels. This penalises local governments for inaction.[108, 109]

101 For examples of such opposition, see Papsco 2016; Los Angeles Times 2024; New York Times 2018.
102 The prioritisation of PPIPs over risk reduction could be a result of concentrated benefits and dispersed costs (Olson 1971). The immediate financial gains of establishing a PPIP rather than regulating land use and building are concentrated among highly motivated interest groups (developers, mortgage lenders, at-risk homeowners or communities) who effectively lobby for coverage. Conversely, the costs of a PPIP are dispersed across the entire tax base, leaving taxpayers no real incentive to lobby against the risk transfer.
103 Christophers 2019.
104 Flood Re 2023a; Financial Times 2025; Flood Re 2023b; Bloomberg 2024; Surminski 2018; ABI 2025.
105 Council of Economic Advisers 2023.
106 Barraqué and Moatty 2020.
107 See Kousky and Shabman 2015 for a discussion of community-based insurance.
108 Guiller 2017.
109 This approach has been abandoned lately because it unfairly penalised private homeowners. Thus, only deductibles for public property are now increased for municipalities without an RPP.

- **Funding public prevention:** Since 1995, France's CCR also contributes a share of its collected premiums to the Barnier Fund, which supports local flood defences, property retrofits, relocations, and risk studies, often conditional on municipalities having approved an RPP.

- **Encouraging uptake of government grants:** Australia's ARPC-Cyclone links its reinsurance pricing to public mitigation efforts by discounting premiums for properties that have received federal or state cyclone-proofing grants.

B. Financial incentives for policyholders

More frequently, PPIPs may provide financial incentives for policyholders to invest in risk reduction:

- **Risk-based pricing:** Some PPIPs relied on risk-based pricing from the start (e.g. California's CEA, a market stabiliser) while others have shifted towards increasingly risk-differentiated prices (e.g. Japan's JER and NFIP in the US, two coverage expanders). The NFIP's Risk Rating 2.0 – a new system of risk-based prices in force since 2022 – now links premiums to granular risk and construction features.

- **Standardised premium discounts:** Since 2001, Japan's JER (established in 1966) has provided 10–50% discounts for seismic retrofitting and a standard 10% discount for homes built after the 1981 building code improvements. CEA also grants 10–25% premium discounts after verified retrofits on older homes. Since 2022, Pool Re (UK) has given a 10% premium discount for 3 years to businesses that adopt security measures identified through its Vulnerability Self-Assessment Tool (VSAT).

- **Deductibles:** Since 2023, California's CEA only allows high deductibles (15–25% rather than 5–10%) for pre-1980 houses that have not undergone verified seismic retrofits.

- **Grants:** Recognising that upfront costs deter investment, some PPIPs provide grants. Since 2013, CEA's Brace + Bolt program has provided homeowners with around USD 3,000 for seismic retrofits, which then qualify homes for CEA premium discounts. Flood Re's Build Back Better programme, launched in 2022, offers up to GBP 10,000 on top of claim payments for installing resilience upgrades during post-flood repairs.

C. Investing in risk knowledge and tools

Through claims data, modelling, and hazard mapping, PPIPs generate information that can guide public policy, such as land-use planning:[110]

- **Developing models and assessment tools:** Pool Re (UK) developed its own terrorism risk models and shares its Vulnerability Self-Assessment Tool (VSAT) with members to guide mitigation efforts. France's CCR runs national natural catastrophe modelling programmes and publishes flood and climate studies used by insurers and public authorities.[111]

- **Funding monitoring and research:** New Zealand's NHC funds GeoNet, a real-time monitoring system for geological hazards. California's CEA funds research into seismic risks and retrofitting techniques.[112]

- **Creating hazard maps and data platforms:** The US Federal Emergency Management Agency (FEMA), which runs NFIP, developed extensive current and future flood maps used for underwriting, community planning, and land zoning.[113]

6.3 The limits of retrofitting: Why individual incentives alone are insufficient

Despite these promising initiatives, achieving meaningful risk reduction through PPIPs faces significant hurdles:

- **Limits of a PPIP's influence:** Most PPIPs influence individual policyholder actions (such as home retrofits). They typically have little impact on often more effective collective measures (such as public flood defences, community-wide infrastructure, or land-use planning) that are the government's responsibility. At the individual level, verification of retrofits is burdensome and difficult to scale, requiring receipts, contracts, or inspections. Most PPIPs thus restrict discounts to standardised, easily verifiable upgrades.[114]

PPIPs typically have little impact on often more effective collective measures, such as public flood defences, community-wide infrastructure, or land-use planning.

110 Expanding risk knowledge reflects implementation need 3.12 of G7 Italia (2024) and Section 3.2 of IAIS (2023).
111 Pool Re; CCR.
112 NHC; CEA.
113 FEMA.
114 Seifert-Dähnn 2018.

- **Limited impact of individual price incentives:** Premium discounts and grants may fail to offset upfront costs (Box 5). Moreover, resilience measures may not be reflected in a property's value, especially when risk levels are also not taken into account, further discouraging investment.[115]

- **Misalignment with wider incentives weakens impact.** Some PPIPs with a coverage-expander archetype aim to limit moral hazard by excluding new properties from solidarity pricing. For example, NFIP (US) denies coverage to new homes in designated high-risk areas unless they enforce specific construction standards. However, external factors, such as strong housing demand, can override these signals. In England, despite post-2008 homes being ineligible for Flood Re's subsidies, strong housing demand continues to drive construction in flood-prone areas.[116] Risk-based prices alone can be insufficient if misaligned with broader economic pressures and not supported by appropriate regulation.

- **Evaluation and data gaps:** While PPIPs offer diverse insurance-based incentives for risk reduction, solid evidence of their effectiveness is rare. Reviews highlight the need for more rigorous, long-term evaluation and improved data collection to better assess the cost-effectiveness and equity implications of incentives.[117]

Box 5: When risk reduction does not pay off for homeowners

In the US, NFIP provides up to USD 30,000 to elevate or relocate flood-prone homes to bring them into compliance with current regulations. Yet, actual elevation or relocation costs often run three to five times higher than this provision.[118,119] Annual discounts for homes with an elevation certificate range from USD 100 to 2,000. A policyholder might spend USD 60,000 to elevate a house, receive a USD 30,000 grant, and save USD 1,000 annually. This implies a 30-year payback period, longer than most ownership spans.[120] In such cases, few households invest.

By contrast, in California's Brace + Bolt programme, subsidies cover actual costs. Brace + Bolt offers homeowners up to USD 3,000 to retrofit pre-1980 homes, with up to USD 10,000 for lower-income homeowners. Retrofitted homes qualify for CEA premium discounts up to 25%. For low-cost projects, grants can cover all expenses; for typical upgrades, they cover 50–75%.[121] Combined with premium reductions, this significant subsidy underpins the programme's uptake, with over 23,000 retrofitted homes across California's fault lines.

Source: Geneva Association

These challenges show that adding isolated risk-reduction components to existing PPIP is not reliably effective.

- First, changing behaviour requires addressing the broader set of factors that influence decisions, not merely adding an extra incentive. When individuals and firms lack sufficient motivation to avoid risks, a PPIP alone is unlikely to reverse these trends.

- Second, while some incentives are needed to change behaviour at the policyholder level, relying solely on them is a critical failure point. A premium discount or grant, however well-designed, cannot overcome the fundamental challenges of collective action, land-use planning, and public infrastructure investment. The largest risks, such as the likelihood of a major flood, are beyond the control of any single homeowner and require governmental measures that PPIP incentives rarely influence.

A premium discount or grant, however well-designed, cannot overcome the fundamental challenges of collective action, land-use planning, and public infrastructure investment.

In fact, the most significant gains occur when PPIPs are embedded in, and aligned with, national risk-reduction strategies that promote collective, rather than isolated, action:

- In France, land-use planning through Risk Prevention Plans (RPPs), which CCR incentivises communities to adopt, has saved EUR 11 in damages for each invested euro.[122]

115 Clayton et al. 2021.
116 Aviva 2024.
117 Kousky 2019; Mechler 2016.
118 Kousky and Lingle 2017.
119 Relocation costs are much higher. Material costs include moving, purchasing, or renting a new home.
120 Maynard and Ranger 2012.
121 CEA.
122 CCR 2024.

- In the US, 65% of NFIP policies belong to the Community Rating System (CRS), adopting higher flood risk reduction standards than the basic NFIP requirements. Flood losses in CRS communities can be up to 20–30% lower than elsewhere.[123]

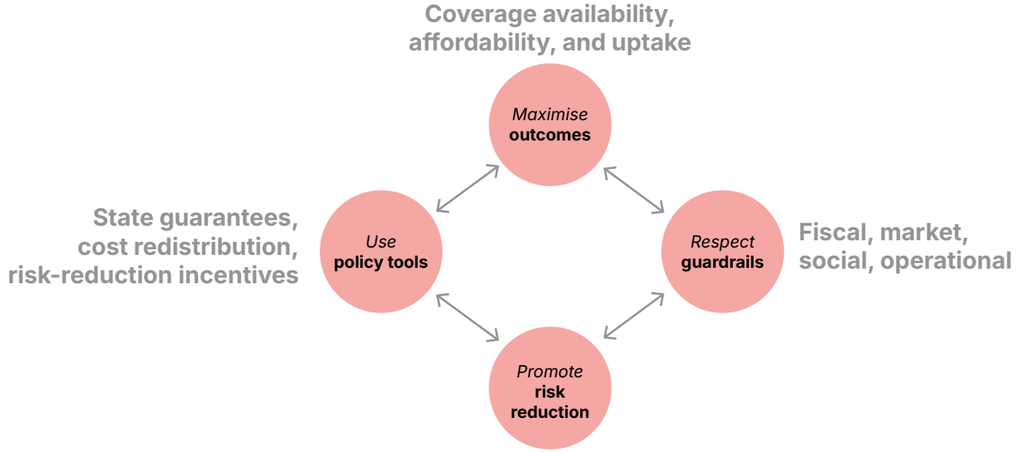
Community Rating System communities tend to prioritise easily achievable measures, such as zoning or public information, over more impactful but costlier flood-reduction projects.

However, such aligned approaches currently lack scale. France's RPPs, despite high adoption levels, are expected to be insufficient to prevent rising losses.[124] In the US, 56% of CRS communities achieve only the lowest improvement classes (classes 8–9 out of 1–9, with 1 representing the highest standards), which offer limited risk-reduction benefits. The remaining communities reach only mid- to low improvement classes (5–7). CRS communities tend to prioritise easily achievable measures (such as zoning or public information) over more impactful but costlier physical flood-reduction projects.[125] In both cases, the system seems to encourage local governments to comply with low or increasingly outdated minimum standards, which effectively serve as regulatory ceilings rather than incentivising more meaningful risk reduction.

6.4 The policymaker's new objective: Designing PPIPs for risk reduction

In a context of mounting fiscal and operational pressures, policymakers are increasingly aware that some PPIPs can no longer function solely as financial shock absorbers. In many cases, strategies are failing because Pillar 3 (PPIPs) are implemented before Pillar 1 (risk reduction). The new mandate for policymakers is to integrate risk-reduction objectives from the outset or retrofit them into existing schemes. This should ensure that the PPIP's design actively promotes public and private resilience efforts – or, at least, does not hinder them. The challenge, illustrated in Figure 11, is not just balancing outcomes and guardrails, but ensuring that the PPIP serves as a resilience accelerator: one that actively narrows the gap between individual incentives and necessary collective, government-led action.

FIGURE 11: PPIPS MUST NOT ONLY MAXIMISE COVERAGE OUTCOMES (PILLAR 3) BUT ALSO ENSURE THAT THE PPIP'S DESIGN PROMOTES INDIVIDUAL AND COLLECTIVE RISK-REDUCTION EFFORTS (PILLAR 1).



Source: Geneva Association

Even the best-designed PPIP cannot replace a comprehensive national prevention and resilience strategy that combines investments in physical resilience with regulations or incentives for individuals and businesses to manage their own risks. When Pillar 1 is weak, PPIPs might temporarily address availability or affordability issues, but risk worsening long-term fiscal and operational pressures.

123 Environmental Defense Fund 2023.
124 CCR 2023.
125 Abdul-Akeem et al. 2019.

7 Principles for effective PPIP design

Principles for effective PPIP design

Policymakers can construct PPIPs according to risk-reduction principles, potentially opening new risks to public-private initiatives.

The analysis in Sections 5 and 6 highlights both the achievements of PPIPs and the challenges they face. It illustrates successes in stabilising or expanding coverage but also resultant strains on fiscal and market guardrails. It further shows instances where PPIPs undermine risk reduction (Pillar 1). Achieving sustainable PPIPs in a world of rising and changing risks requires a robust national risk-reduction strategy to be in place, with governments leading coordinated efforts across society. Moreover, the design of Pillar 3 (PPIPs) must actively support risk-reduction objectives.

Achieving sustainable PPIPs in a world of rising and changing risks requires a robust national risk-reduction strategy.

This section outlines ten principles for designing new or reforming existing PPIPs, ensuring they are part of a comprehensive, proactive risk management strategy that prioritises risk reduction whenever feasible. Insights for policymakers considering new PPIPs, including for emerging risks such as systemic cyber and pandemic business interruption losses, are also provided.[126]

Box 6: A holistic approach to climate risk and resilience

When risks are complex, moving from reactive crisis management to proactive resilience-building requires a comprehensive public investment strategy. Public spending on resilience is cost-effective: flood defences, early warning systems, and nature-based solutions do not only reduce losses and relieve public financial burdens (e.g., UK flood defences avert an estimated GBP 1.15 billion in annual property damage), they also make insurance more available and affordable, easing strains on households and firms.

Moreover, large infrastructure investments such as the UK Thames Barrier and Dutch dike systems can deliver a so-called 'triple dividend of resilience': 1. Saving lives and reducing losses; 2. Supporting economic vitality by making areas more investable; and 3. Creating social and environmental co-benefits, particularly when using nature-based solutions (e.g. urban greening for heat, wetlands and beach restoration for floods).[127]

A comprehensive, effective resilience strategy depends on collaboration between the public and private sectors. Public investment alone cannot cover all risks. Private capacity, however, needs the right enabling conditions. Governments can align commercial incentives with national resilience ambitions.[128] Public-private partnerships help pool resources and expertise, while instruments such as ILS and community-based insurance can both incentivise risk reduction and protect vulnerable populations.[129]

A comprehensive approach links three functions: risk assessment, risk reduction, and risk transfer. Robust risk knowledge (data, modelling) guides targeted investment and policy.[130] It allows matching the right tool – risk reduction, retention, or transfer – to each risk layer, from frequent to catastrophic, in the most cost-effective way. Combining flood defences with insurance both prevents damage and supports rapid recovery.[131]

Public investment must be forward-looking and adaptive, recognising changing climate signals and potential tipping points. It must also acknowledge that, in some regions and for some perils, relocation or managed retreat may be necessary. Scaling finance will require instruments such as blended public-private funding or ILS. Risk-transfer pooled solutions can also enable mitigation, as seen in Flood Re's 'Build Back Better' initiative and the North Carolina Insurance Underwriting Association's USD 600 million resilience bond (2025).

Despite clear benefits, many regions still rely on incremental upgrades and crisis responses that lag escalating risks. Public policy should prioritise prevention and preparedness, integrating major protective works with ecosystem-based solutions and stronger codes and land-use planning to deliver durable resilience.[132]

Sources: Swenja Surminski, Managing Director, Climate and Sustainability at Marsh McLennan, and Professor in Practice at the London School of Economics and Political Science, United Kingdom

7.1 Is a PPIP needed?

We first address the rationale for launching a PPIP. While most existing schemes were emergency responses to disasters, jurisdictions are increasingly considering this option proactively, enabling a more deliberate, less reactive approach. In all cases, launching a PPIP requires political leadership and broad stakeholder agreement on the need for intervention. Four steps can guide the process of building this consensus:

Step 1 **Clarify the problem.** Key stakeholders need a common, data-driven, and granular understanding of the underlying risks, the causes and consequences of protection gaps, and whether the issue is temporary or permanent.[133]

Step 2 **Prioritise Pillars 1 and 2.**[134] This step minimises the residual risk that requires public-private risk-sharing (Pillar 3). Risk reduction (Pillar 1) is economically justified whenever it is more cost-effective than additional risk transfer. Market-enhancement measures (Pillar 2) are likely to cause fewer market distortions than a PPIP. For intractable risks – too catastrophic to be fully reduced or absorbed by private markets – a PPIP may be needed. PPIPs can also give policymakers time to implement necessary measures that require time to mature fully.[135] Then, holding governments accountable for progress could ensure the PPIP does not delay essential Pillar 1 and Pillar 2 measures.

Step 3 **Agree on the perils and exposures covered.** A PPIP's coverage should extend to vulnerable groups, such as SMEs and low-income households, and possibly to business interruption. Residual protection gaps must be acknowledged and societally acceptable.

Step 4 **Quantify the fiscal case for a PPIP.** A PPIP formalises a hidden fiscal liability that governments can monetise by charging the PPIP for state backing. Additionally, a state guarantee can encourage private capital accumulation, thus lowering uninsured losses. Scenario analysis can identify fiscal exposure, both with and without a PPIP.[136] Forward-looking models predict how stress points may shift. Anticipating a potential winding down of the PPIP, once Pillars 1 and 2 measures are fully implemented, can help ensure fiscal exposure does not become permanent.[137]

7.2 Core PPIP implementation principles

A new social contract is required to redefine the role of PPIPs for resilience. Based on the comparative analysis of fourteen schemes in Sections 5 and 6, we propose 10 principles for policymakers:

126 Systemic risk refers to the risk that a single event or chain of events could destabilise or collapse an entire industry or economy.
127 The triple resilience dividend refers to the multiple direct and indirect benefits that investments in resilience and adaptive measures can provide (Surminski and Tanner 2016).
128 National Preparedness Commission and MarshMcLennan 2021.
129 MarshMcLennan 2024.
130 Surminski 2017.
131 Surminski 2025.
132 MarshMcLennan 2023.
133 This corresponds to Step 1 in G7 Italia (2024).
134 This corresponds to Step 2.4 in G7 Italia (2024).
135 Flood Re in the U.K. illustrates this. With a planned sunset date in 2039, the scheme (Pillar 3) is intended to soften the transition to risk-based pricing (Pillar 2) by giving the government, insurers, and homeowners time to invest in risk reduction (Pillar 1).
136 Such an exercise was carried out in France in 2025 as part of the assessment of potential modifications to the 'Cat Nat' regime and the CCR (Haut Commissariat à la Stratégie et au Plan 2025).
137 Experience from our sample of 14 PPIPs, however, suggests that even temporary PPIPs become de facto permanent.

Strategic alignment and governance

Principle 1 **Embed PPIPs within national risk reduction strategies.** PPIPs cannot succeed in isolation and must complement – not substitute for – robust public investments in risk-reduction of infrastructure, resilient building codes, effective land-use planning, and potential relocation.

Principle 2 **Articulate clear objectives and guardrails.** Clearly define the PPIP's specific goals – such as improving availability, affordability, or uptake – and explicitly pair them with fiscal, market, social, and operational guardrails, acknowledging inherent trade-offs.

Principle 3 **Create an enabling environment.** Foster legitimacy and effectiveness through early engagement with re/insurers, regulators, and consumer groups; strong coordination across national and local government; and clear regulations defining roles, governance, and oversight procedures.[138] In particular, the PPIP's operations should be insulated from short-term political deadlock.

Principle 4 **Invest in expanding risk knowledge.** Leverage the PPIP's position to generate, aggregate, and share risk data and models, enhancing understanding and awareness across society and informing public policy, land-use planning, and mitigation efforts (see Box 7).

Principle 5 **Plan for evolution.** Design the PPIP with mechanisms for adaptation, allowing adjustments to scope, triggers, pricing, and financing structures in response to changing risks and market conditions, using performance milestones rather than fixed dates for transitions or exits.[139]

Guardrails and discipline

Principle 6 **Keep the state as a reinsurer of last resort.** Ensure state guarantees and PPIP's own capital cover only the most catastrophic loss layers where private capacity is truly insufficient, thus minimising fiscal risk.

Principle 7 **Encourage market participation.** Calibrate triggers and structure re/insurance layers so private markets absorb as much risk as they sustainably can. For backstops and reinsurer-PPIPs, predictable triggers bring certainty, attracting more private insurance capacity.

Principle 8 **Use compulsion strategically.** When the main goal is to stabilise the market or provide additional capacity, voluntary participation preserves market discipline and competition. Compulsion should be used only when the goal is to rapidly expand coverage.

Pricing and incentives

Principle 9 **Signal risk through risk-based pricing.** Adopt risk-based pricing as the default to signal risk and incentivise mitigation, addressing affordability concerns through targeted, transparent subsidies rather than distorting price signals. Solidarity pricing aimed at supporting vulnerable groups should be transparent to beneficiaries and, where feasible, temporary.

Principle 10 **Reinforce individual risk-reduction incentives.** Use PPIP contract features and financial incentives to reward policyholders for making safer choices beyond the minimum standards. Incentives must be strong enough to change behaviour and lead to a meaningful reduction in risk. Importantly, schemes that depend on solidarity pricing need specific measures to restore lost risk-reduction incentives.

138 This reflects implementation needs 3.10, 3.11, and 3.14 of G7 Italia (2024)
139 While adaptability is crucial, the scope of coverage must remain transparent and predictable – for example, not allowing ad-hoc, retroactive expansions of eligibility after an event.

Box 7: Risk modelling, data, and insurance: resilience enablers

Open, probabilistic modelling, paired with standardised metrics and cross-sector collaboration, turns climate risk data into an enabler of resilience.

First, open access widens use and levels the field. Most models are proprietary and commercially restricted, limiting adoption in low- and middle-income countries. Open-source platforms such as CLIMADA and Oasis LMF provide free, event-based probabilistic modelling that broadens access and enables consistent analyses across users.[140]

Second, standardised methods turn data into actionable, comparable signals. Disclosure of physical climate risk is expanding, but varied, incomparable metrics prevent portfolio-level aggregation and obscure systemic vulnerabilities. Adopting standardised, event-based probabilistic assessments unifies metrics, directs capital toward firms better equipped to manage climate impacts, and incentivises corporate adaptation, strengthening systemic resilience.

Third, risk pooling benefits from model-driven design, especially at a global scale. Many catastrophe pools and PPIPs operate regionally without maximising diversification. Modelling shows that global pooling can improve diversification by up to 65% versus regional designs. Probabilistic optimisation of pool composition reduces the cost of climate impacts while improving liquidity access.

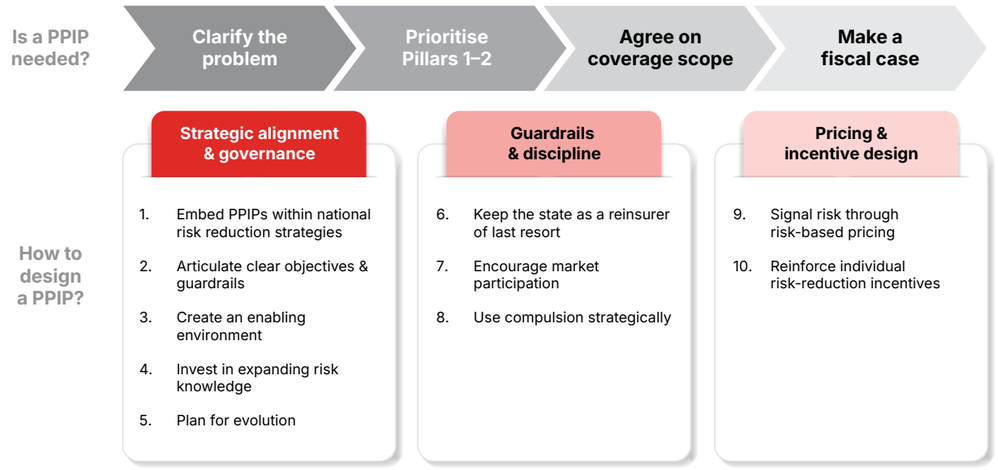
Fourth, insurance translates modelling into incentives and protection. Using probabilistic tools, insurers price climate risk more accurately and design products that align financial incentives with resilience outcomes. Premium discounts for risk reduction, parametric covers that rapidly deliver liquidity, and index-based schemes for small farms illustrate how modelling can drive behavioural change while providing financial protection.

Collaboration is the operating system of resilience. Open tools link climate science to decision-making by quantifying impacts, evaluating risk reduction and transfer options, and assessing cost–benefit trade-offs. Scientists deliver methodologies and hazard data. Policymakers create enabling regulations. Financial institutions design risk transfer mechanisms. Finally, businesses implement adaptation measures to safeguard assets and operations. While no single actor can tackle climate risks alone, an integrated ecosystem that relies on data-driven modelling, financial innovation, and cross-sector collaboration offers a pathway to building a more resilient future.

Source: David Bresch, Professor for Weather and Climate Risks, ETH Zürich, Switzerland.

Figure 12 summarises these policy recommendations.

FIGURE 12: POLICY RECOMMENDATIONS: FOUR STEPS AND TEN PRINCIPLES



Source: Geneva Association

140 Climada Technologies; OASIS Loss Modelling Framework.

7.3 PPIPs for cyberattacks and pandemics

Cyber risk and pandemic business interruption (BI) are often cited as candidates for future PPIPs. Both involve highly systemic, hard-to-model losses and large protection gaps. Applying the four-step framework in Section 7.1 shows that the case for PPIPs differs across the two perils.

For cyber, there may be a role for a PPIP focused on extreme, systemic events, but design is complex and political momentum is limited. For pandemic BI, the risk is essentially fiscal rather than insurable in a traditional sense. A PPIP could provide a short-term liquidity bridge for some businesses within a broader public health and fiscal strategy.

7.3.1 Addressing the cyber protection gap

Cyber risk is now a major threat to economic stability, driven by global digitalisation, the concentration of a few critical service providers, and increasingly hostile nation-state activity. Global losses are estimated at trillions of US dollars, most of which would be uninsured.[141] Several governments and industry bodies in the US, UK and EU have explored the use of PPIPs for extreme, systemic cyber events, often inspired by terrorism programmes.

Step 1: Clarify the problem

Cyber threats and exposures evolve quickly, so historical data is sparse and only weakly predictive, while mitigation measures lag new attack methods. Insurers respond with aggregate caps (limits on total payouts across all claims in a year) and sub-limits (limits on specific loss types within a policy), and by excluding un-modellable events such as cyber war and critical infrastructure outages.[142] At the same time, demand for cyber insurance, especially from SMEs, remains limited due to low awareness, affordability constraints, product complexity and failure to meet cybersecurity standards.[143] Recent market growth has fallen short of previous expectations.[144]

This pattern differs from natural disasters and terrorism. There has been no major shock event triggering wholesale capacity withdrawal, as after 9/11 attacks, nor recurring public relief costs comparable to earthquakes or floods. Fear of a future catastrophe constrains insurance growth, but premiums are currently softening. The cyber protection gap thus reflects three drivers: rising threats and lagging mitigation; low adoption, especially among SMEs; and limited insurance capacity for tail risks, including excluded events such as cyber war.

The cyber protection gap reflects three drivers: rising threats and lagging mitigation; low adoption, especially among SMEs; and limited insurance capacity for tail risks.

Step 2: Prioritise Pillars 1 and 2

The priority for governments is to strengthen Pillar 1 by raising baseline cyber hygiene. This includes national frameworks and standards, sectoral regulation for critical infrastructure, and incentives or requirements for basic controls such as secure configurations and incident response plans.[145]

Pillar 2 focuses on enabling private cyber insurance markets. Key measures include better incident reporting, more standardised policy terms and knowledge sharing to improve modelling. Targeted mandates, tax incentives and awareness campaigns can stimulate demand, especially from SMEs. Where insurers link cover and pricing to cybersecurity standards, higher cyber insurance uptake can also support national resilience objectives.[146]

These measures may eventually support risk transfer to capital markets via ILS, adding capacity for tail risk.[147] However, fast-evolving threats mean that residual uncertainty – 'unknowable unknowns' – will likely remain, limiting private appetite for the most extreme layers.[148]

141 Swiss Re 2022; Lloyd's 2023.
142 Geneva Association 2022.
143 Swiss Re 2025; Munich Re 2025d.
144 Swiss Re 2025.
145 In the U.S., the National Institute of Standards and Technology (NIST) develops such cybersecurity standards (National Institute of Standards and Technology). In the U.K., the Cyber Essentials programme provides security standard certificates and uses public procurement to enforce compliance. Businesses that adopt it are 92% less likely to file a cyber insurance claim (UK Government 2024). In the E.U., the 2025 Digital Operational Resilience Act (DORA) aims to strengthen the financial sector's digital resilience, for example, by requiring digital operational resilience testing and mandating the reporting of significant incidents to competent authorities (Digital Operational Resilience Act).
146 OECD 2017; Leiserson (2025).
147 Geneva Association 2024.
148 Geneva Association 2023b; Leiserson (2025); Lockton Re 2025.

Step 3: Agree on the perils and exposures covered

Proposals for cyber PPIPs target different parts of the protection gap. To address the shortage of capacity for catastrophic events, some suggest a market-stabiliser PPIP:

- For modelled perils such as ransomware, designs are inspired by TRIP in the US (a backstop) and Pool Re in the UK (a reinsurer-PPIP).[149]
- For excluded perils such as cyber war or third-party critical infrastructure outages, there could be a state insurer or insurer-PPIP in which private insurers bear only a small share of the risk.[150]

A reinsurer-PPIP or backstop with clear liability limits and a state guarantee could encourage insurers to offer broader cover and higher limits, potentially increasing coverage value and uptake.[151]

A reinsurer-PPIP or backstop with clear liability limits and a state guarantee could encourage insurers to offer broader cyber cover and higher limits.

Several proposals focus on SMEs because of their vulnerability and position as potential entry points into supply chains.[152] These include the financing of SME compensation through levies on cyber-adjacent property and casualty lines.[153]

Step 4: Quantify the fiscal case for a PPIP

Cyber catastrophe models are relatively new and produce divergent loss estimates.[154] This complicates the assessment of potential economic losses and fiscal exposure. Nonetheless, a major cyber catastrophe would likely require public support, indicating that states already bear an implicit risk.[155] A PPIP could help monetise this implicit liability.[156] However, this presents a technical challenge: determining an accurate price for a state guarantee covering events that are difficult or impossible to model. Some proposals, therefore, rely on post-event recoupment, as under TRIP (US).[157]

Design principles for a cyber PPIP

If a cyber PPIP is introduced, the design principles in Section 7.1 must be adapted to the nature of cyber risk. This presents potential challenges:

A cyber PPIP requires predictable triggers and clear liability limits; however, rapidly evolving threats complicate calibration and event definition.

- Under Principle 1 (embed PPIPs within national risk-reduction strategies), a cyber PPIP should coordinate with relevant public bodies to improve cybersecurity across businesses and critical infrastructure. However, Principle 10 (reinforce individual risk-reduction incentives) suggests that a PPIP should not interfere with effective underwriting practices. Insurers and their expert cybersecurity partners are best suited to identify and promote effective, evidence-based security practices.[158]
- Under Principle 4 (invest in expanding risk knowledge), participation could be conditional on sharing standardised incident and claims data to improve modelling and confidence among capital providers.[159]
- Under Principle 6 (keep the state as reinsurer of last resort), there is a trade-off between a very high aggregate loss trigger, which limits fiscal exposure and focuses on rare, truly catastrophic events; and structures that also address loss accumulation from more frequent mid-sized events that may still constrain insurance market growth.[160]

149 MarshMcLennan and Zurich Insurance 2024; Lockton Re 2025; RAND 2025; Pool Re 2024, Lockton Re 2025.
150 RAND 2025 suggests ranges of 5–10% of an insurer-PPIP's liabilities.
151 Geneva Association 2023b; Leiserson (2025).
152 KPMG 2025.
153 Pool Re 2024.
154 Geneva Association 2023b.
155 Geneva Association 2023b.
156 For example, since its inception, Pool Re has paid over £2 billion to the U.K. Treasury for its guarantee, which has never been triggered.
157 Some commentators believe state backing of cyber insurance premiums through a PPIP may weaken insurers' and businesses' incentives to reduce cyber risks (The Actuary 2024). However, if cybersecurity standards are mainly effective at preventing attritional losses rather than catastrophic ones, designing a PPIP so that insurers cover attritional losses and the state insures catastrophic losses would not alter insurers' incentives to assist businesses in improving their cyber hygiene.
158 Leiserson 2025. Some experts also note that most cybersecurity measures, such as multi-factor authentication, are likely more effective against frequent, low-severity losses than against catastrophic scenarios (RAND 2025).
159 RAND 2025, Leiserson 2025.
160 Lockton Re 2025; Leiserson 2025.

- Principle 7 (encourage market participation) requires predictable triggers and clear liability limits; however, rapidly evolving threats complicate calibration and event definition.[161,162] A PPIP may end up absorbing losses that private markets could handle, overstepping the market guardrail, or failing to activate when needed, straining the operational guardrail.[163] Finally, some proposals might compel insurers to cover risks they cannot model or price, such as cyber warfare, decreasing their willingness to participate.[164]

- Principle 8 (use compulsion strategically) suggests compulsory elements should focus on SMEs, among which cyber insurance uptake is low, rather than large firms. This respects the market guardrail.

- Principle 5 (plan for evolution) is especially important for cyber. A PPIP would likely need to adjust parameters and scope as threats, exposures and private market capacity change, possibly starting with a minimal framework and expanding it over time.[165]

Overall, there is a clear theoretical case for a PPIP to provide capacity for large-scale, uncertain and ambiguous cyber losses. Such an intervention could support the growth of the cyber insurance market. Still, design is complex and political momentum is limited, especially in a context of high public debt. History suggests that such interventions usually gain traction only after a crisis.

7.3.2 Address the pandemic business interruption protection gap

Business interruption (BI) losses are a foremost corporate concern, second only to cyber risk.[166] The pandemic revealed a significant protection gap as most BI losses caused by the virus and related government measures went uninsured. This has sparked interest in ex-ante financing mechanisms, including PPIPs, to enhance resilience against future pandemics.[167]

Step 1: Clarify the problem

Pandemic BI poses an even greater insurability challenge than cyber.[168] Losses are highly interconnected across sectors and regions, driven by government mandates such as lockdowns and social distancing. Pathogen behaviour, policy responses, and supply-chain disruptions add further uncertainty. During COVID-19, BI losses in the United States alone were estimated at around USD 1 trillion per month; if insured, claims from small businesses could have depleted the capital of the entire US property and casualty sector within a few months.[169]

Pandemic business interruption poses an even greater insurability challenge than cyber as losses are highly correlated and driven by government mandates.

Most BI policies now exclude pandemic losses entirely. Before COVID-19, demand for pandemic BI cover was negligible; afterwards, capacity tightened further, and public support in many countries reduced the perceived need for insurance.[170] Supply and demand for pandemic BI would thus need to be built almost from scratch.

Step 2: Prioritise Pillars 1 and 2

To lessen the impacts of the pandemic on life, health, and the economy (Pillar 1), governments depend on surveillance, early warning systems, public health measures, and preparedness, including vaccine research and rapid approval pathways. Businesses can diversify suppliers, adjust inventories, improve ventilation and remote working capabilities, and enhance continuity plans.[171] Grants, tax incentives, and regulatory standards can promote such adaptations.[172,173]

161 Geneva Association 2023b.
162 However, history shows that high uncertainty and limited data are not insurmountable obstacles. After all, many terror PPIPs were established after the 9/11 attacks, a single event that provided insufficient data to calibrate triggers or liability limits reliably.
163 To prevent systemic contagion, a cyber backstop could be triggered based on objective event metrics (like service outage duration) rather than the individual insurer loss retentions used in the US TRIP, which can be too slow to halt a cascading crisis.
164 Leiserson 2025.
165 Lockton Re 2025.
166 Allianz 2025.
167 The OECD has compiled a review of existing proposals (OECD 2021b).
168 Geneva Association 2020.
169 Hartwig et al. 2020.
170 Geneva Association 2021; U.S. Government Accountability Office 2023.
171 OECD 2021b.
172 EIOPA 2021.
173 For instance, Japan's post-COVID supply-chain initiative subsidised the relocation of critical production to lower concentration risks (East Asia Forum 2024). The incentive for businesses to adopt these measures can be considerable if they believe public support is unpredictable or that compliance is required for future compensation.

Pillar 2 seeks to improve the terms under which private BI insurance markets, where they exist, operate. Products would need clear, simple triggers, shorter indemnity periods or higher deductibles, and better data to support modelling.[174] ILS or multi-year and multi-line policies might provide additional, diversified capacity.[175] Even with such a redesign, however, systemic tail risk will likely remain beyond insurers' risk-absorbing capacity.

Step 3: Agree on the perils and exposures covered

Given SMEs' vulnerability, many proposals focus on them, sometimes incorporating compulsory elements inspired by coverage-expander PPIPs for natural catastrophes. Larger firms would be handled through more market-oriented solutions, including risk-based pricing, risk mitigation, and voluntary participation, with a state-backed reinsurer-PPIP to provide additional risk-absorbing capacity.

To balance affordability and fiscal prudence, proposals generally favour limited, time-bound support rather than full indemnity of business interruption losses.

To balance affordability and fiscal prudence, proposals generally favour limited, time-bound support rather than full indemnity of BI losses. As with capped earthquake cover in programmes such as NHC (New Zealand) or TCIP (Türkiye), pandemic PPIPs would provide liquidity for a set period (e.g. three months), with governments responsible for longer-term relief.[176] The aim is to ensure business continuity at the lowest possible cost.

Step 4: Quantify the fiscal case for a PPIP

Given the scale of potential losses, insurers would probably cover only a small part of a pandemic BI PPIP. Proposals typically envisage private contributions ranging from 0–5%, possibly increasing to around 10% after two decades of capital accumulation.[177] The main guardrail to consider is therefore fiscal: any PPIP would mainly formalise and cover potential costs in advance that taxpayers would otherwise bear after the fact. The rationale for such a PPIP is therefore not traditional risk sharing, but:

- To make inevitable relief more predictable and rules-based, replacing chaotic, ad-hoc post-crisis spending with a pre-defined mechanism that offers short-term liquidity while longer-term measures are designed.

- To leverage insurers' operational capacity for distributing funds, subject to careful assessment of whether they can handle huge claim volumes in a short period.[178]

Governments may hesitate to commit to substantial state guarantees, especially when a PPIP would not eliminate the need for ad hoc measures and when benefits from rare events must be balanced against fixed administrative costs.[179] These concerns challenge both fiscal and operational guardrails.

In summary, a pandemic BI PPIP could help maintain continuity for SMEs and vulnerable groups but is unlikely to replace large-scale public intervention. It would be, at best, one component of a much broader health and economic resilience strategy.

A pandemic business interruption PPIP could help maintain continuity for SMEs and vulnerable groups but is unlikely to replace large-scale public intervention.

174 Hillier 2022.
175 Geneva Association 2021.
176 OECD 2021b.
177 Geneva Association 2021; US Government Accountability Office 2023; Chubb 2020.
178 Geneva Association 2021; U.S. Government Accountability Office 2023.
179 U.S. Government Accountability Office 2023.

8 Conclusion

Conclusion

Many risks are becoming harder to insure. PPIPs are valuable tools to ensure insurance affordability and availability – but only within broader strategies of risk reduction.

Globally, disaster risk is accelerating faster than societies can adapt, widening protection gaps and testing the limits of re/insurance markets. The industry now faces a defining question: how to preserve insurability in a world where risk is growing and becoming increasingly systemic.

This report analyses the traditional role of PPIPs as powerful risk-sharing mechanisms. Our analysis of fourteen schemes demonstrates their ability to stabilise markets and expand coverage. However, it also shows that their design is a complex balancing act, navigating difficult trade-offs between fiscal, market, social, and operational guardrails.

This analysis also reveals that many PPIPs are under severe strain due to rising losses. This proves that, while sharing risks more broadly across individuals, businesses, re/insurers, and governments is essential, it is no longer sufficient for some perils and in some regions. This creates a new imperative: to be sustainable, PPIPs need to be part of – not replace – a comprehensive national risk-reduction strategy. Besides risk-sharing, PPIPs need to support, not hinder, risk reduction through adequate insurance-based incentives.

This shift requires a new deal between governments, re/insurers, and society. Governments must lead on risk reduction, invest in resilient infrastructure and enforce risk-informed planning and regulations that incentivise individuals and businesses to mitigate their own risks. Insurers must advance risk analytics and pricing that reflects actual risk while rewarding prevention. PPIPs remain essential tools, but they should be (re)designed as an integral part of this broader strategy – one that complements and incentivises risk reduction rather than subsidising exposure. We recognise that political urgency frequently results in a PPIP being established before sufficient risk-reduction measures are in place. In such cases, the PPIP should not delay necessary investments.

This report guides the design of more effective public-private risk-sharing mechanisms. No single institution can meaningfully narrow protection gaps on its own. Progress depends on aligning incentives around the common goal of building a resilient society. The transition from reaction to proactivity is not optional. The time to act is now, before rising risk becomes uninsurable risk.

Appendix

TABLE 2: CHARACTERISTICS OF THE 14 PPIPS ANALYSED IN THIS REPORT

PPIP	Country	Eligible perils	Eligible exposures	Market role	Type of state guarantee	Capital strategy	Mandates at the direct insurance level	Mandates at reinsurer-PPIP level	Solidarity pricing present
Australian Reinsurance Pool Corporation, Terrorism Pool (ARPC-Terrorism)	Australia	Terrorism (including CB but excluding RN) when the event is certified by the government	Commercial property, and associated business interruption	Reinsurer	Capped (currently AUD 10 billion) with upfront fees	Own capital, private reinsurance	Terrorism exclusions are voided when a terrorist attack is certified, then coverage is automatic for eligible policies	Cession is voluntary but cedents must cede all eligible policies to ARPC-Terrorism	Yes: tariffs according to broad risk zones
Gestion de l'Assurance et de la Réassurance des Risques Attentats et Actes de Terrorisme (GAREAT)	France	Terrorism (including CBRN and cyber) when the event is certified by the government	Commercial, industrial, and homeowner property and associated business interruption	Reinsurer	Unlimited with upfront fees	Retrocession to insurers, private reinsurance, ILS	Compulsory bundling with property policies	All insurers must cede to GAREAT all policies with a sum insured over EUR 20 million	Yes: tariff by exposure size band
Extremus	Germany	Terrorism (excluding CBRN) when the event is certified by the government	Commercial and industrial property above EUR 25 million	Insurer	Capped (currently EUR 5.98 billion) with upfront fees	Private reinsurance	None	-	No
Pool Re	UK	Terrorism (including CBRN and cyber) when the event is certified by the government	Commercial property and associated business interruption; non-damage business interruption	Reinsurer	Unlimited with upfront fees	Own capital, private reinsurance, ILS	Insurers who join Pool Re must offer terrorism cover at the policyholder's request	Cedents must cede all eligible policies to Pool Re	Gradual transitioning from tariff-based (based on broad risk zones) towards risk-based pricing
Terrorism Risk Insurance Program (TRIP)	US	Terrorism (including CBRN and cyber-terrorism) when the event is certified by the government	Commercial property and casualty lines	Backstop	Capped (80% of losses above insurers' retentions and below a USD 100 billion liability limit; currently about USD 33 billion) with post-event recoupment	-[180]	Insurers must offer a terrorism rider at non-discriminatory rates	-	No
Japan Earthquake Reinsurance Company (JER)	Japan	Earthquake, volcanic eruption, tsunami. The event must be certified by the government	Residential buildings and contents	Reinsurer	Capped (currently JPY 11.7 trillion) with upfront fees to compensate the State	Retrocession to insurers, own capital	Insurers must offer an earthquake rider	All insurers must cede all premiums to JER for eligible policies	Yes: tariffs according to broad risk zones and high differentiation according to building type
Natural Hazards Commission – Toka Tū Ake (NHC)	New Zealand	Earthquake-type perils (earthquake, landslide, volcanic eruption, tsunami, hydrothermal activity). Since 2024, also storm and flood. The event must be certified by the government	Residential buildings and land (via fire policies), although buildings are not covered for storm and flood	Insurer	Unlimited, with post-event recoupment	Own capital, private reinsurance, ILS	Compulsory bundling with fire policies	-	Yes: flat surcharge on underlying policy rate

180 As a backstop, TRIP does not accumulate its own funds. The state guarantee lies directly above insurer retentions.

PPIP	Country	Eligible perils	Eligible exposures	Market role	Type of state guarantee	Capital strategy	Mandates at the direct insurance level	Mandates at reinsurer-PPIP level	Solidarity pricing present
Turkish Catastrophe Insurance Pool (TCIP)	Türkyie	Earthquake and fire following the earthquake	Residential buildings within municipal boundaries	Insurer	Excess of Loss layer above private reinsurance, with post-event recoupment	Own capital, private reinsurance	Purchase mandate for eligible homes (urban areas, legally built)	-	Yes: tariffs according to broad risk zones with little differentiation according to building type
California Earthquake Authority (CEA)	US	Earthquake	Residential buildings and contents	Insurer	None (capped industry and policyholder levies)	Own capital, private reinsurance, ILS, revenue bonds	Participating insurers must offer an earthquake rider	-	No
Caisse Centrale de Réassurance (CCR)	France	Most 'natural catastrophes' (flood, drought, clay shrink-swell, earthquake, storm, volcanic eruption, avalanche, marine submersion, subsidence, cyclones) excluding hail and snow. The event must be certified by the government	Residential and commercial property (incl. industrial and motor), and damage-related business interruption	Reinsurer	Unlimited, with upfront fees	Own capital	Compulsory bundling with eligible policies and a purchase mandate for tenants	No	Yes: flat surcharge on underlying policy rate
Consorcio de Compensación de Seguros (CCS)	Spain	'Extraordinary risks' (earthquake, tsunami, flood, volcanic eruption, wind over 120 km/h, meteorites, terrorism, civil unrest but excluding hail, rain, and snow)	All property, motor, and personal accident lines, and damage-related business interruption	Insurer	Unlimited, with post-event recoupment	Own capital	Compulsory bundling with property policies	-	Yes: flat surcharge on underlying policy rate
Flood Re	UK	Floods	Residential properties meeting eligibility criteria (built before 2009 and units of 3 flats or less)	Reinsurer	None (unlimited industry levies)	Own capital, private reinsurance, ILS	Flood coverage is automatically included in all home insurance policies	No	Yes: pricing depending on council tax band (i.e. approximately based on property value)
National Flood Insurance Program (NFIP)	US	Floods	Residential and commercial properties in participating communities	Insurer	Capped (currently USD 30.425 billion), with post-event recoupment	Own capital, private reinsurance, ILS	Purchase mandate for properties with state-backed mortgages in high-risk areas	-	Yes until 2022, with about 15% of policies still grandfathered
Australia Cyclone Reinsurance Pool (ARPC-Cyclone)	Australia	Cyclones	Residential, strata,[181] and small-business property in cyclone-exposed regions	Reinsurer	Capped (currently AUD 10 billion), with post-event recoupment	Own capital[182]	Cyclone coverage is included in most property policies	All insurers must cede all eligible policies to ARPC-Cyclone	Yes: all cost savings achieved through state guarantees and pooling are passed on to high-risk policies only, keeping rates for low-risk policies aligned with market rates

Source: Geneva Association

181 In Australia, a 'strata' is a type of property ownership where different individuals own some parts (e.g. flats) and also own shares of a company that owns the building.
182 As a recently established PPIP, the ARPC Cyclone Pool is currently in a capital-accumulation phase; its solvency is underpinned mostly by the AUD 10 billion Commonwealth Guarantee and premium inflows.

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