

Financial Protection Against Catastrophic Risks

Floods, Fires and Other Major Risks



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Foreword

Large-scale risks, such as natural hazards, cyber attacks and infectious disease outbreaks, can lead to devastating financial consequences for individuals, households and businesses. Insurance markets play a critical role in providing financial protection against these risks. However, evolving climate and environmental risks, fast-moving technological changes, and increasing geopolitical tensions and social unrest are testing the ability of private insurance markets to achieve broad coverage.

This report aims to support government efforts to build financial resilience against catastrophic risks and mitigate the social, economic and financial consequences of unprotected financial exposures. It provides a framework to assess the need for government-supported financial protection and the advantages and disadvantages of the main approaches to offering such support. It applies this framework to three types of large-scale risks, natural hazards, infectious disease outbreaks and cyber-attacks and incidents. It examines the implications of increasing wildfire losses and government approaches to supporting the availability, affordability and take-up of insurance coverage for this risk. Finally, it examines how the different design features of flood risk insurance programmes contribute to four common objectives for a public-private insurance programme.

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Executive summary

Individuals, households and businesses are exposed to a broad range of social, economic, technological and environmental risks throughout their lifetimes that can have significant financial consequences should they materialise. Access to insurance can play a critical role in protecting them from potentially devastating financial losses, providing a secure source of funding to support recovery. However, private insurance and reinsurance markets may be unable to provide significant financial protection for some types of risks that occur infrequently but result in severe and widespread impacts, such as natural hazards, cyber catastrophes or pandemics. For some of these risks, public-private insurance programmes can provide a means to support the availability of affordable insurance and address unprotected financial exposures.

Governments should evaluate the need for government-supported financial protection to respond to large-scale catastrophes

Governments play an important role in ensuring that adequate financial protection is available to respond to catastrophic risks. They can support the availability of insurance coverage by establishing public-private insurance programmes or develop public compensation and financial assistance arrangements to respond to unprotected financial exposures. Governments should identify risks that could have a high impact on a significant share of the population, and assess the adequacy of financial protection for those risks and the potential implications that unprotected financial exposures could have on economic activities, such as through access to credit.

Public-private insurance programmes are likely to be a better approach to responding to more frequent risks and to unprotected financial exposures that could impede economic activity

Government-supported financial protection can be offered through a public-private insurance programme or a public compensation and financial assistance arrangement. The two approaches have different characteristics in terms of funding, the certainty that would be provided for beneficiaries, the amount of discretion for governments in preparing their response, and the participation of private (re)insurance markets. Public-private insurance programmes are likely to be more suited to protecting against risks that occur more frequently and where the certainty of an insurance obligation is important for mitigating hindrances to economic activity. Public compensation and financial assistance arrangements are likely to be more appropriate for addressing risks that are expected to materialise very rarely and where flexibility in response could be needed based on higher levels of uncertainty about their impact.

Public-private insurance programmes that leverage insurance market capacity and risk reduction expertise may be better placed to address unprotected financial exposure to natural hazard and cyber risks

Natural hazards, cyber attacks and incidents and infectious disease outbreaks can all result in material impacts for a significant share of the population. Some past events have led to economic losses in the hundreds of billions of US dollars. Important gaps in the adequacy of financial protection for these risks increase the likelihood that they could lead to unprotected financial exposures. The rationale for offering some form of government-supported financial protection is likely to be higher for the natural hazard risks that occur with greater frequency and are more likely to affect access to credit. There may also be a

rationale for offering government-supported financial protection for cyber risks, given the increasing impact of unprotected cyber exposures on contractual relationships, and the potential that government support could mitigate a substantial impediment to the availability of insurance coverage.

Public-private insurance programmes may be more appropriate for addressing risks, such as natural hazards, that would lead to more frequent funding demands, where certainty of financial protection is necessary for those exposed, and where the insurance sector can potentially contribute to assuming losses. The insurance sector could help with speedier payments, fraud reduction, and in encouraging risk management and risk reduction. The insurance sector also has greater appetite and capacity to assume natural hazard and cyber risks and has contributed to risk reduction for both risks. Insurance and reinsurance markets have more limited appetite for providing coverage for the revenue losses related to major infectious disease outbreaks and fewer opportunities to incentivise risk reduction.

Addressing increasing wildfire losses requires increasing investment in wildfire risk reduction to maintain the availability of insurance coverage

Governments have had more limited involvement in supporting the availability of insurance for wildfire risk. Insurance in countries with high levels of property insurance take-up has generally absorbed a significant share of past losses. However, increasing wildfire risks, driven by development in the wildland-urban interface and weather conditions more conducive to fire ignition and spread, have led to a dramatic increase in wildfire losses in the last decade. In OECD Member and accession countries, average annual economic losses from damaging wildfires were almost five times higher in 2015-2024, relative to 2000-2014. The increasing losses are impacting the availability of affordable insurance in some wildfire-exposed countries, including Australia, Canada and the United States.

Some highly exposed jurisdictions have taken steps to enhance the availability of property insurance coverage. In many wildfire-prone US states, residual insurance arrangements have provided an increasing share of the coverage for high-risk households and businesses, although the coverage provided is usually limited and expensive. Significant demand for coverage has led to insurance sector innovation in risk assessment and product design that has expanded availability for lower risk policyholders in high-risk regions. Increasing investment in risk reduction and adaptation is the most sustainable approach to improving long-term affordability. Risk-based premiums, although not consistently applied in all high-risk countries, can provide incentives for household and business investment in risk reduction.

Public-private insurance programmes that provide coverage for flood risk can support broad coverage, reduce overall public sector exposure and support risk reduction

Increasing flood hazard in the context of changing precipitation patterns and continued development in areas exposed to flooding has led to an increase in losses from floods. However, the share of flood losses insured is below 30% in more than half of OECD Member and accession candidate countries. Public-private insurance programmes that provide coverage for flood risk are increasingly being established and have supported the availability, affordability and take-up of flood insurance coverage. These programmes have led to broader coverage of flood losses and contributed to reducing overall public sector exposure to flood risk and supporting risk reduction and adaptation.

Countries have taken different approaches to the design of flood risk insurance programmes, in terms of covered hazards, eligible insureds, type of compensation or (re)insurance provided, role of the programme in the market, approach to premium pricing, and the role of government in providing financial support and oversight. While these different approaches can all be effective in addressing protection gaps in flood insurance, the different approaches to programme design can have differing impacts on the level of coverage ultimately achieved, the potential risks for public finances and the contribution of the programme to encouraging risk reduction.

1 **Assessment and recommendations**

This chapter provides an overview of the main issues, policy options and recommendations presented in the report.

Individuals, households and businesses are exposed to a broad range of social, economic, technological and environmental risks throughout their lifetimes. The materialisation of these risks can have financial implications for those impacted, such as costs to rebuild damaged property, replace damaged equipment or household contents, fund health care needs or recover lost income or revenue. Should damage or disruption be significant, many individuals, households or businesses would struggle to absorb the resulting financial costs, leading to financial vulnerabilities.

Access to insurance can play a critical role in protecting individuals, households and businesses from potentially devastating financial losses, providing a secure source of funding to support recovery and facilitating their participation in economic activities, including through access to credit. Insurance can also contribute to mitigating the economic, social and financial consequences of large-scale events. Studies on insurance for natural hazard risks have demonstrated the benefits of this form of financial protection in reducing contractions in economic activity and accelerating recovery. Higher insurance penetration has also been found to reduce the disaster recovery burden on taxpayers and the downward pressure on sovereign credit ratings.

However, for many types of risks, the availability of private insurance is limited. For risks that occur infrequently but result in widespread and severe impacts, such as natural hazards, cyber catastrophes, or pandemics, private insurance and reinsurance markets may be unable to provide significant financial protection due to their inability to absorb large, simultaneous losses. In the context of evolving weather and environmental risks, fast-moving technological changes, and increasing geopolitical tensions and social unrest, the ability of private insurance markets to achieve broad financial protection is increasingly being tested, particularly where efforts to reduce risk have been insufficient to reduce ultimate losses. Inadequate private insurance coverage for these risks can leave individuals, households and businesses with unprotected financial exposures that could lead to financial stress and have broader social, economic and financial consequences.

This report aims to support government efforts to build financial resilience against catastrophic risks and mitigate the social, economic and financial consequences of unprotected financial exposures. It provides a framework to help governments assess the need for government-supported financial protection and an application of this framework to natural hazard, cyber and infectious disease outbreak risks. It then examines approaches to supporting insurance coverage for two increasingly critical natural hazard risks – wildfires and floods – highlighting how differences in insurance market dynamics can impact the choice of approach to broadening the availability of coverage.

1.1. A framework for examining government-supported financial protection to respond to large-scale catastrophes

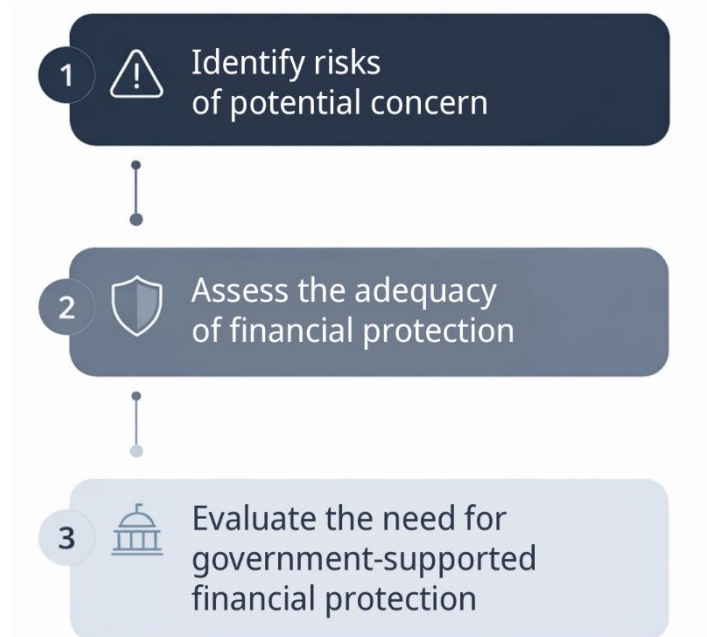
Governments play an important role in ensuring that adequate financial protection is available to respond to catastrophic risks, whether by supporting the availability of insurance coverage or developing public compensation and financial assistance arrangements to address gaps in the availability of financial protection through insurance markets. A framework to assess the need for government-supported financial protection as well as the advantages and disadvantages of the main approaches to offering government-supported financial protection would help policymakers in undertaking such an evaluation (Chapter 2).

There are three main components to evaluating the need for government-supported financial protection (Figure 1.1)

- Governments should identify risks of potential concern, focusing on identifying risks that have a non-trivial likelihood of occurring and that could have a high impact on a significant share of the population.

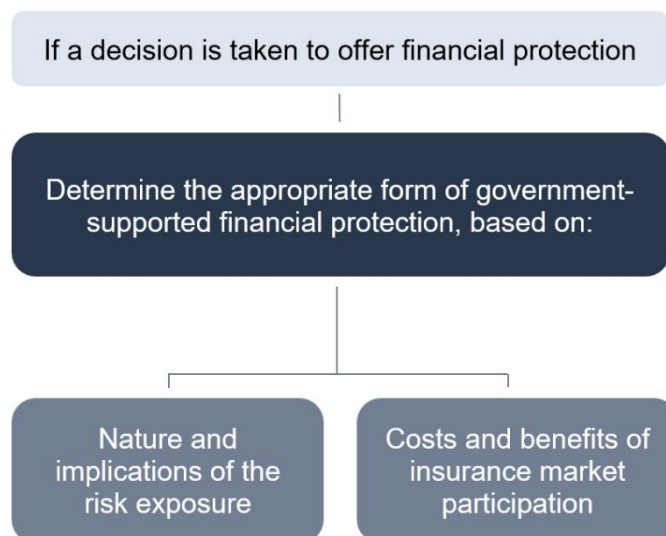
- Governments should then assess the adequacy of financial protection for the risks identified as risks of potential concern. This assessment should examine the availability, affordability and take-up of insurance coverage for these risks as well as the sufficiency of the coverage available in mitigating the potential financial exposures of households and businesses. The assessment should aim to identify unprotected financial exposures to the risks of potential concern and the main drivers of those unprotected financial exposures, whether a lack of availability, affordability or take-up of financial protection. It should also determine whether the unprotected financial exposures are widespread or limited to a few segments of the population, such as those at high-risk that may have opportunities to access financial protection through increased investment in risk reduction.
- Governments should then evaluate the need to offer government-supported financial protection by considering: (i) the likelihood, frequency and severity of the risk; and (ii) the potential implications that unprotected financial exposures could have on economic activities, such as through access to credit, and on the more vulnerable segments of the population who would have a more limited ability to recover without financial protection. A key component of this evaluation should be an examination of the potential for expanding financial protection through private insurance markets and potential impediments to private insurance market involvement in assuming such risks. Ultimately, the rationale for offering financial protection will be most compelling for risks that: (i) occur more frequently and are more severe; (ii) impede economic activity and access to credit; and (iii) are considered uninsurable by private insurance markets due to challenges such as establishing a pool of uncorrelated risks or quantifying potential losses.

Figure 1.1. Evaluating the need for government-supported financial protection



Government-supported financial protection, where needed, can be offered through a public-private insurance programme or a public compensation and financial assistance arrangement. The two approaches have different characteristics in terms of funding, the certainty that would be provided for beneficiaries, the amount of discretion for governments in preparing their response, and the participation of private (re)insurance markets (Figure 1.2).

Figure 1.2. Determining the appropriate approach to providing government-supported financial protection



Given these different characteristics, the optimal approach will differ based on the nature and implications of the risk exposure on access to credit and for vulnerable segments of the population, as well as the potential contribution that private insurance markets can make to absorbing losses, providing quick payments and mitigating fraud.

- Public-private insurance programmes are likely to be more suited to protecting against risks that occur more frequently and for which certainty in the availability of financial protection is important for mitigating hindrances to economic activity. This approach will be most beneficial when focused on risks for which the private (re)insurance market can make a meaningful contribution to absorbing losses, improving payment speed and accuracy, and incentivising risk management and risk reduction.
- Public compensation and financial assistance arrangements are likely to be more appropriate for addressing risks that are expected to materialise very rarely and where flexibility in response could be needed based on higher levels of uncertainty about their impact. Public compensation and financial assistance arrangements could play an important role in addressing unprotected financial exposures to risks for which there is unlikely to be significant insurance market appetite, or where highly exposed households and businesses are likely to face unaffordable premiums.

These considerations should inform decisions on whether, and how, to offer government-supported financial protection. However, governments, and societies more broadly, ultimately have different social and economic characteristics and values which lead to differing perspectives on the appropriate roles of governments and private markets, acceptable levels of risk and financial vulnerability, and thresholds for government intervention.

1.2. Examining the need for government-supported financial protection for natural hazard, infectious disease outbreak and cyber risks

Natural hazards, infectious disease outbreaks and cyber attacks and incidents have the potential to lead to widespread and severe financial impacts and are relevant for most, if not all, countries. In many countries, private insurance markets have been unable to achieve broad coverage for all potential financial

exposures to these risks. Therefore, they are the types of large-scale risks for which an evaluation of the need for and approach to government-supported financial protection is likely to be necessary (Chapter 3).

Natural hazards, cyber attacks and incidents and infectious disease outbreaks all have the potential to result in material impacts for a significant share of the population. Natural hazards can lead to major damage to homes and businesses and can impact a large number of households and businesses simultaneously. Cyber attacks and incidents can lead to relatively large business interruption losses for targeted companies while cyber catastrophes that impact critical service providers can spread losses to a significant number of dependent businesses. Infectious disease outbreaks, while relatively rarer, have the potential to impact entire populations and can have material impacts for individuals and businesses in sectors targeted by restrictions on economic activity.

There are gaps in the adequacy of financial protection for these risks that can lead to unprotected financial exposures. For natural hazard risks, the gaps are driven by challenges related to affordability for some households and businesses and a lack of take-up. For cyber attacks and incidents, the gaps result from inadequate insured limits, low take-up as well as the application of exclusions aimed at protecting insurers from large correlated losses. For infectious disease outbreaks, the availability of coverage for business revenue losses is extremely limited.

The rationale for offering some form of government-supported financial protection is likely to be higher for the natural hazard risks that occur with greater frequency and are more likely to affect access to credit. However, in some cases, unprotected financial exposures are driven almost exclusively by gaps in take-up of available and affordable coverage which may be better addressed through other policy and regulatory interventions, such as investments in risk reduction and efforts to improve risk awareness. There may also be a rationale for offering government-supported financial protection for cyber risks given the increasing impact of unprotected cyber exposures on contractual relationships and the potential that government support could mitigate a substantial impediment to the availability of insurance coverage.

Public-private insurance programmes might be more appropriate for addressing risks that would lead to more frequent funding demands, where certainty of financial protection is necessary for those exposed and where the insurance sector can potentially contribute to assuming losses, making speedy payments, reducing fraud and encouraging risk management and risk reduction. The insurance sector also has greater appetite and capacity to assume natural hazard and cyber risks and there is some evidence that they contribute to risk reduction for both of these risks, although that contribution appears to be more limited for households and smaller businesses. Insurance markets and reinsurance markets have more limited appetite for providing coverage for the revenue losses related to major infectious disease outbreaks, and their ability to incentivise risk reduction is likely to be more limited.

1.3. Insurance coverage for wildfire risk

There has been limited government involvement in supporting the availability of insurance for wildfire risk. Insurance in countries with high levels of property insurance take-up has generally absorbed a significant share of past losses. However, increasing wildfire risks, driven by development in the wildland-urban interface and weather conditions more conducive to fire ignition and spread, have led to a dramatic increase in wildfire losses in the last decade.

The increasing losses are impacting the availability of affordable insurance in some wildfire-exposed countries, including Australia, Canada and the United States. As mortgage lenders will often require borrowers to have insurance coverage against fire risk, reduced access to affordable insurance could have implications for housing markets. Chapter 4 examines the implications of the increase in wildfire losses and government approaches to supporting the availability, affordability and take-up of insurance coverage.

Some highly exposed jurisdictions have taken steps to enhance the availability of property insurance coverage. In many wildfire-prone US states, residual insurance arrangements have provided an increasing share of the coverage for high-risk households and businesses, although the coverage provided is usually limited and expensive. Significant demand for coverage, driven by the broad applicability of mortgage-related insurance requirements in some regions, has led to insurance sector innovation in risk assessment and product design that has expanded availability for lower risk policyholders in high-risk regions.

Addressing affordability challenges is usually more difficult. The most sustainable approach to improving long-term affordability is to invest in risk reduction and adaptation. Artificially suppressing premium rates through rate regulation could lead insurers to limit availability of coverage or exit the market. Risk-based premiums can provide incentives for household and business investment in risk reduction although insurers in some countries do not appear to be reflecting different levels of wildfire risk in premium-setting. For risk-based pricing to be an effective incentive for risk reduction, insurers must be willing to provide premium discounts for policyholders that make investments in risk reduction that can demonstrably reduce losses. The insurance sector is applying its risk management and modelling expertise to identifying effective risk reduction measures. In a few US states, insurance regulators are also requiring that insurers provide premium discounts for specific risk reduction measures. Holistic investments that incorporate home hardening, defensible space and community-level mitigation measures appear to be the most effective in reducing losses and receive the most significant premium discounts from insurers.

Requirements to purchase insurance against wildfire risk could enhance the take-up of insurance. These requirements would likely have the greatest impact if applied in the rural areas where exposure is high and mortgage-related insurance requirements are not broadly applicable. However, mandatory insurance requirements will only have an impact on reducing wildfire losses if accompanied by measures to encourage or require investments in risk reduction.

1.4. The design of flood risk insurance programmes

Increasing flood hazard in the context of changing precipitation patterns and continued development in areas exposed to flooding has led to an increase in losses from floods. Average annual economic losses from flood events in OECD Members and accession candidate countries were almost 80% higher in the first few years of this decade (2020-2024) relative to the previous five-year period (2015-2019). However, the share of economic losses resulting from floods that is insured is low in many countries. In many countries, governments are supporting financial protection against flood risk. Public-private insurance programmes that provide coverage for flood risk are increasingly being established and have supported the availability, affordability and take-up of flood insurance coverage. These programmes have led to broader coverage of flood losses and contributed to reducing overall public sector exposure to flood risk and supporting risk reduction and adaptation. Chapter 5 examines the design of the flood risk insurance programmes that have been established.

Countries have taken different approaches to the design of flood risk insurance programmes, in terms of covered hazards, eligible insureds, type of compensation or (re)insurance provided, role of the programme in the market, approach to premium pricing and the role of government in providing financial support and oversight. While these different approaches can all be effective in addressing protection gaps in flood insurance, the different approaches to programme design can lead to different outcomes.

Programmes that play a larger and more direct role in assuming flood risk, for example by providing direct insurance for a broad scope of flood hazards and insureds, are generally able to ensure the availability of affordable coverage. However, broad coverage may not be achieved without the implementation of measures to support take-up, such as automatic inclusion of flood coverage or broadly applicable mortgage-related flood insurance requirements. Countries with lower levels of property insurance penetration are also likely to face coverage gaps, even where programmes make affordable flood

insurance coverage broadly available. Programmes with a larger role in covering flood risk could, however, miss opportunities to leverage private market expertise and capacity to assume risks. They could also increase fiscal risks if premiums are inadequate, and the government provides a generous backstop for programme losses.

Programmes that are more focused on addressing specific market gaps in coverage are generally better able to leverage private market expertise and risk-bearing capacity. However, the establishment of programmes targeted at markets gaps will likely lead to a risk pool containing more high-risk properties which could lead to greater loss volatility. More narrowly targeted programmes are also likely to face more challenges in achieving broad coverage if the private insurance market is unable or unwilling to provide coverage for hazards or insureds that are not eligible for programme coverage, which could lead to demands for public compensation or financial assistance to respond to uninsured losses.

Requirements for insurers to offer flood coverage or for households or businesses to acquire flood insurance coverage are usually effective in supporting take-up of coverage. However, such requirements could have implications for policyholders if the required coverage is unaffordable or for insurers if they are required to assume risk that they do not have capacity to assume. Ensuring that coverage is affordable for all policyholders required to acquire such coverage will be critical, although this is challenging to achieve without some form of subsidisation for high-risk policyholders, which can have potential implications on fiscal risk and exacerbate moral hazard.

The application of risk-based pricing in programme coverage can provide important risk signals and incentives for risk reduction. However, the effectiveness of pricing incentives in encouraging risk reduction will depend on the capacity of policyholders to invest in risk reduction. Risk-based pricing can also lead to affordability challenges for those at high-risk, and political challenges if those at high-risk are obligated to acquire flood insurance coverage. Cross-subsidies, or greater risk mutualisation, among low and high-risk policyholders is commonly applied in flood risk insurance programmes, particularly those that cover multiple natural hazard risks, although this approach can blunt incentives for risk reduction and potentially incentivise development in high-risk areas. This risk can be mitigated through the implementation of effective land-use controls and resilient building standards. A number of programmes have incorporated risk management requirements, conditions or incentives to reduce the impact of limiting risk signals in premium pricing.

Supporting risk reduction and adaptation will be critical for addressing rising flood losses, whether flood insurance coverage is provided through private insurers, a flood risk insurance programme or both. Flood risk insurance programmes that have direct links to governments have sometimes demonstrated a greater potential to leverage that relationship to influence broader risk reduction, although a number of private sector programmes are also contributing to flood risk management.

2 A framework for examining government-supported financial protection to respond to large-scale catastrophes

Governments play a critical role in ensuring that adequate financial protection is available to individuals, households and businesses to mitigate the financial consequences of large-scale catastrophes. This chapter provides a framework to help governments evaluate the need to provide government-supported financial protection. It also outlines some considerations for determining whether to provide government-supported financial protection through a public-private insurance programme or a public compensation and financial assistance arrangement.

2.1. Introduction

Individuals, households and businesses are exposed to a broad range of social, economic, technological and environmental risks throughout their lifetimes. The materialisation of these risks can have financial implications for those impacted, such as costs to rebuild damaged property, replace damaged equipment or household contents, fund health care needs or recover lost income or revenue. Where damage or disruption is significant, many individuals, households or businesses would struggle to absorb the resulting financial costs, leading to financial vulnerabilities.

Access to financial protection can play a critical role in protecting individuals, households and businesses from potentially devastating financial losses, providing a secure source of funding to support recovery and facilitating their participation in economic activities, including through access to credit. Pooling the risks of many individuals, households or businesses through an insurance arrangement can also have broader macroeconomic benefits by supporting a more optimal use of capital (Vaughan and Vaughan, 2008^[1]) and reducing the need for pre-cautionary savings.

Financial protection can also contribute to mitigating the economic, social and financial consequences of large-scale events. A variety of studies focused on insurance for natural hazard risks, for example, have demonstrated the benefits of this form of financial protection in reducing contractions in economic activity (Melecky and Raddatz, 2011^[2]; Von Peter, Von Dahlen and Saxena, 2012^[3]; 2024^[4]) and accelerating recovery (Cambridge Centre for Risk Studies and AXA XL, 2020^[5]; OECD, 2018^[6]). Higher insurance penetration has also been found to reduce the disaster recovery burden on taxpayers (Lloyd's, 2012^[7]) and the downward pressure on sovereign credit ratings (Standard & Poor's Ratings Service, 2015^[8]).

However, for many types of risks, the availability of private insurance is limited. For risks that occur infrequently but result in widespread and severe impacts, such as natural hazards, cyber catastrophes, pandemics or interstate conflicts, private insurance and reinsurance markets may be unable to provide significant financial protection due to their inability to absorb large, simultaneous losses. In the context of evolving climate and environmental risks, fast-moving technological changes, and increasing geopolitical tensions and social unrest, the ability of private insurance markets to achieve broad financial protection is increasingly being tested, particularly where efforts to reduce risk have been insufficient to reduce ultimate losses.

Inadequate private insurance coverage for these risks can leave individuals, households and businesses with unprotected financial exposures that could lead to financial stress and have broader social, economic and financial consequences. Governments may need to intervene to reduce the potential for harm to society and the broader economy where a large share of individuals, households or businesses face unprotected financial exposures (*ex ante*) or losses (*ex post*).

The purpose of this chapter is to provide a framework to support an assessment of the need for government-supported financial protection and the advantages and disadvantages of the main approaches to offering government-supported financial protection (Figure 2.1). The framework is focused mainly on property risks, including risks of damage to property and contents and related businesses revenue losses, rather than personal risks for which financial protection is often provided through social insurance arrangements.

Figure 2.1. Framework for assessing the need for and approach to government-supported financial protection



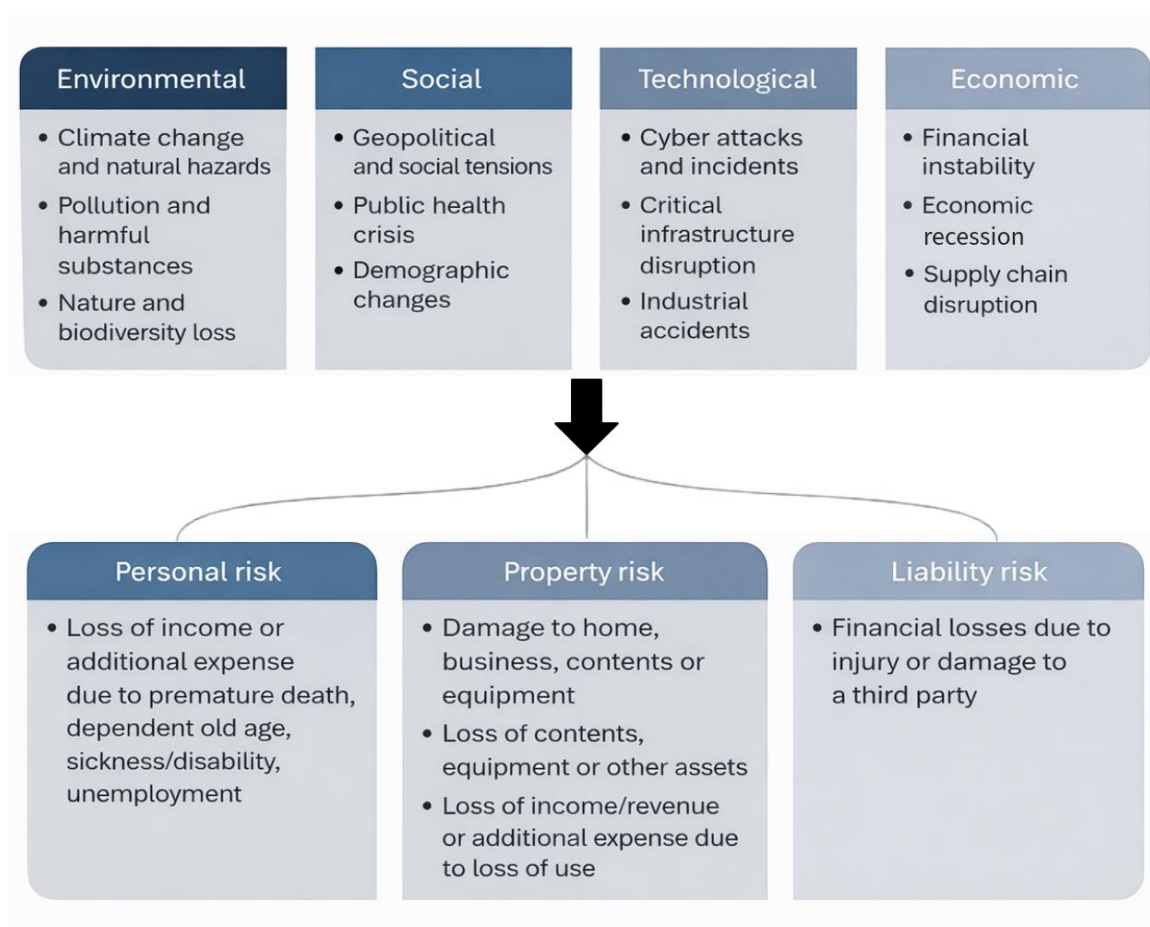
The proposed framework builds on, and complements, the G20/OECD Methodological Framework for Disaster Risk Assessment and Risk Financing (OECD, 2012^[9]) by providing additional guidance to support government decisions on whether, and how, to offer government-supported financial protection. It also complements the G7 High-Level Framework for Public-Private Insurance Programmes against Natural Hazards, which provides guidance on the design of PPIPs (G7 Finance Track, 2024^[10]).

2.2. Evaluating the need for government-supported financial protection

2.2.1. Identifying risks of potential concern

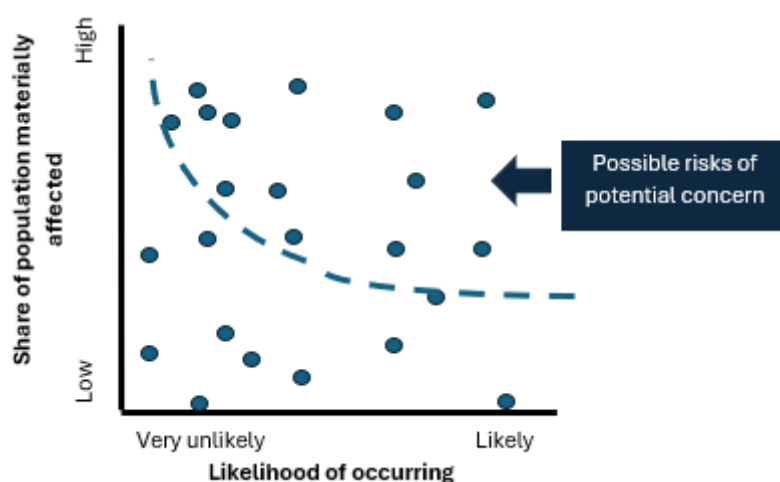
The first step in evaluating the need for government-supported financial protection is to identify risks of potential concern. There are different types of environmental, social, technological and economic risks that can create personal, property and liability risks for individuals, households and businesses (Figure 2.2). Risks of potential concern would likely be those that are: (i) high impact, i.e. risks that could have financial impacts that would be potentially significant for an individual, household or business and lead to financial stress if unprotected; and (ii) widespread, i.e. risks that could simultaneously have a high impact on a large number of individuals, households or businesses.

Figure 2.2. Types of large-scale risks and potential impacts



The universe of potential high-impact and widespread risks that could materialise and therefore be considered as “risks of potential concern” may be quite large. National risk assessment exercises could provide a basis for focussing on risks that have a non-trivial likelihood of occurring.¹ A risk with a very low frequency of occurrence could still be considered a risk of potential concern if there is a non-trivial likelihood of occurrence and a potential for very significant and widespread impacts. Figure 2.3 provides an illustration of the characteristics of risks of potential concern.

Figure 2.3. Identifying risks of potential concern



Note: For simplification, the illustration only includes “high-impact risks” (i.e. risks that could have impacts that would be significant for those affected)

2.2.2. Assessing the adequacy of financial protection

Once the set of risks of potential concern have been identified, governments should assess the adequacy of financial protection for these risks in order to identify potential unprotected financial exposures that could create financial vulnerabilities. This assessment should take into account the financial protection available through private insurance markets, as well as any protection that would be available through social insurance arrangements established for other purposes. For example, a risk that is likely to result in mostly income or health-related losses and costs might be adequately protected in countries where the government provides substantial loss of employment or health care benefits through a social insurance arrangement.

The assessment should consider whether the financial protection available to individuals, households and businesses is sufficient given their potential financial exposure. Sufficient financial protection would entail financial protection that responds to the vast majority of the potential risk materialisations (i.e. without material conditions or exclusions) with retention levels and insured limits that allow for the transfer of an amount of risk that is sufficient to mitigate financial vulnerabilities.

There are several steps for undertaking an assessment of the adequacy of financial protection (Figure 2.4).

Figure 2.4. Assessing the adequacy of financial protection



There could be inadequate financial protection if there is a:

- **Lack of availability:** Sufficient financial protection is not generally available (i.e. not available to most of the individuals, households or businesses exposed to the given risk), or only available to a subset of the population (i.e. only certain segments of the population have access to coverage, for example, only those with low-risk exposure).
- **Lack of affordability:** Available financial protection is not affordable for all or a subset of the population (e.g. those facing high-risk exposure or with modest income). A premium cost that is considered “affordable” will vary across countries and across individuals, households and businesses, based on differences in income or revenue levels and differences in the cost of living and/or operating costs. While understanding affordability is critical for assessing the potential for financial vulnerabilities, there are few broadly applied definitions of insurance affordability (Box 2.1).
- **Lack of take-up of coverage:** Financial protection may not be acquired by a significant share of individuals, households or businesses, even if that protection is broadly available, sufficient and affordable.

Box 2.1. Measures of home insurance affordability

Some organisations have developed specific thresholds for identifying the share of households that may face unaffordable premiums. These thresholds provide examples of potential approaches to measuring affordability.

In Australia, the Actuaries Institute has developed a Home Insurance Affordability Index used to monitor trends in the affordability of home insurance in Australia. The index shows the cost of home insurance premiums in terms of the number of weeks of average gross household income and defines “affordability-stressed” households as those facing premiums that cost more than four weeks of gross household income (Paddam et al., 2024^[11]).

The European Insurance and Occupational Pensions Authority has developed a dashboard on insurance protection gaps for natural catastrophes that includes estimates of the share of households that could find insurance unaffordable in the covered member countries. The estimate is derived by comparing the cost of home insurance to a measure of the difference between disposable income and the poverty line, defined as 60% of median income (EIOPA, 2025^[12]). The share of households that face premium costs that are greater than the amount of their disposable income above the poverty line are considered as “finding insurance unaffordable”.

A combination of the above factors could lead to inadequate financial protection. For example, there may be inadequate financial protection for a specific risk that results from a lack of availability for some households or businesses, a lack of affordability for others, and low levels of take-up among those that have access to affordable coverage.

2.2.3. Evaluating the need for government-supported financial protection

Governments should then evaluate whether there is a rationale or need for government-supported financial protection for risks of potential concern for which there is inadequate financial protection. A need for government-supported financial protection could arise where there is a potential for significant economic, social or financial consequences due to unprotected financial exposures against risks with potentially high and widespread impacts.

Governments, and societies more broadly, will have different perspectives on the appropriate roles of governments and private markets, acceptable levels of risk and financial vulnerability, and thresholds for government intervention (Box 2.2). They will also have different perspectives on the optimal balance between solidarity, equity and individual responsibility.

Box 2.2. The implications of different social and economic characteristics and values

While governments might consider similar factors for evaluating the need for government-supported financial protection, such as those outlined in this section, differences in social and economic characteristics and values across different countries are likely to lead to different conclusions on whether to offer government-supported financial protection to address an identified need.

Different views on the level of collective responsibility of the government for protecting households and businesses against unprotected financial exposures is likely to be an important factor. While all governments will recognise a responsibility to protect their citizens against the impacts of large-scale social, economic, technological and environmental risks, they are likely to place different levels of emphasis on the importance of individual responsibility (Jarzabkowski et al., 2023^[13]). They are also likely to have differing perspectives on the balance between solidarity and moral hazard and different appetites for government intervention in insurance or financial protection markets (Jarzabkowski et al., 2023^[13]).

Governments will also face different capacities to respond to unprotected financial exposures which could impact the amount of importance they place on maximising the level of insurance market protection. Some governments have greater fiscal capacity and more favourable access to debt financing and might therefore have a higher willingness to accept a level of unprotected financial exposure given their larger capacity to respond to any needs that emerge. Some governments may have a limited appetite for unprotected financial exposures, regardless of their fiscal or financing capacity.

In evaluating the need for government-supported financial protection, governments should consider the following factors linked to the nature and implications of the unprotected exposure (Figure 2.5).

- *Likelihood, frequency and severity of the risk*: The evaluation of the need for government-supported financial protection should prioritise risks that have some or all of the following characteristics: (i) a greater likelihood of materialising; (ii) the potential to occur more frequently; (iii) the potential for more significant financial impacts on households and businesses; and/or (iv) the potential to impact a larger share of the population. A risk that could have extremely high and widespread impacts should be prioritised, even if the likelihood that it could materialise is relatively low.
- *Potential implications of unprotected exposures for economic activity*: Unprotected financial exposures that could hinder the participation of individuals, households or businesses in economic activity likely warrant particular attention when evaluating the need for government-supported financial protection. A particular concern should be where unprotected financial exposure to a risk impedes access to credit, including mortgage loans as well as investment and working capital (OECD, 2012^[9]).
- *Potential implications of unprotected exposures for vulnerable populations*: Risks that could disproportionately impact segments of society with more limited financial capacity to absorb the potential financial impacts should also present a greater need for government-supported financial protection than risks that are mostly relevant to economic actors with more significant financial capacity and access to credit. There is likely a stronger rationale for government-provided financial protection for risks that create significant financial exposure for households, particularly modest-income households, and smaller businesses.

Figure 2.5. Factors that could increase the need for government-supported financial protection

Likelihood, frequency and severity of the risk	• Risks with a greater likelihood of materialising • Risks likely to occur more frequently • Risks likely to lead to more significant impacts for a larger share of the population
Potential implications of risk exposure	• Risk exposure that impedes economic activity and access to credit • Risks likely to impact the most vulnerable
Potential for expanding financial protection	• Private insurance is not generally available, and risk may be uninsurable • Limits to the availability of affordable private insurance • Few or no losses would be covered by existing government-provided financial protection arrangement

The evaluation should also assess *the potential for expanding financial protection* to address unprotected financial exposures through private insurance markets alone, including through increased investment in risk reduction. As noted earlier, unprotected financial exposures may result from a generalised lack of availability of insurance, a lack of availability for some segments of the population, a lack of affordability, or a lack of take-up of insurance.

A generalised lack of availability is more likely where *the risk is not insurable by the private insurance market*, indicative of a market failure. This could be driven by an inability of the insurance sector to assess the risk and quantify potential losses or, given correlated exposures, to diversify the risk across a large pool of potential policyholders. Box 2.3 provides an overview of characteristics that impact the insurability of a risk by private insurance markets.

Box 2.3. Insurability in private insurance markets

The business model of private insurance companies is to pool assumed risks in order to capture the benefits of risk diversification across populations, regions, risks and time, and therefore lower the cost of providing financial protection. By pooling the risks of many insureds, insurance companies can provide effective financial protection with a lower amount of reserves than individuals, households or businesses would need to set aside individually to protect against the risks that they face (Vaughan and Vaughan, 2008^[11]). This allows insurers to charge individual policyholders premiums that are lower than the amount that they are likely to receive in the event of a claim, and provides an incentive for individuals, households and businesses to purchase insurance rather than retain their own risk. Insurance dampens shocks that would be severe for an individual without creating large immediate costs to others whose risks have been pooled (ESRB, 2015^[14]).

However, this business model is only effective for risks that are considered insurable within private insurance markets. The insurability of a given risk is often considered against a set of three main types of criteria (Berliner, 1982^[15]; Hartwig and Gordon, 2020^[16]; Jemli, Chtourou and Feki, 2010^[17]; Schanz, 2020^[18]):

- *actuarial criteria*, which are linked to: (i) the ability of the insurer to absorb the risk given its financial capacity; (ii) the potential for the assumed risks to be accurately quantified and diversified through the creation of a large pool of independent and random risks; and (iii) the ability of the insurer to mitigate information asymmetries, moral hazard and adverse selection
- *market criteria*, which refers to the potential for establishing a price or premium for assuming the risk that is acceptable to insureds and adequate for insurers
- *societal criteria*, which relates to the consistency of risk transfer to insurance markets with legislation, public policy and societal values.

As a result, it is more challenging for private insurance companies to offer protection against some types of risks, including:

- risks that are very likely to materialise (e.g., death for an individual in old age)
- risks that are difficult to quantify, whether due to a low frequency of occurrence, limited historical experience or where the risk is constantly changing – all of which limit the ability of insurance companies to confidently estimate expected losses (e.g., catastrophic cyber attacks)
- risks that could impact a large share of the insured population simultaneously (i.e. risks that are correlated and not independent) as actual losses would deviate significantly from expected losses, requiring insurers to set aside significant reserves and capital (e.g., earthquakes)
- risks that involve information asymmetries likely to lead to adverse selection (e.g., loss of employment)
- risks for which there is a significant gap between the perception of insurers and consumers of the amount of expected loss (e.g., natural hazards)
- risks for which compensation of losses would be illegal or contrary to societal values (e.g., regulatory fines and penalties).

Where risks can be diversified internationally, the additional layer of financial protection capacity provided through international reinsurance and capital markets can mitigate some of these challenges.

A more limited gap in the availability or unaffordability of financial protection that only affects a subset of the population is likely indicative of *high levels of risk exposure or limited capacity to pay for private insurance coverage*. In this context, the risk itself is likely insurable overall. However, modest-income households and small businesses may not be able to afford the coverage, or insurers may not be willing to offer affordable coverage to households or businesses that are likely to face frequent and/or severe losses. Increasing investment in risk reduction should contribute to expanding the availability and affordability of insurance coverage.

A lack of take-up of insurance coverage, despite the availability of affordable insurance coverage, likely indicates that households or businesses do not perceive themselves as exposed to significant losses. Among those that are exposed, this could be driven by a lack of risk awareness or an expectation that government-supported financial protection will be available through public compensation or financial assistance arrangements.

The rationale for offering government-supported financial protection may be most compelling for risks for which there is a generalised lack of insurance availability, especially if driven by a difficult to address breach of one of the conditions of insurability and where opportunities to reduce the risk are limited. However, the

potential for the private insurance market to expand the availability of coverage should be carefully considered, particularly in the case of emerging risks for which the market coverage is likely to evolve and expand.

There may also be a case for government-supported financial protection if, despite the availability of insurance in general, access to affordable insurance coverage is limited for some segments of the population. A limited gap in access to affordable insurance likely indicates that the risk is too elevated for some and that greater investment in risk reduction could support the availability of affordable insurance. It could also be driven by a lack of affordability for lower income segments of the population which could indicate a need for government-supported financial protection or other forms of government assistance.

The case for government-supported financial protection is likely more limited where affordable insurance coverage is universally available but not acquired by a share of the population. A lack of take-up of affordable insurance among those that are exposed likely indicates a lack of risk awareness or insurance literacy, or an expectation of public compensation and financial assistance. These challenges could potentially be addressed by efforts to increase risk awareness and insurance literacy and limit the expectation for government assistance.

The overall evaluation should consider the availability of financial protection for some types of losses through government-supported financial protection arrangements established for other purposes. As noted above, government-supported financial protection is likely to be available through social insurance arrangements for losses related to an increase in health care costs or a loss of employment in countries with publicly provided health care, health care insurance or unemployment insurance.

2.3. Determining the appropriate form of government-supported financial protection

If there is a decision to offer government-supported financial protection, the government's intervention could support financial protection by establishing some form of social insurance arrangement, a public-private insurance programme (PPIP) to offer financial protection through private insurance markets, or by providing public compensation and financial assistance to those impacted (Box 2.4).

Box 2.4. Main forms of government-supported financial protection

There are three main approaches to offering government-supported financial protection: (i) social insurance arrangements; (ii) public-private insurance programmes; and (iii) public compensation and financial assistance arrangements.

- 1) Governments have established social insurance arrangements to provide financial protection against a range of personal risks. Beneficiaries of contributory social insurance arrangements make contributions to the scheme, usually as a component of their employment income, which is used to fund benefits.¹ While practices differ across countries, contributory social insurance arrangements are most commonly applied to personal risks relevant for a broad share of the population, such as protecting individuals against loss of income due to unemployment, sickness or disability, covering the costs of health care, and supporting the adequacy of retirement income (pensions).
- 2) Governments have established public-private insurance programmes² to provide financial protection for property risks and sometimes personal risks, related to natural hazards, terrorism and other catastrophe risks. Policyholders pay premiums to the programme which are used to fund claims. These programmes have generally been established to address a lack of private insurance market capacity or appetite for assuming specific catastrophe risks, although some programmes have been established to ensure broad take-up of coverage.
- 3) Governments have established public compensation and financial assistance arrangements to aid individuals, households or businesses impacted by the materialisation of a risk, through tax reductions or deferrals, grants, loans or guarantees. These arrangements are usually funded from general government revenues, without the payment of a contribution or premium. Public compensation and financial assistance arrangements are usually established in response to risks that affect broad segments of the population simultaneously, and for which there is limited financial protection provided by private insurance markets, including public-private insurance programmes, or through existing social insurance arrangements. They may provide financial protection for both personal and property risks. In many cases, these arrangements are established after a risk has materialised, although some countries have established multi-year or permanent arrangements that respond to risks as they materialise.

In most countries, funding allocated to social insurance arrangements tends to be much larger than the premiums collected by private insurance markets. However, the relative role of governments and private insurance markets evolve over time. For some risks, such as health and dependent old-age, private insurance markets are playing an increasing role in providing financial protection, often driven by a desire to reduce potential fiscal risks and/or enhance innovation and cost efficiency. For others, such as natural hazard risks, government-supported financial protection through public-private insurance programmes has tended to increase as rising losses and other factors have led to challenges in achieving broad coverage through private insurance markets.

Note:

¹ Depending on the design of the arrangement, contributions may be used to fund the benefits of current contributors or past contributors.

² Public Private Insurance Programmes (PPIPs) (or catastrophe risk insurance programmes) can be defined as “any type of arrangement established by the insurance sector and/or government to provide insurance, co-insurance, reinsurance and/or a government guarantee for losses resulting from catastrophe perils to all or specific types of potential policyholders” (OECD, 2021^[19]). In OECD countries, PPIPs are focused on supporting the availability of insurance coverage for catastrophe perils for households and/or businesses. The programmes that have been established target natural hazard and political violence (particularly terrorism) perils, although there have been discussions, proposals and some initiatives aimed at providing coverage for losses related to cyber incidents/attacks and infectious disease outbreaks.

Governments should consider several factors when determining whether to deliver financial protection for property risks through a public-private insurance programme, or through a public compensation and financial assistance arrangement, which may be ad hoc or permanent in nature. It should be noted that the different forms of government-supported financial protection for property risks are not mutually exclusive, and that financial protection may be provided through a mix of public-private insurance and public compensation and financial assistance. Social insurance arrangements may also provide some financial protection against large-scale risks. For example, in many countries, social insurance may provide a basic level of protection for health and dependent old age risks, while private health insurance or private pension plans are available to supplement the protection provided through social insurance.

In undertaking this assessment, governments should consider the main characteristics that differentiate these two approaches.

- **How each approach is funded:** Claims paid by a public-private insurance programme are funded by premiums paid in advance by those that will benefit from the financial protection. Public compensation and financial assistance are usually funded by general government revenues. As a result, the two approaches have different fiscal and distributional implications. Public-private insurance programmes usually involve more limited fiscal risks, as long as funding is adequate and budgetary contributions are limited, while some forms of public compensation and financial assistance are a direct fiscal cost.² The distributional impact of public compensation and financial assistance will be equivalent to the distributional impact of the tax system, while the distributional impact of a public-private insurance programme will depend on the approach to setting premium rates. Governments usually have greater financial capacity to provide financial protection given their large balance sheet and access to bond markets which allows them to diversify risk over time. However, this greater financial capacity would theoretically be available for both forms of government-supported financial protection.³
- **The level of certainty for beneficiaries and discretion for government:** A public-private insurance programme would usually involve an obligation to provide the full level of financial protection promised through the arrangement when a covered loss is incurred. A commitment to provide public compensation and financial assistance could potentially involve some flexibility to modify or rescind the commitment made, if necessary, particularly if the programme is temporary. The obligation to deliver financial protection inherent in a public-private insurance programme should therefore provide the policyholder with greater certainty regarding the protection that they have acquired. A public compensation and financial assistance arrangement should provide the government with greater discretion to respond to any unforeseen needs or circumstances resulting from a large event. That discretion could be leveraged to ensure a targeted response, focussing on the most severely affected, most vulnerable and/or those whose protection is deemed to be important for economic or social functioning. It could also introduce a level of “fairness” into the response that is consistent with societal values.
- **The participation of private (re)insurance markets:** A public-private insurance programme would usually involve the insurance sector in distributing financial protection and assuming risk. The participation of the insurance sector could have implications for the cost and efficiency of delivering financial protection and the capacity to incorporate incentives to encourage risk management and risk reduction. A public compensation and financial assistance arrangement would not normally involve the private insurance sector and could have a negative impact on the take-up of any available private insurance.

Given these different characteristics, the optimal approach for delivering government-supported financial protection is likely to differ based on the specific nature and implications of the unprotected financial exposure, and the costs and benefits of insurance market participation (Figure 2.6).

Figure 2.6. Determining the appropriate form of government-supported financial protection

Public-private insurance programme	• Relatively frequent occurrence requiring more regular funding through the accumulation of reserves • Certainty of financial protection would address hindrances to economic activity • Private (re)insurance market participation could reduce fiscal costs, improve speed and accuracy of payments and incentivise risk management and risk reduction
Public compensation and financial assistance programme	• Rare occurrence for which the accumulation of reserves could involve unacceptable opportunity costs • Risks for which there is greater uncertainty related to impacts and flexibility in response could be needed • Limited potential for increased insurance market participation • Premium rates unlikely to be affordable for some of those most exposed and with limited options for risk reduction

2.3.1. Nature and implications of the unprotected financial exposure

The characteristics of the unprotected financial exposure, such as the potential frequency with which the exposure could materialise and the implications and distribution of the unprotected financial exposure, should be considered when determining the appropriate approach to offering government-supported financial protection

Providing financial protection against risks that are expected to materialise with a relatively higher frequency would require more regular funding. A public-private insurance programme that collects premiums from those at risk would support the availability of regular funding through the accumulation of reserves. There may also be benefits to the economy if a portion of the needed funding for recovery is pre-funded through collected premiums. The accumulated funds would be available to be invested in capital markets, providing a potential source of capital for productive investment (Pearson and Martin, 2005^[12]), although investments backing property risks tend to be shorter-term in nature. Relying on debt to finance a significant portion of the recovery could increase post-event leverage and hinder the long-term recovery, whether the funds are borrowed by government to fund grant-based public compensation and financial assistance, or by individuals and businesses in accepting repayable public compensation and financial assistance.

However, accumulating reserves has opportunity costs that need to be taken into account. The accumulation of significant reserves to respond to risks that materialise with very low frequency may not be consistent with societal preferences if there are other unmet needs for government spending or investment. Accessing debt markets to spread at least a portion of the losses from very low frequency events over time may be considered fair at a societal level given the lengthy expected return period for such losses.⁴

Those facing unprotected financial exposures to risks that create an *ex ante* hindrance to their participation in economic activities or access to credit would benefit from the greater certainty of financial protection that would likely accompany a public-private insurance programme. This would help ensure that those that are exposed, and those transacting with those that are exposed, are confident that there is sufficient financial protection in place should the risk materialise. The financial protection provided by a public compensation or financial assistance programme, even if arranged *ex ante*, may be at risk of a change in political priorities or fiscal capacity. As a result, there may be some uncertainty over whether the financial exposure hindering economic activity or access to credit has ultimately been mitigated.

For risks that involve greater uncertainty in terms of the magnitude and distribution of losses, governments could benefit from greater discretion to respond to any unprotected financial exposure that emerges. Through public compensation and financial assistance arrangements, governments would have greater flexibility in allocating public resources to respond to unanticipated needs and to incorporate equity considerations. A public-private insurance programme with a pre-defined public resource commitment would reduce that flexibility, particularly where governments face fiscal constraints.

Risks that are most likely to impact households or businesses with limited financial capacity may be more difficult to address through a public-private insurance programme, as the programme will depend on the amount of premiums that can be collected. The reach of the financial protection may be limited if the required premium is unaffordable for modest income households or small businesses. A public compensation and financial assistance arrangement funded by the general government budget would ensure that the distributional impact of funding the fiscal response is aligned with the tax system, which will likely involve a more limited contribution from those with modest income and a higher contribution from those taxed at a higher marginal rate and who likely have a greater capacity to bear costs.⁵

2.3.2. Costs and benefits of insurance market participation

Offering government-supported financial protection through a public-private insurance programme would allow for the participation of the private (re)insurance market in distributing financial protection and assuming a portion of the risk. Private (re)insurance market participation would have benefits if:

- *The private (re)insurance market would be willing to provide some capacity:* a public-private insurance programme could allow for a sharing of the risk with private insurance companies and ensure that some portion of the losses are absorbed by private insurance, reinsurance and capital markets. Such an arrangement could also enhance the availability of private insurance coverage by, for example, providing reinsurance or a guarantee for significant loss events that might otherwise impede the availability of private insurance market coverage, or by imposing a requirement to acquire insurance that could reduce adverse selection and help create a more diversified pool of risks. Offering public compensation and financial assistance, whether arranged *ex ante* or *ex post*, could discourage the purchase of insurance and reduce the share of losses absorbed by private insurance markets.
- *The participation of the private insurance sector could support quicker and more certain payments to beneficiaries and reduce fraud:* a public-private insurance programme that leverages the insurance sector's capacity for adjusting losses and making payments to those impacted could support a speedier recovery and lead to more limited economic disruption and lower overall losses, depending on the type of financial protection that is being provided and the commitment of the insurance sector to resolving claims fairly and quickly. Some types of financial protection could potentially be provided quickly by either the insurance sector or the government. For example, payments of fixed amounts to support immediate and basic needs or replace lost income or revenue could potentially be made quickly through a public compensation and financial assistance arrangement, or through an insurance coverage that incorporates a simplified or parametric

payment trigger. The insurance sector's expertise in detecting fraud and verifying the eligibility of claims could lead to cost benefits in terms of reducing fraudulent payments and over-payments.

- *The participation of the private (re)insurance sector could support risk management and risk reduction:* Private (re)insurance market participation in assuming risk should incentivise insurers, reinsurers and intermediaries to develop risk assessment tools to support the underwriting and pricing of those risks. These risk assessment tools can support the government's understanding of risk and improve the ability of governments to make effective investment in risk reduction and preparation. They could also support the application of risk-based premiums that can potentially encourage increased investment in risk reduction where attractive reductions in premium rates increase the financial benefits of investing in risk reduction.

However, the benefits of private sector participation will not be equivalent for all risks. The willingness of private (re)insurance to assume risks may be very limited while their capacity to assess and quantify risks will be lower for more complex and dynamic risks. As noted, the response to some risks could benefit from greater government discretion in allocating funds to address unanticipated needs and support an equitable recovery. In addition, the ability of risk-based premiums to encourage risk reduction will also differ for different risks.

There are also costs to including the private (re)insurance sector in distributing coverage and assuming risk, including the commissions that intermediaries, insurers and/or reinsurers would demand, the excess premium costs to account for returns to the shareholders of private (re)insurance companies, and any additional cost that could result from a multiple provider model. Ultimately, the potential benefits of private (re)insurance market participation in providing financial protection in co-operation with governments, including the potential reduction in fiscal risk, the possibility of quicker and more accurate payments and the support for risk management and risk reduction will need to be weighed against these costs. For some risks, a mix of public-private insurance and public compensation and financial assistance may be the appropriate approach.

2.4. Conclusion

The unprotected financial exposures that can result from large-scale social, economic, technological and environmental risks could have important social, economic and financial implications and create financial vulnerabilities for those impacted. Governments play an important role in ensuring that adequate financial protection, whether through insurance or other forms, is available to respond to these financial vulnerabilities. This chapter presented a framework for governments to support decisions on offering government-supported financial protection.

The first part provided a framework for evaluating the need for government-supported financial protection.

1. Governments should start with an exercise to identify risks of potential concern, focused on identifying risks that have a non-trivial likelihood of occurring and that could have a high-impact on a significant share of the population.
2. This should be followed by an assessment of the adequacy of financial protection for the risks identified as risks of potential concern. This assessment should examine the availability, affordability and take-up of insurance coverage for these risks, as well as the sufficiency of the coverage available in mitigating the potential financial exposures of households and businesses. The assessment should aim to identify unprotected financial exposures to the risks of potential concern and the main drivers of those unprotected financial exposures, whether a lack of availability, affordability or take-up of financial protection. It should also determine whether the unprotected financial exposures are widespread or limited to a few segments of the population,

such as those at high-risk that may have opportunities to access financial protection through increased investment in risk reduction.

3. Governments should then evaluate the need to offer government-supported financial protection by considering: (i) the likelihood, frequency and severity of the risk; and (ii) the potential implications that unprotected financial exposures could have on economic activities, such as through access to credit, and on the more vulnerable segments of the population who would have a more limited ability to recover without financial protection. A key component of this evaluation should be an examination of the potential for expanding financial protection through private insurance markets and potential impediments to private insurance market involvement in assuming such risks. Ultimately, the rationale for offering financial protection will be most compelling for risks that: (i) occur more frequently and are more severe; (ii) impede economic activity and access to credit; and (iii) are considered uninsurable by private insurance markets due to challenges such as establishing a pool of uncorrelated risks or quantifying potential losses.

The second part of the framework examines the factors that are relevant for determining the appropriate form of government-supported financial protection. Governments can offer financial protection through a public-private insurance programme or a public compensation and financial assistance arrangement. The two approaches have different characteristics in terms of funding, the certainty that would be provided for beneficiaries, the amount of discretion for governments in preparing their response, and the participation of private (re)insurance markets.

Given these different characteristics, the optimal approach to offering government-supported financial protection will differ based on the nature and implications of the risk exposure on access to credit and for vulnerable segments of the population, as well as the potential contribution that private insurance markets can make to absorbing losses, providing quick payments and mitigating fraud.

- Public-private insurance programmes are likely to be more suited to protecting against risks that occur more frequently and for which certainty in the availability of financial protection is important for mitigating hindrances to economic activity. This approach will be most beneficial when focused on risks for which the private (re)insurance market can make a meaningful contribution to absorbing losses, improving payment speed and accuracy, and incentivising risk management and risk reduction.
- Public compensation and financial assistance arrangements are likely to be more appropriate for addressing risks that are expected to materialise very rarely and where flexibility in response could be needed based on higher levels of uncertainty about their impact. Public compensation and financial assistance arrangements could play an important role in addressing unprotected financial exposures to risks for which there is unlikely to be significant insurance market appetite or where highly exposed households and businesses are likely to face unaffordable premiums.

While these considerations should inform decisions on whether, and how, to offer government-supported financial protection, governments, and societies more broadly, ultimately have different social and economic characteristics and values which lead to differing perspectives on the appropriate roles of governments and private markets, acceptable levels of risk and financial vulnerability, and thresholds for government intervention.

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Notes

¹ An OECD survey of national risk assessment practices in OECD Members found that governments commonly use a rating scale that identifies very unlikely risks as those that have an annual probability of occurrence of less than 0.05% (OECD, 2018_[20]). In the United Kingdom, for example, the most recent National Risk Register focuses on risks that are deemed to have at least a 0.2% annual likelihood of occurrence although most of the risks examined are deemed to have an annual likelihood of 1% or higher (HM Government, 2025_[21]). Likelihoods in the National Risk Register are presented as the probability, in percentage, that the "reasonable worst-case scenario" could occur at least once within the 5-year duration period of the risk assessment (HM Government, 2025_[21]). The probabilities above have been converted to annual probabilities.

² Some forms of financial assistance, including equity, loans and guarantees may not be reported in the fiscal framework.

³ A government could leverage its balance sheet and borrowing capacity to both provide public compensation and financial assistance and co-insure, reinsure or provide a backstop for a public-private insurance programme.

⁴ Accumulating reserves to fund the possible losses from a future event and accessing debt to fund the losses from an event that has materialised are both forms of inter-generational transfer. However, a transfer of resources to future generations for an uncertain future loss may be more difficult to implement, as the current transferors will likely have more political weight than the future recipients.

⁵ The ultimate distributional impact of a public compensation and financial assistance arrangement will also depend on the distributional impact of programme disbursements.

3

Examining the need for government-supported financial protection for natural hazard, cyber and infectious disease risks

Natural hazards, infectious disease outbreaks and cyber attacks and incidents have the potential to lead to widespread and severe financial impacts. In many countries, private insurance markets have been unable to achieve broad coverage for all potential financial exposures to these risks leaving individuals, households and businesses exposed to potentially significant unprotected financial losses. This chapter applies the framework presented in Chapter 2 to these three risks of potential concern by examining the potential impacts, the adequacy of financial protection provided by insurance markets and the potential implications of unprotected financial exposures for economic activity. It also discusses factors that should be considered in determining the appropriate form of any government-supported financial protection, including the nature of the unprotected financial exposures and the potential for (re)insurance markets to contribute to loss absorption and risk reduction.

3.1. Introduction

Natural hazards, infectious disease outbreaks and cyber attacks and incidents have the potential to result in significant unprotected financial exposures. These three types of risks are relevant for most, if not all, countries and have the potential for widespread and severe financial impacts. In addition, broad protection for all potential financial exposures to these risks has not been achieved through private insurance markets.

The purpose of this chapter is to provide an application of the framework outlined in Chapter 2 to these risks. It first evaluates the need for government-supported financial protection. It provides data on the potential impact of natural hazards, infectious disease outbreaks and cyber attacks and incidents on individuals, households and businesses, and on the possibility that these risks could have significant impacts on a large share of the population. It then assesses the adequacy of financial protection available through private insurance markets and existing social insurance arrangements, and limitations in the availability, affordability and take-up of insurance coverage for these risks. It then examines factors that should be considered in determining the need for government-supported financial protection, including factors related to the potential likelihood, frequency and severity of natural hazards, infectious disease outbreaks and cyber attacks and incidents, the impact of unprotected financial exposures on economic activity and vulnerable populations with more limited capacity to absorb financial losses, as well as the potential to expand the availability, affordability and take-up of financial protection.

The second part focuses on determining the appropriate form of government-supported financial protection, whether as a public-private insurance programme or a public compensation and financial assistance arrangement. It discusses how the nature and implications of exposure to natural hazard, infectious disease outbreak and cyber risks could impact the choice between these two potential approaches to offering government-supported financial protection and on the potential costs and benefits of (re)insurance market participation in assuming risk, supporting quicker payments and reduced fraud, and contributing to risk management and risk reduction, given the different characteristics of natural hazard, infectious disease outbreak and cyber risks.

3.2. Evaluating the need for government-provided financial protection

3.2.1. Identifying risks of potential concern

Governments should identify the “risks of potential concern” that have a non-trivial likelihood of occurring and that could result in high-impacts on a large number of individuals, households or businesses. Natural hazards, infectious disease outbreaks and cyber attacks and incidents are “risks of potential concern” (Table 3.1).¹

Table 3.1. Likelihood, impact severity and extent of natural hazard, infectious disease outbreak and cyber risks

	Likelihood of occurring	Potential for high impacts on individuals, households and businesses	Potential for impacts on a significant share of the population
Natural hazards	High likelihood for many natural hazard risks (relatively frequent occurrence)	High impact (damage equivalent to significant share of income)	Potential to impact a significant number of households and businesses
Infectious disease outbreaks	Likely to occur (although low frequency, particularly outbreaks that lead to restrictions on economic activity)	Moderate impact (losses in income and revenue from restrictions on economic activity)	Potential to impact entire population with income and revenue losses concentrated in some sectors
Cyber incidents and attacks	Idiosyncratic incidents are highly likely (high frequency) Cyber catastrophes are likely to occur (although low frequency)	Moderate to high impact (losses in income and revenue from restrictions on economic activity)	Cyber catastrophe could impact a significant number of businesses

All of these risks have a non-trivial **likelihood of occurring**.

- **Risks related to natural hazards:** Natural hazards, including floods, storms, earthquakes and wildfires, can result in morbidity and mortality, significant damage to homes and businesses and large income and revenue losses for impacted individuals and businesses. Most countries face damages and losses from natural hazards with some frequency. Natural hazards that impact a large geographical area or important population centres can result in damages and losses for a significant share of the population.
- **Risks related to infectious disease outbreaks:** Infectious disease outbreaks lead to morbidity and mortality, including an increase in health costs. Outbreaks that require the implementation of government restrictions on economic and social activity can lead to substantial losses in income and revenue. Infectious disease outbreaks occur with some frequency, although outbreaks that result in government restrictions on economic and social activity have occurred rarely. However, when restrictions are imposed, a large share, if not the entire population, are likely to be impacted and face significant income and revenue losses.
- **Risks related to cyber attacks and incidents:** Cyber attacks and incidents can lead to income and revenue losses and other financial losses from theft of funds, restoration expenses, as well as compensation to third parties and fines and penalties for breaches of legal or contractual obligations (e.g. disclosure of personal data). In some cases, a cyber attack could also lead to damages to property or equipment and bodily injury. While cyber attacks occur with a high-level of frequency and can impact any individual, household or businesses with a connection to the internet, most attacks and incidents are idiosyncratic and result in limited financial impacts. However, there is a clear potential for large-scale attacks that could materially impact a significant segment of the population simultaneously.

All of these risks could be **high impact**, with the potential to lead to significant financial impacts on individuals, households and/or businesses.

- **Natural hazards:** Wildfires, cyclones, earthquakes, floods and other natural hazards can lead to deaths and injuries, significant damages to homes and businesses and substantial losses in income and revenue as homes and businesses are repaired or rebuilt. For example, the average National Flood Insurance Program insurance claim for floods in the United States is USD 68 000 (National Flood Insurance Program, n.d.^[11]) while the average wildfire claim paid by one insurance company was USD 224 000 in 2021-2022 (Harris, 2022^[21]), equivalent to approximately 84% and 278% of median household income, respectively, in 2023. The damages and losses from natural hazards can lead to significant financial stress. One study of the impact of natural hazards on individual financial health in the United States found an increase in debt distress and bankruptcies and a reduction in credit scores among those impacted which continued for a number of years after the occurrence of the event (Ratcliffe et al., 2019^[3]). Businesses can face significant disruption to their operations. For example, a study of small businesses affected by flooding in Townsville (Australia) in 2019 found that 56% of small businesses faced business interruption of one month or more, including 28% that faced interruptions or expected interruptions of more than six months (SGS Economics and Planning, 2021^[4]). According to one estimate from the United States, more than 40% of businesses do not re-open at all after being impacted by a natural hazard while, among businesses that reopened, only 29% were still operating two years later (Scott, 2014^[5]).
- **Infectious disease outbreaks:** The COVID-19 pandemic demonstrated the significant financial impact of a highly contagious pathogen that required measures to restrict economic and social activity. The reduction in economic activity led to an increase in the unemployment rate in 33 out of 38 OECD countries (OECD, 2021^[6]), while underemployment reached its highest levels since at least before the global financial crisis (OECD, 2021^[7]). One survey across 43 countries found that 53% of households faced a decrease in income in the first year of the pandemic (2020).

(Pinkovetskaia, 2022^[8]). Businesses also faced significant declines in revenue. For example, one survey of Canadian businesses found that, relative to April 2019, business revenues in April 2020 had declined by more than 10% for all sectors and more than 30% for the hardest-hit sectors (Statistics Canada, 2020^[9]). There was a significant increase in business insolvencies in 2024 across most countries, due in part to the phasing-out of COVID-related fiscal support and the start of repayment obligations for loans provided or supported by governments (Atradius, 2025^[10]).

- **Cyber attacks and incidents:** Cyber attacks and incidents can have a significant financial impact on individuals, households and businesses. For example, individuals impacted by cybercrime could face costs that approximate the financial impact of natural hazards. In Australia, individuals faced an average cost of AUD 30 700 (Australian Signals Directorate, 2024^[11]), equivalent to approximately 55% of median personal income in 2021-2022. In the United States, the average cost of cybercrime incidents reported to the Federal Bureau of Investigation by the public in 2024 was USD 19 372, although this figure may include some reporting from small businesses as well as individuals (Internet Crime Complaint Center, 2025^[12]). The average claims payment for a cybercrime under a household insurance policy was more than USD 10 000 (Insurance Information Institute and HSB, 2025^[13]). For small businesses, average loss estimates range from AUD 49 600 (small businesses) in Australia (Australian Signals Directorate, 2024^[11]) to over USD 300 000 across companies in one global study of insurance claims, with a large proportion in the United States (NetDiligence, 2024^[14]). One survey of businesses in Canada reported costs of over CAD 100 000 for 41% of the SMEs surveyed (Azimi, 2024^[15]). For large companies, average costs can reach up to USD 40 million (NetDiligence, 2024^[14]). One survey of businesses in the United States and a number of European countries found that approximately 20% of companies faced solvency concerns as a result of a cyber attack (Hiscox, 2022^[16]) while a survey in the United Kingdom found that 37% of companies faced employee reductions after a cyber attack (CIR, 2024^[17]).

All of these risks have the potential to be high impact for a significant segment of the population.

- **Natural hazards:** The number of people affected by natural hazards between 2010 and 2024 accounted for more than 5% of the population (overall) in 15 OECD Members and accession candidate countries, and more than 1% of the population annually on average in 9 OECD Members and accession candidate countries since 2010 (although some individuals were likely affected by multiple events).² In the United States, 99% of counties have been impacted by flooding since 1996 (National Flood Insurance Program, n.d.^[1]). More than 65% of the population or GDP of Chile, Greece, Indonesia, Mexico, the United Kingdom and the United States is located in areas exposed to two or more natural hazards, including cyclones, drought, floods, earthquakes, volcanoes or landslides. More than 80% of the population or GDP of Colombia, Costa Rica, Japan, Korea, Thailand and Türkiye is located in areas exposed to these natural hazards (Dilley et al., 2005^[18]). Another study found that more than 20% of the population of Austria, Colombia, Croatia, Indonesia, Japan, Korea, Latvia, the Netherlands and Thailand are exposed to high pluvial, fluvial or coastal flood risk (Rentschler, Salhab and Jafino, 2022^[19]).
- **Infectious disease outbreaks:** Outbreaks involving highly transmissible and highly virulent pathogens, such as COVID-19, have the potential to impact the vast majority of the population, if not the entire population, whether through direct infection or as a result of the containment measures implemented in response. The number of reported COVID-19 cases and deaths³ was equivalent to approximately 10% and 0.09% of the world population, respectively, although the case count could include individuals infected multiple times while both figures could suffer from significant over- or under-reporting (WHO, 2024^[20]). Some historical outbreaks have also impacted a significant share of the population, including the 1918-1919 influenza pandemic that affected approximately 25-30% of the world population and led to 50 million deaths (Piret and Boivin, 2021^[21]).

- **Cyber attacks and incidents:** Any individual or business with an internet connection is potentially exposed to a cyber attack or incident and a large share of individuals and businesses have faced cyber attacks or incidents. In the United States, 28% of consumers have had a social media account hacked while 15% experienced an online cyber attack (Insurance Information Institute and HSB, 2025^[13]). Most businesses have faced a cyber attack and many face numerous cyber attacks on annual basis. For example, one survey found that, in 2023, 66% of companies across the world had been hit by a ransomware attack (Statista, 2024^[22]). According to a survey of companies of varying sizes in 15 developed and emerging markets, 30% of respondents had been affected by ransomware, 42% by online fraud and 47% by a data breach (Munich Re, 2024^[23]). A survey of businesses in the United States and several European countries found that companies, on average, faced 49 (Germany) to 80 (Spain) cyber attacks annually (Hiscox, 2024^[24]). Unlike natural hazards and infectious disease outbreaks, the vast majority of cyber attacks are idiosyncratic, affecting a single individual or business. However, a single cyber attack or incident could easily affect many policyholders simultaneously. There have been a number of cyber catastrophes “near-misses” and some evidence of an increase in cyber attacks with significant impacts. For example, in the United Kingdom, the National Cyber Security Centre reported that the number of “nationally significant cyber attacks” had more than doubled in the 12 months to September 2025, relative to the previous 12 months (National Cyber Security Centre, 2025^[25]). Box 3.1 provides an overview of the types of cyber catastrophes that could occur and some estimates of the potential financial impact.

Recent materialisations of these risks of potential concern have impacted large numbers of households and businesses and have led to significant economic impacts. Table 3.2 provides some estimates of the magnitude of damages and losses from past natural hazards, infectious disease outbreaks and cyber attacks and incidents.

Box 3.1. Cyber catastrophes

There are significant concerns about the potential for a single cyber attack or incident to affect many households or businesses simultaneously, based on: (i) the exploitation of a vulnerability in commonly-used software or hardware; (ii) the mass deployment of harmful, and potentially self-replicating, malware (or ransomware); (iii) an attack or disruptive incident affecting a critical digital services provider, such as a cloud service provider; or (iv) an attack or disruptive incident affecting critical infrastructure services (water, electricity, etc.) (Brew and Lewis, 2025^[26]; Lloyd’s Market Association, 2025^[27]; Pain, 2023^[28]; Romanosky et al., 2025^[29]). A number of scenarios have been developed to estimate the potential losses that could materialise as a result of a cyber catastrophe, including a disruption to a major cloud service provider with estimated economic losses of up to USD 23.8 billion¹ (Lloyd’s and AIR Worldwide, 2018^[30]) and a financial services payment system disruption that estimated one-year losses of up to USD 15 trillion² (Lloyd’s Futureset and Cambridge Centre for Risk Studies, n.d.^[31]).

There have been a number of significant losses affecting multiple companies, including losses due to the spread of computer viruses, particularly in the early 2000s, as well as more recent losses due to attacks on, or disruptions to, critical service providers or service providers critical to specific sectors. Cyber attacks on critical service providers in 2023 and 2024 affected approximately 100 million people around the world in each case.³

However, thus far, economic losses from large-scale cyber events have not reached the magnitude of losses seen for other perils, such as the largest earthquakes or cyclones or the losses seen as a result of COVID-19. One analysis of cyber catastrophes found that, between 1998 and 2023, there were

25 events causing a total of USD 326.4 billion in economic losses, with the largest events causing approximately USD 65-70 billion in losses (inflated to current USD). This analysis also found that more than 90% of the economic losses occurred between 1998 and 2008 (Johansmeyer, 2024^[32]; Johansmeyer, 2024^[33]).⁴

Notes:

¹ This loss estimate reflects a 5.5 to 11 day disruption to users of a cloud service provider in the United States (Lloyd's and AIR Worldwide, 2018^[30]).

² This loss estimate reflects an extreme scenario that causes a lengthy disruption and a major compromise of transaction data (Lloyd's Futureset and Cambridge Centre for Risk Studies, n.d.^[31]).

³ The breach of the a file transfer service affected approximately 2 800 organisations and 96 million people while the breach of a healthcare payments and claims platform may have impacted up to one third of the US population (Howden, 2024^[34]).

⁴ For the purpose of this analysis, cyber catastrophes were defined as events that resulted in more than USD 800 million in losses and affected more than one company (Johansmeyer, 2024^[32]).

Table 3.2. Economic impact of selected major events

	Direct damages or financial losses
COVID-19	USD 1 200 – 1 600 bn
Great East Japan Earthquake (2011)	USD 211.3 bn
Hurricane Katrina (2005)	USD 128.3 bn
Thai Floods (2011)	USD 46.5 bn
Canterbury Earthquakes (2010-2011)	NZD 40 bn
Cyber incident at cybersecurity vendor (2024)	USD 5.4 bn
Queensland Floods (2010-2011)	AUD 5.7 bn
Cyber incident at healthcare service provider (2024)	USD 4.5 bn

Source: COVID-19 loss estimates are from Wolfrom (2022^[35]), *Could insurance provide an alternative to fiscal support in crisis response?*; Great East Japan Earthquake loss estimates are from Kajitani, Chang and Tatano (2013^[36]), *Economic Impacts of the 2011 Tohoku-oki earthquake and tsunami*; Hurricane Katrina loss estimates are from GAO (2020^[37]) *Natural Disasters: Economic Effects of Hurricanes Katrina, Sandy, Harvey, and Irma*; Thai Floods loss estimates are from World Bank (2012^[38]), *Thai Flood 2011: Rapid Assessment for Resilient Recovery and Reconstruction Planning (Overview)*; Canterbury Earthquakes loss estimate are from Potter et al. (2015^[39]), *An overview of the impacts of the 2010-2011 Canterbury earthquakes*; Queensland Floods loss estimates are from Deloitte Access Economics (2016^[40]), *The cost of natural disasters: Australian experiences* and Reserve Bank of Australia (2011^[41]), *Statement on Monetary Policy*. The loss estimates for the two cyber incidents are from Guasch Garcia and Pujol (2025^[42]), *Top 10 Cyber Incidents 2024*.

3.3. Assessing the adequacy of financial protection

The framework proposes that governments undertake an assessment of the adequacy of financial protection for the risks of potential concern to identify potential unprotected financial exposures. This assessment should examine the availability, affordability and take-up of insurance coverage offered through private insurance markets, including public-private insurance programmes, the sufficiency of that coverage in mitigating financial exposures, as well as any financial protection that could be available through social insurance arrangements established for other purposes (Table 3.3).

Table 3.3. Adequacy of financial protection for natural hazard, cyber and infectious disease outbreak risks

	Availability of sufficient financial protection	Affordability of financial protection	Take-up of financial protection
Natural hazard risks	Generally available to households and businesses although may include high deductibles or low limits for some hazards or some consumers	Unaffordable in some regions for a moderate share of high-risk households and businesses, and concerns about increasing premium rates	Take-up of coverage in some countries is relatively low
Infectious disease outbreaks	Very limited financial protection available for businesses revenue losses	Not evaluated (coverage not generally available)	Not evaluated (coverage not generally available)
Cyber attacks and incidents	Mostly available to households and businesses although some businesses have faced challenges in access, and exclusions for potentially significant risks are usually applied	Price increases have been significant in some years for some businesses although recent moderation	Take-up of coverage is relatively low among SMEs

3.3.1. Availability of financial protection

Natural hazard risks

Financial protection against most natural hazard risks is generally available in OECD Members and accession candidate countries, either from the private insurance sector or through public-private insurance programmes. For example, the availability of insurance coverage in the 23 European countries examined by EIOPA was only estimated as “low” for one or two natural hazard perils in five countries.⁴ An examination of the household insurance market in the United States found that non-renewal rates (i.e. the share of annual insurance policies that insurers decided not to renew due to the risk profile of the property) were below 2% on average (for 2018-2022), even in high-risk areas (Federal Insurance Office, 2025^[43]). However, households in some regions within some countries face difficulties in accessing insurance coverage for specific types of natural hazards. For example, one recent report identified insurance availability challenges in 10 US states⁵ and for approximately 10% of Canadian households deemed to be at high risk of flooding (Golnaraghi and Vichev, 2025^[44]). As outlined in chapter 4, challenges also exist in accessing insurance coverage for wildfire losses in high-risk areas in a few countries.

Insurance coverage for natural hazard risks will usually provide sufficient coverage to respond to the major types of losses that individuals, households or businesses could face. Property insurance that includes coverage against natural hazard risks usually provides financial protection against damage to property and revenue losses (i.e. business interruption) for businesses and for damage to property and temporary living expenses for households. Individuals that face a loss of income due to disruptions to economic activity in the affected region may be eligible for government-supported unemployment insurance or benefits in most countries.

However, coverage for business interruption and temporary living expenses may be subject to limits that could lead to unprotected financial exposures for businesses and households. In addition, for some risks or for some policyholders, high deductibles or low limits on sum insured may be applied⁶ which could result in large, unprotected exposures in some cases. Financial protection for mortality and morbidity risks related to natural hazard risks is generally available through health and life insurance policies. Health care needs or costs would also be directly provided or covered through health insurance arrangements established in most countries.

Infectious disease outbreaks

Financial protection for mortality and morbidity risks related to an infectious disease outbreak is generally available in relevant health and life insurance policies offered by private insurers, and there does not appear to be any exclusions applied. In many countries, basic health care is either directly provided by governments at no cost or financial protection for health costs is provided through a social insurance arrangement.

Where constraints on economic activities are imposed, individuals that face a loss of income may be eligible for government-supported unemployment insurance or benefits.⁷ However, the availability of private insurance coverage for business revenue losses is very limited as a result of conditions and exclusions applied in property insurance policies.⁸ Since COVID-19, insurers have reportedly tightened “communicable disease” exclusions and are consistently applying an exclusion in property and business interruption policies (Marsh, 2021^[45]; Dennis, 2024^[46]; Curtis, 2022^[47]). As a result, the only coverage available for business interruption related to infectious disease outbreaks is through a very limited specialty market for epidemic risks coverage.⁹ Significant *ex post* financial protection was provided by governments to address unprotected losses in income and revenue. This financial protection was provided as public compensation and financial assistance (e.g. grants, loans, loan guarantees) that was implemented as a specific response to the impacts of COVID19, not as part of a pre-established government-supported financial protection arrangement.

Cyber attacks and incidents

Financial protection against cyber attacks and incidents is generally available through private insurers, either in a stand-alone cyber insurance policy or as a covered peril in some property, liability, crime or other insurance policies (OECD, 2021^[48]). The financial protection offered by private insurers to individuals and households generally covers losses and extra expense related to the fraud, extortion, data breach and other forms of cybercrime. The financial protection available from private insurers for businesses usually covers the main potential financial impacts, including revenue and other financial losses such as theft of funds, extra expense and costs related to liability and fines and penalties, to the extent allowed by law.¹⁰

However, access to cyber insurance coverage may not be available for all businesses while coverage may not be offered to many individuals and households.¹¹ For example, a global survey of risk managers found that 8% of respondents were not able to access cyber insurance coverage (FERMA, 2024^[49]). Another report found that 28% of companies with less than 250 employees were unable to acquire or renew cyber insurance coverage in 2023 (Hoffman, 2024^[50]). In addition, limits on the amount of covered losses and sub-limits for some types of losses, such as business interruption, are often applied (Pain, 2023^[28]) which could leave businesses with unprotected exposures. In 2024, 35% of risk managers reported a reduction in available coverage (FERMA, 2024^[49]). The limits on coverage may be particularly challenging for large businesses seeking higher amounts of coverage (Romanosky et al., 2025^[29]).

Some types of cyber attacks and incidents are usually not eligible for coverage, including through the application of war and infrastructure exclusions (Ruiz, 2023^[51]; GFIA, 2023^[52]; Romanosky et al., 2025^[29]; Pain, 2023^[28]). Critical national infrastructure exclusions are commonly applied to losses resulting from a failure of a satellite, electricity interruptions and gas, water, telecommunications and other infrastructure outages (Romanosky et al., 2025^[29]; Ruiz, 2023^[51]), and may also be applied to key components of the infrastructure that operates the internet, such as domain name system or certificate system providers (Pain, 2023^[28]). Coverage for cloud service disruptions is, however, often included (Pain, 2023^[28]), although this coverage is reportedly more limited in Europe and Asia-Pacific (Guy Carpenter, 2025^[53]) and is often subject to waiting periods of 8 to 24 hours before coverage is triggered (Hemenway, 2025^[54]). Cyber war exclusions vary across policies although commonly aim to exclude hostile attacks where the attackers are under the control of a nation-state or acting on its behalf and where the attack is a widespread

event and/or has a major detrimental impact on the capacity of the state to function (Miller, 2023^[55]; Pain, 2023^[28]). Some of these exclusions could have a material impact on the overall adequacy of available cyber insurance coverage (Box 3.2).

Box 3.2. Potential implications of cyber insurance exclusions and limitations

Cyber insurance exclusions and coverage limitations related to cloud service disruptions and nation-state attacks could leave many businesses with significant unprotected financial exposures to cyber risks.

Cloud service disruptions can affect thousands of businesses simultaneously and lead to significant business interruption losses for those impacted. For example, a 15-hour cloud service outage for US customers in October 2025 reportedly affected more than 2 000 large organisations and up to 70 000 in total (Essen, 2025^[56]; Hemenway, 2025^[54]). Early overall loss estimates from the disruption ranged from USD 565 to USD 740 million (CIR, 2025^[57]), although the application of 8-12 hour waiting periods before coverage is triggered (Essen, 2025^[56]) and other factors meant that insured losses were expected to be only USD 40 million (Hemenway, 2025^[54]).

Growing geopolitical tensions could increase the frequency of cyber attacks executed by nation-states or related entities, whether for the purposes of harming adversaries, creating chaos or stealing funds (Collins, 2024^[58]; WEF, 2024^[59]). One analysis of “major state-affiliated cyber attacks”¹ found an increase in the number of attacks from approximately 20 per year between 2007 and 2010 to more than 120 per year since 2019 (Howden, 2024^[34]). A recent survey of information security professionals from the United Kingdom and the United States found that 32% were extremely concerned and 37% were somewhat concerned that a state-sponsored cyber attack could target their business (Muncaster, 2025^[60]). Major disruptive attacks affecting a large UK retailer and a large UK automotive company in 2025 may have been part of escalating state-sponsored hybrid attacks in Europe, according to an official from the North Atlantic Treaty Organization (Reynolds, 2025^[61]).

Note: ¹ The analysis is based on the types of entities targeted, with major attacks against government agencies and defence and high-tech companies identified as “state-affiliated” attacks (Howden, 2024^[34]).

3.3.2. Affordability of financial protection¹²

Natural hazard risks

The cost of insurance coverage for some natural hazard risks may be, or may be becoming, unaffordable in some regions of the world. More than 25% of households or businesses in 4 of the 17 European countries included in an analysis by EIOPA could face insurance coverage for some or all natural hazard risks that is unaffordable.¹³ In Australia, a recent analysis found that approximately 15% of households faced household insurance premiums that cost more than four weeks of gross household income¹⁴ in 2024, driven in part by the cost of coverage for natural hazard risk (Paddam et al., 2024^[62]). Businesses are also facing challenges in accessing affordable coverage. One recent survey of larger businesses headquartered in North America, Europe and Asia-Pacific found that 44% had chosen not to secure full coverage for their exposure to extreme weather risks as a result of the cost of coverage (FM, 2025^[63]). The cost of property insurance coverage is increasing in many countries, partly as a result of increasing natural hazard risks. The OECD’s Global Insurance Market Trends 2024 found that the nominal growth rate of the price of dwelling insurance in 2023 was above 5% in just over half of the OECD countries for which data was available (OECD, 2024^[64]). The cost of household insurance in the United States increased at a rate of 8.7% above inflation between 2018 and 2022 (Federal Insurance Office, 2025^[43]) and has increased by

40.4% overall since 2019 (Davis, 2025^[65]). In some US states, average household insurance premiums increased by more than 40% between 2020 and 2023 alone¹⁵ (Golnaraghi and Vichev, 2025^[44]). Average household insurance premiums increased by 7.7% between 2023 and 2024 in Canada, 10% in Australia and approximately 20% in the United Kingdom (Golnaraghi and Vichev, 2025^[44]). As outlined in chapters 4 and 5, there appears to be some moderate challenges in the affordability of flood insurance coverage in a few countries and more significant challenges in the affordability of wildfire insurance in high-risk areas in Canada and the United States.

Cyber attacks and incidents

Some businesses may perceive cyber insurance coverage as unaffordable or at least too expensive relative to the perceived benefits of coverage. A global survey of companies of different sizes found that 33% of those that did not acquire coverage indicated that the cost of coverage was the main factor (Munich Re, 2024^[23]). The cost of cyber insurance coverage has increased significantly since 2020. According to one report, about 70% of organisations that renewed their coverage in 2023 faced premium increases of more than 50% (Hoffman, 2024^[50]). Companies in some sectors, such as health care, continue to face challenges in securing affordable coverage (Howden, 2024^[34]; Amwins, 2024^[66]). The cost of cyber insurance has declined more recently, although premiums costs remain significantly above levels in 2020 (Howden, 2025^[67]; Swiss Re, 2025^[68]; The Council, 2025^[69]). The cost of personal cyber coverage offered by private insurers is reportedly low and likely affordable (less than USD 3 per month) (Schlichter, 2023^[70]).

3.3.3. Take-up of financial protection

Natural hazard risks

The take-up of insurance coverage for some or all natural hazard risks is relatively low in many OECD Members and accession candidate countries. In Europe, for example, EIOPA has reported that “insurance penetration”¹⁶ among households is below 50% for at least one natural hazard peril in 20 of the 27 countries examined,¹⁷ and often below 25% (EIOPA, 2025^[71]). In Greece, for example, only 14% of households have property insurance coverage against weather-related hazards and earthquakes (Hellenic Association of Insurance Companies, 2025^[72]). In Portugal, only 19% of households have coverage for earthquake risk (ASF, 2024^[73]). In Italy, approximately 25% of small businesses (10-49 employees) and 7% of micro businesses (less than 10 employees) have insurance coverage for natural hazard risks (Persano Adorno, 2025^[74]). In addition, a large share of economic losses between 2000 and 2024 in OECD Members and accession candidate countries were uninsured (53% of cyclone losses, 71% of flood losses and 79% of earthquake losses),¹⁸ reflecting a lack of availability, affordability or take-up. In 21 OECD Members and accession candidate countries,¹⁹ less than 20% of economic losses from natural hazards since 2000 were insured, and less than 50% were insured in almost two-thirds of countries.²⁰

Cyber attacks and incidents

Data on the level of take-up of insurance coverage for cyber risks is available from various surveys undertaken by insurance companies, intermediaries and others. The take-up rates can vary across different surveys although most estimates find relatively high take-up among large organisations, usually between 60-85% (Bueermann. Gretchen and Rohrs, 2024^[75]; Munich Re, 2024^[23]; Swiss Re, 2025^[68]). However, most surveys find low take-up among SMEs, ranging from 10-30% (Bueermann. Gretchen and Rohrs, 2024^[75]; Munich Re, 2024^[23]; Swiss Re, 2025^[68]; Howden, 2025^[67]). Some surveys have found much higher take-up among SMEs, up to 71% in one survey based on responses from companies in France, Germany, Ireland, Portugal, Spain, the United Kingdom and the United States (Hiscox, 2025^[76]). Others have found lower levels of overall cyber insurance take-up, including one analysis that estimates take-up rates of below 30% in France, Germany, Italy and Spain, and below 40% in the United Kingdom

(Howden, 2025^[67]). The take-up of personal cyber insurance coverage by individuals is very low (Insurance Information Institute and HSB, 2025^[13]).

3.4. Evaluating the need for government-supported financial protection

Governments should evaluate the potential economic, social and/or financial consequences of the unprotected financial exposure that results from inadequate financial protection to determine whether there is a need for government-supported financial protection. This evaluation should consider: (i) factors linked to the nature and implications of the risk exposure, such as the potential frequency of significant economic, social or financial impacts, the impact of the risk exposure on economic activity, and the distribution of potential losses across segments of society; and (ii) factors linked to the potential for expanding financial protection for the unprotected exposures, such as the ability of private insurance markets to establish a pool of uncorrelated exposures, quantify potential losses, address information asymmetries, moral hazard and adverse selection, and achieve economic feasibility.

3.4.1. Factors linked to the nature and implications of the unprotected financial exposure

Governments should consider several factors linked to the nature and implications of the unprotected financial exposure as part of this evaluation (Table 3.4). Risks that are likely to lead to more frequent or severe unprotected financial exposures should be prioritised along with those likely to have a greater impact on more vulnerable segments of the population who will have less capacity to respond to unprotected financial exposures. In addition, risks that can lead to unprotected financial exposures that impede economic activity, such as by limiting access to credit, should also be prioritised.

Table 3.4. Risk characteristics and potential implications of unprotected financial exposure to natural hazard, infectious disease outbreak and cyber risks

	Frequency and severity	Implications for economic activity	Loss distribution affecting vulnerable
Natural hazard risks	Frequent severe losses and increasing weather-related losses	High and increasing impact on access to credit	Some evidence of disparate impact as vulnerable populations may face higher exposure
Infectious disease outbreaks (income losses)	Rare but very severe losses and possibility of higher frequency in the future	No hindrance to economic activity	Some evidence of disparate impact in terms of health, income and revenue losses (more exposed sectors)
Cyber attacks and incidents (cyber catastrophes)	Frequent and increasing attacks although few cyber catastrophes, possibility of increase in cyber catastrophes due to geopolitical tensions	Increasing impact on business activity through contractual requirements for coverage	Some evidence of disparate impact on small businesses as attractive targets of cybercrime and lower defensive capacity

Likelihood, frequency and severity of the risk

In evaluating the need for the need for government-supported financial protection, governments should prioritise risks that have a greater likelihood of materialising, the potential to occur more frequently, the potential for more significant financial impacts on individuals, households and businesses and/or those that could potentially impact a larger share of the population. A risk that could have very high and widespread impacts should also be prioritised, even if the likelihood that it could materialise is relatively low.

Major **natural hazard** events can occur frequently. For example, between 2010 and 2024, annual economic losses from floods exceeded USD 1 billion in nine years in Japan, eight years in Italy, six years in Australia, Canada and Germany, four years in France and three years in the United Kingdom. Meanwhile, convective and winter storms have resulted in annual economic losses above USD 1 billion in eleven years in Germany and five years in France. Japan and Mexico faced annual tropical cyclone losses exceeding USD 1 billion in eight years and seven years, respectively. Japan has also faced annual losses from earthquakes exceeding USD 1 billion in nine years since 2000 while Indonesia has faced such losses in five years. In the United States, combined annual economic losses from floods and convective storms have exceeded USD 10 billion in every year between 2010 and 2024 and exceeded that amount in nine years as a result of tropical cyclones and three years as a result of wildfires.²¹

A changing climate is expected to lead to more frequent and severe losses from natural hazards. For example, one analysis projects that average annual damages from natural hazards in the United States could be 26% higher in 2050 relative to 2020 (Lutz, Lafakis and Rudaviciute, 2025^[77]). Overall, the level of economic losses from natural hazards in OECD Members and accession candidate countries in the most recent decade (2015-2024) is approximately 20% higher than the previous decade (2005-2014). Weather-related losses increased by 48% (in constant 2024 USD) while losses resulting from earthquakes declined by close to 60%.²² One recent analysis found that weather-related losses between 2020-2024 in Brazil, Canada, France, Germany, Italy and the United States were higher as a share of GDP than any of the preceding decades since 1980 (Grimm and Hanselmann, 2025^[78]).

Infectious disease outbreaks occur with some frequency although major events approximating the scale of the COVID-19 pandemic are very rare. Since 1950, there have been three major influenza outbreaks (1957, 1968 and 2009) and two coronavirus outbreaks (2002 and 2012), in addition to COVID-19, although all of the outbreaks resulted in much lower infection and mortality rates than COVID-19 (Piret and Boivin, 2021^[21]). However, the frequency of severe infectious disease outbreaks could be increasing. For example, one study that incorporated changes in zoonotic spillover, global travel patterns and factors such as the prevalence of armed conflicts estimates that a respiratory pandemic causing approximately 10 million deaths has a 4.2% annual probability of occurring (i.e. approximately a 50% chance of occurring in the next 25 years) (Madhav et al., 2023^[79]). A risk model provider for epidemic risks has provided a similar estimate of the annual probability of an outbreak on the scale of the COVID-19 of 2.5-3.3% (22-28% in the next 10 years and 47-57% in the next 25 years (Kraut, La Bonté and Richter, 2025^[80]). Continued habitat encroachment, urbanisation and a changing climate are likely to increase the frequency of infectious disease outbreaks in the future (The Vaccine Alliance (Gavi), 2020^[81]; Whiting, 2020^[82]; Piret and Boivin, 2021^[21]).

Cyber attacks and incidents occur frequently, and the frequency is increasing.²³ There is a lack of reliable estimates of the frequency of cyber catastrophes that could lead to widespread losses. According to one estimate, there were 25 “cyber catastrophes” between 1998 and 2024, with most occurring between 2001-2008, although with four events in 2024 (Johansmeyer, 2024^[32]; Johansmeyer, 2024^[33]).²⁴ As highlighted in Box 3.2, there is increasing concern about, and some evidence of, growing exposure to major state-affiliated cyber attacks (Howden, 2024^[34]). Increasing dependence on key information technology services is also leading to growing concerns about single points of failure that could lead to disruptions for a significant number of businesses dependent on that service (Aon, 2025^[83]). Recent cyber attacks and incidents affecting providers of payment technologies, cybersecurity services and software for specific sectors have demonstrated the broad scope of potential dependencies (i.e. beyond core infrastructure such as cloud service providers) that can lead to impacts for a large number of companies (Aon, 2025^[83]).

Implications for economic activity

The evaluation should also take into account the implications of the unprotected financial exposures of individuals, households and businesses to a risk of potential concern on their ability to participate in

economic activities. For example, unprotected financial exposure to a risk may impede access to credit, including mortgage loans as well as investment and working capital, or could hinder transactions with parties that impose a requirement for insurance coverage. Risks that create these types of *ex ante* hindrances to economic activity likely warrant particular attention when evaluating the need for government-supported financial protection.

Mortgage lenders in some countries require households to have insurance coverage for **natural hazard risks** in order to obtain a mortgage. As a result, a lack of insurance availability could have an impact on credit availability. The requirements for insurance coverage against natural hazard risks could become more stringent due to the increasing awareness of lenders, and financial sector supervisors, of the potential consequences of unprotected exposures to natural hazard risks.²⁵ Banks in some countries are denying mortgages and other loans in communities at higher flood risk due to a lack of insurance availability or a potential future lack of insurance availability (Blickle et al., 2023^[84]; Shingler, 2024^[85]; Shankleman, 2024^[86]). One major credit rating agency recently issued a request for market feedback on incorporating physical climate risks into credit assessments of the mortgage-backed securities and covered bonds that many banks issue to fund lending (Rossiter and Albers, 2025^[87]). In addition, insurance costs are increasingly impacting real estate development in some high-risk areas (Torarp et al., 2025^[88]), although this could also have benefits if it hinders development in areas that are highly exposed to natural hazards.

Financial protection against the consequences of **infectious disease outbreaks** does not appear to have any impact on access to credit. There is no evidence that lenders require an individual, household or business to have coverage to protect against the financial impacts of an infectious disease outbreak as a condition for accessing credit.

Similarly, lenders do not usually require households or businesses to have financial protection against **cyber attacks and incidents** in order to access credit. However, some businesses are requiring their suppliers to have insurance coverage for cyber attacks and incidents as a condition in their contractual arrangements. Some insurers have identified such contractual requirements as a driver of cyber insurance take-up and have indicated that the requirements are sometimes leading individual companies to acquire higher cyber insurance limits (Amwins, 2024^[66]). This suggests that these requirements are increasingly common and also that the adequacy of coverage is being taken into account. However, one examination focused on the United States found no evidence that limitations in the availability of cyber insurance is leading to any significant reduction in economic activity (Romanosky et al., 2025^[29]).

Distribution of potential losses

The evaluation should also take into account the distribution of possible losses linked to risks of potential concern across segments of society, with a focus on individuals, households and businesses that are unlikely to have sufficient financial capacity to absorb unprotected losses without facing significant financial stress.

Natural hazards can impact households with different levels of income and wealth and businesses of varying size, potentially indiscriminately. However, there is some evidence that more vulnerable populations are more likely to reside in communities with greater exposure to natural hazard risk. For example, one study on the level of exposure to wildfire, flood, and hurricane and storm risk in the United States found that, at a national level, a higher share of Hispanic households are located in areas facing high wildfire risk, relative to households from other racial backgrounds, and that a higher share of Black households are significantly exposed to hurricane and storm risk (Ng, 2025^[89]). Similar disparities were also found in some specific communities. For example, in the US city of New Orleans, a higher share of Asian American, Black and Hispanic households are located in high-risk flood areas (Ng, 2025^[89]). In addition, there are likely to be differences in terms of the capacity of lower income households and small businesses to protect themselves from the physical impacts of natural hazard events which could inflate the share of losses borne by these segments of the population. Another study focused on the United States

found a positive correlation between flood risk and various indicators of social vulnerability, including racial background, linguistic isolation, the presence of vacant homes and housing type and ownership (i.e. renters and mobile homes faced higher risk) (Asl et al., 2025^[90]). In Canada, a study found that neighbourhoods with higher levels of economic dependency (e.g. reliance on social assistance, higher dependency ratios (such as more children and seniors) and situational vulnerability (e.g. lower value homes, single-income households, lower education levels) faced more frequent flooding than other neighbourhoods (Foran, Sinha and Pinault, 2025^[91]).

While the health consequences of **infectious disease outbreaks** could potentially impact any individual, regardless of wealth or income, a number of examinations of the impact of COVID-19 have found that mortality was significantly higher among low-income segments of the population, both within and across countries (McGowan and Bamba, 2022^[92]).²⁶ This could reflect both a higher level of exposure to infectious diseases as well as a lower level of protection against severe consequences, for example in terms of access to health care. Restrictions on economic activity imposed in the context of infectious disease outbreaks would likely have more significant impacts on businesses and employees in certain sectors, such as tourism, hospitality and retail (amongst others).²⁷ These sectors could have a greater concentration of employees with below average salaries.

Cyber attacks and incidents most often affect businesses although individuals are also exposed to this risk. Claims data from insurance companies indicate that small businesses are significant targets of cyber attacks, accounting for 98% of claims in one report on the claims experience of multiple insurers (NetDiligence, 2024^[14]) and 75% of ransomware victims in the claims experience of another (Altman, 2025^[93]). SMEs usually account for a significant share of the number of business although the take-up of cyber insurance coverage is lower among SMEs. If these shares indicate a higher level of exposure, it may be the result of either targeting by cyber criminals of the smaller companies that are perceived to be more vulnerable or a higher success rate when targeting SMEs. The impacts on small businesses might also be more severe even if the average loss faced by SMEs is significantly lower than the average loss faced by larger businesses. For example, one survey of small businesses in North America found that 55% of small businesses would cease to operate if they faced financial impacts of USD 50 000 and that 32% could even go out of business as a result of financial impacts as low as USD 10 000 or less than a day of downtime (VikingCloud, 2025^[94]). However, the distribution of losses from cyber catastrophes could be different. SMEs are likely to be equivalently exposed to some types of cyber catastrophes, such as disruptions to critical infrastructure or digital services or mass malware attacks. However, large-scale attacks affiliated to nation-state actors are more likely to be targeted at larger, more strategic companies.

3.4.2. Factors linked to the potential for expanding financial protection

Government should also undertake an evaluation of the potential for private insurance markets to provide further coverage and reduce unprotected financial exposures. This potential is likely to be constrained for risks that do not meet the criteria necessary to be considered an insurable risk. Risks related to natural hazards, cyber catastrophes and losses of income and revenue in the context of major infectious disease outbreaks have characteristics that could hinder their insurability. The evaluation should consider the ability of private insurance markets to establish a pool of uncorrelated exposures, quantify potential losses, address information asymmetries, moral hazard and adverse selection, and achieve economic feasibility (Table 3.5).

Table 3.5. Potential impediments to expanding financial protection for natural hazard, infectious disease outbreak and cyber risks

	Limited risk diversification through reinsurance	Significant challenges in risk quantification	Information asymmetries, moral hazard, adverse selection	Challenges to economic feasibility
Natural hazards	Significant reinsurance market appetite for catastrophic losses	Catastrophe models for many hazards and regions although gaps in coverage and concerns about uncertainty related to climate change impacts	Adverse selection risk for better understood hazards	Low risk awareness of infrequent hazards Moderate expectation of post-event financial assistance
Infectious disease outbreaks	Reinsurance market appetite for business disruption risk is untested although there are concerns about correlated losses and correlation with financial markets performance	Quantification challenges due to complexity of risk assessment (pathogen spread/treatment, government restrictions). Very few models for business disruption risk	Adverse selection for risks related to potential restrictions on economic activity	Significant expectation of post-event financial assistance, amplified by perceptions of government responsibility for restrictions and resulting losses
Cyber-attacks and incidents	Limited (but potentially growing) appetite for coverage of catastrophic losses	Quantification challenges related to technological development, attacker/defender capacities. Increasing confidence in models (although more limited for catastrophe losses)	More limited risk of adverse selection given wide range of attacker motivations	Lower expectation of post-event financial assistance, with the exception of state-affiliated attacks

Ability to establish a pool of uncorrelated exposures

Private insurance markets face challenges in providing financial protection against risks that could simultaneously impact a large number of individuals, households or businesses. Natural hazard risks, infectious disease outbreaks and cyber catastrophes all have the potential to affect a large number of individuals, households and businesses simultaneously. Insurance companies would have to set aside significant capital to protect against the possibility of a large, correlated loss that deviates substantially from expected losses (Hartwig and Gordon, 2020^[95]; Schanz, 2020^[96]), which would raise the cost that policyholders will have to pay for financial protection.

A critical consideration is whether some portion of a risk that could lead to correlated losses in one region or country can be transferred to international reinsurance and capital markets (Romanosky et al., 2025^[29]). International reinsurance and capital markets can assume risks from a wide variety of regions and countries²⁸ and therefore create a more diversified pool of risks, leading to a lower overall cost of coverage. These diversification benefits can be captured for risks that are not correlated geographically, such as natural hazard risks, and international reinsurance and capital markets play a significant role in assuming natural hazard risks.

There has been substantial and increasing reinsurance and capital market appetite to assume **natural hazard risks**. For example, the largest reinsurers' catastrophe budgets in 2025 were more than 1.6x their budgets in 2020 in nominal terms²⁹ while the value of outstanding catastrophe bonds and insurance linked securities, which are mostly issued to cover natural hazards risks, increased by a similar amount.³⁰ At the same time, primary insurer retention levels have substantially increased in recent years,³¹ suggesting an overall increase in insurance market appetite for natural hazard risks.

It is difficult to provide any assessment of the potential appetite of reinsurance markets for the income and revenue losses related to **infectious disease outbreaks** given the lack of primary insurance market coverage for this risk. It is almost certain that there would be significant concerns about the limited ability to diversify this risk geographically, which would constrain reinsurance market appetite. The potential that losses would be correlated with financial market downturns could also limit capital market appetite as investors in insurance-linked securities tend to be attracted by returns that are uncorrelated with financial market performance (OECD, 2021^[97]).

Reinsurance and capital market appetite for reinsuring losses resulting from **cyber catastrophes** appears more limited, reflecting in part the inability to diversify these risks geographically as well as concerns about large correlated losses. A significant share of **cyber risk** is transferred to the reinsurance market (approximately 36% of gross written premium for 2025) (Howden Re, 2025^[98]). However, the vast majority, of reinsurance for cyber risks, just under 90%, is provided on a proportional basis (Howden Re, 2025^[98]), with very limited use of the non-proportional reinsurance coverage that is usually accessed to address catastrophe losses. There is also very limited use of retrocession by reinsurers (only 7% of reinsurer premiums is retroceded) and less than a quarter of the risk transferred to retrocession markets is transferred on a non-proportional basis (Howden Re, 2025^[98]). The share of non-proportional reinsurance coverage and use of retrocession markets has increased over the years although the reinsurance market for cyber risks remains highly concentrated with only a handful of active reinsurers (Howden Re, 2025^[98]). The capital market appetite for cyber risk is also limited as only 1.9% of the outstanding value of catastrophe bonds and insurance-linked securities is dedicated to cyber risks (Artemis, n.d.^[99]). However, there are some signs of increasing demand as a recent catastrophe bond with an excess-of-loss coverage issued by one insurers was able to attract 50% more in investment than initial targets (Willard, 2025^[100]).

Challenges in quantifying potential losses

Insurance companies need to have the ability to estimate the potential value of claims under the insurance coverage that they provide in order to set the premium rate for coverage and to manage the financial exposure they assume through capital, reserves and risk transfer to reinsurance and capital markets. As a result, insurance companies may be reluctant to provide financial protection against risks that are difficult to assess and quantify, or may charge very high premium rates to compensate for uncertainty. The potential financial impacts of risks related to natural hazards, infectious diseases and cyber attacks and incidents are difficult to assess and quantify due to their relative infrequency, the complexity of the human and natural factors driving these risks, and the evolutions in hazard, exposure and vulnerability that could significantly impact losses over time.

Natural hazard risks materialise relatively infrequently. As a result, there is a limited amount of historical data on their frequency, severity and financial impact, which makes it more difficult for insurance companies to assess and quantify potential losses using traditional actuarial and statistical methods. A changing climate adds further challenges. The uncertainty in the trajectory of future emissions and exposure, the level of investment in risk reduction and adaption, and the ultimate impact of changes in climate parameters on the frequency and intensity of extreme events all add complexities to the assessment of natural hazard risks (OECD, 2023^[101]). For example, one catastrophe modelling firm's assessment of the potential impact of climate change by 2100 on the frequency of tropical and extratropical cyclones, severe convective storms, wildfires and inland and coastal floods of varying severities found a significant range in potential changes for each of the perils examined (Sousounis and Little, 2017^[102]).

Major **infectious disease outbreaks** that result in restrictions on economic activity have rarely occurred and therefore there is limited data on the frequency, severity and impact of large-scale outbreaks. Assessing this risk is complex given the broad range of possible outbreak scenarios and responses. Pathogens differ in terms of their transmissibility and virulence and have different capacities to adapt or mutate over time (GAO, 2023^[103]). Consumer reactions to an infectious disease outbreak are likely to vary

across and within countries and will have an impact on the scope of any activity restrictions imposed by governments. The duration of an outbreak will depend on government actions and the capacity of the health sector to develop effective treatments and vaccines. In addition, the likelihood of many different types of outbreaks is likely to evolve in the future with changes in urbanisation, mobility and contact with animals through habitat encroachment.

There is also limited historical data on **cyber attacks and incidents**, given that this risk has emerged only in recent decades. There is increasing data on some types of idiosyncratic cyber attacks and incidents that occur with greater frequency. However, there are still very few occurrence of cyber catastrophes which limits the ability of insurers to estimate accumulation risks (Howden, 2024^[34]; Pain, 2023^[28]). The assessment and quantification of cyber risks is complicated by the need to evaluate the motivations and capabilities of criminals or other hostile actors and the effectiveness of those charged with defending against such attacks. Cyber risk is also extremely dynamic as new vulnerabilities continuously emerge (Caron, 2025^[104]) and as attackers and defenders adapt to each other's tactics (Pain, 2023^[28]). New technological capabilities will provide both cyber attackers and defenders with new tools and create new sources of exposure. For example, cyber criminals are beginning to leverage artificial intelligence and large language models to enhance the speed and scope of ransomware attacks, develop new malware and improve social engineering tactics, including through the use of deep fakes (Allianz Commercial, 2024^[105]; von dem Kneesebeck and Kreuzer, 2024^[106]; Howden, 2024^[107]). Increasing digitalisation and the expansion of 5G networks will increase the volume of connected devices that are vulnerable to attacks and that are not always highly secure (Allianz Commercial, 2024^[105]).

The insurance sector has developed sophisticated catastrophe models that incorporate both existing and hypothetical events as a means to address some of the challenges in assessing low-frequency risks with limited historical data. These models are most advanced for natural hazards for which probabilistic models have been developed for many parts of the world and for many perils, particularly where there is more substantial insurance coverage. However, important gaps in natural hazard model coverage remain. Modelling of cyber risk is more recent although confidence in these models is increasing (Blosfield, 2025^[108]). There are important gaps in the availability of tools for estimating complicated (e.g. business interruption and supply-chain disruptions) and emerging risks like physical damage and bodily injury (Romanosky et al., 2025^[29]). There are also significant challenges in modelling cyber catastrophes which has led to large variations in model outputs and limited confidence.³² Mortality risks related to infectious disease outbreaks are often incorporated in catastrophe models for life insurance risks although these models do not estimate losses due to disruptions in economic activity.

Addressing information asymmetries, moral hazard and adverse selection

Risks that could entail significant information asymmetries or risks of adverse selection and moral hazard could be challenging for insurance companies to assume if those risks cannot be mitigated. There are likely to be more limited information asymmetries for complex risks related to natural hazards, cyber attacks and incidents and infectious disease outbreaks as individuals, households and businesses are unlikely to be better able to assess their exposure to damages and losses than insurance companies. It is also unlikely that moral hazard due to the existence of insurance protection will be any more significant for these risks than for other types of insured risks, or that mitigation measures such as risk-based pricing and deductibles and other types of co-insurance will be any less effective.

Adverse selection is likely to be more problematic and could limit the ability of insurance companies to establish a pool that contains both low- and high-risk individuals, households and businesses. Some communities and some individual households and businesses are clearly less exposed to earthquakes, floods and cyclones than others and are likely to be less willing to pay a premium for financial protection against those risks. Similarly, businesses that operate in sectors that are unlikely to face severe restrictions in the context of an infectious disease outbreak would also be less interested in acquiring financial

protection. The same could be true for cyber risks. For example, businesses that make more significant fund transfers or that collect substantial personal data may perceive themselves to be a more attractive target for cybercriminals while the operators of critical digital services or infrastructure might perceive themselves to be a target for cyber attacks with a disruptive motive. However, the complexity of deciphering the motivations and capabilities of those perpetrating cyber attacks would likely limit the potential for adverse selection among potential insureds (Romanosky et al., 2025^[29]).

Achieving economic feasibility

A disparity between insurers' assessment of the exposure, reflected in the premium rates that they demand, and the perceived value of financial protection for households, individuals and businesses could limit the economic feasibility of private insurance as a source of financial protection. All of the factors above would have an impact on the premium rates that insurance companies would demand to provide financial protection. Financial protection available from private insurance companies against risks with significant potential for correlated losses, substantial uncertainties and that carry a risk of adverse selection will usually only be offered at higher cost. At the same time, risk awareness among potential insureds will likely be low for all of these risks given their inherent infrequency and a likely expectation of government financial assistance to address the impacts of a major catastrophe. This expectation is likely to be greatest for risks where governments have provided significant support in the past or where the government may be perceived as having a critical role in preventing the risk. These factors would be expected to reduce the amount that individuals, households and businesses would be willing to pay for financial protection.

Risk perception and willingness-to-pay for financial protection is likely to vary among the different natural hazard perils. Individuals, households and businesses are likely to be more aware of their exposure to risks that materialise more frequently in a broad range of locations (e.g. convective storms) and therefore more willing to pay for financial protection. Individuals, households and business located in areas prone to flooding or wildfires or exposed to periodic cyclones may also have high levels of risk awareness although the broader geographic footprint of these types of events could increase the expectation of government financial assistance in response to these types of widespread risks, particularly where such assistance has been provided in the past. There might also be a perception that government is partly responsible for damages and losses in communities where development was authorised despite exposure to natural hazard risks. The willingness-to-pay for earthquake coverage is likely to be lower given the infrequency of major earthquakes.

The perception of risks related to infectious disease outbreaks is likely high in the aftermath of COVID-19 although will certainly decline if there are no other major outbreaks in the coming years. However, the willingness-to-pay for financial protection against this risk is likely very low given the substantial government financial assistance that was provided in response to the most recent pandemic. Individuals, households and businesses may also attribute some responsibility to the government for losses related to restrictions on economic activity, particularly if the restrictions are perceived to demonstrate a failure in the health care system or in the monitoring of infectious disease risks.

Risk perception and willingness-to-pay for financial protection against cyber risks may be relatively higher given the higher frequency of cyber attacks and incidents, even if cyber catastrophes occur rarely. There is likely to be a more limited expectation of government financial assistance for those impacted as past events have not usually led to government financial assistance. However, the level of expectation could be higher in the context of a cyber catastrophe, particularly if government policy or actions are perceived to have been a factor motivating the attack.

3.5. Determining the appropriate form of government-supported financial protection

Should governments identify a need for government-supported financial protection, they could offer such protection through either a public-private insurance programme or a public compensation and financial assistance arrangement. These two main approaches differ in terms of how they are funded, the level of certainty provided for beneficiaries and the level of discretion available to governments, and the potential for the participation of the private (re)insurance market in distributing financial protection and assuming risk. In determining the optimal approach for delivering government-supported financial protection, governments should assess the nature and implications of the risk exposure and the costs and benefits of (re)insurance market participation (Table 3.6).

Table 3.6. Factors that could impact the appropriate form of government-supported financial protection for natural hazard, infectious disease outbreak and cyber risks

	Benefits of reserve accumulation	Importance of certainty of financial protection	Opportunity to leverage private market capacity	Opportunity to support risk reduction through insurance
Natural hazards	Higher frequency supports reserve accumulation	Certainty of financial protection is often important for access to credit	High – significant market appetite	High – insurers have substantial risk assessment and risk reduction expertise and can provide premium incentives
Infectious disease outbreaks	Very low frequency could make reserve accumulation challenging	Certainty of financial protection is unnecessary in accessing credit	Limited – market appetite for revenue loss is likely limited	Limited – there may be few opportunities for effective risk reduction for revenue loss
Cyber attacks and incidents	Low frequency of cyber catastrophes could make reserve accumulation challenging	Certainty of financial protection is increasingly important for contractual arrangements	High – increasing market appetite	High – insurers have increasing risk assessment and risk reduction expertise and can provide premium incentives

Note: Darker blue indicates a greater potential benefit in offering government-supported financial protection through insurance and with insurance sector participation.

3.5.1. Nature and implications of the risk exposure

Governments should consider the nature of the different risks and the implications of risk exposure in deciding on the most appropriate approach to offering government-supported financial protection.

For risks that are expected to materialise more frequently, there could be a number of advantages to offering government-supported financial protection through a public-private insurance programme. In particular, the collection of premiums would provide a source of funding to address more frequent losses.

However, it would likely be more challenging to accumulate significant reserves to respond to risks that materialise with very low frequency. Allocating funds to accumulate reserves has opportunity costs, which may be deemed to be unacceptably high if there are many other unmet needs for government spending and investment. Accessing debt markets to spread at least a portion of the costs of very low frequency events over time may be preferred from a societal perspective. Large losses from natural hazards occur relatively frequently in many countries, although some types of natural hazard risks, such as earthquakes, are relatively rarer. Cyber catastrophes and major infectious disease outbreaks currently materialise with low frequency, although the frequency of both risks could increase in the future.

There may also be some longer-term implications in offering significant government-supported financial protection as public compensation and financial assistance. If that assistance is provided as grants funded by the government budget or as tax reductions or tax deferrals, a large amount of support could increase

fiscal deficits and government debt-to-GDP ratios. If provided as equity, loans or guarantees, a large amount of support could lead to future fiscal costs from reductions in equity value or loan defaults. An increase in lending, including where supported by government guarantees, could lead to higher leverage in the corporate sector. As a result, public and private investment, and ultimately economic growth, could be lower if both governments and businesses have a reduced capacity to finance productive investments.³³ One study of the impact of corporate leverage on investment found that higher corporate leverage can negatively impact investment for three to five years (Heresi and Powell, 2022^[109]).

A reliance on borrowing to respond to the impact of COVID-19 led to increased debt levels that may be constraining productive investment. Governments provided significant financial protection through public compensation and financial assistance. Debt-to-GDP levels have increased in OECD countries and are expected to reach 85% in 2025, a 10% percentage point increase relative to 2019 and almost twice as high as 2007 (OECD, 2026^[110]). Outstanding SME business loan debt in 2022 was, on average, 25% larger relative to 2019 in OECD Members with available data (OECD, 2024^[111]).³⁴ Business bankruptcies were significantly higher in 2023 in 35% of the OECD Members³⁵ for which data was available (OECD, 2024^[112]) and are expected to continue to increase in many countries (Boata, Kuhanathan and Lemerle, 2024^[113]). Overall corporate debt has been increasing, including corporate bonds, syndicated loans and private credit. The outstanding amount of corporate bonds in 2025 was 64% higher than in 2008 (in real terms) and has been increasingly concentrated among issuers with lower credit ratings (OECD, 2026^[110]). Corporate leverage measures such as corporate debt-to-GDP (including bonds and syndicated loans), have increased in 29 out of 38 OECD countries (OECD, 2026^[110]). In addition, much of the debt issued in recent years has been driven by a desire to fund financial operations and shareholder payouts, rather than productive investments (OECD, 2025^[114]).

A public-private insurance programme could provide confidence that exposures are mitigated through an obligation to provide financial protection, and therefore limit the potential for unprotected financial exposures to lead to *ex ante* hindrances to economic activity and/or access to credit. Unprotected financial exposure to some natural hazard risks can impact access to credit. Unprotected financial exposure to cyber risks is having an increasing impact on transactions between businesses. The financial protection provided by a public compensation or financial assistance programme, even if arranged *ex ante*, may not provide the level of certainty on the availability of financial protection that would be necessary to reduce the hindrances to economic activity and access to credit.

An approach to offering financial protection that provides greater government discretion in defining the response will likely have advantages where the materialisation of risk would involve greater uncertainty in terms of its potential impact. The magnitude and distribution of losses from a cyber catastrophe or a major infectious disease outbreak is more uncertain given the limited experience. A public-private insurance programme with a pre-defined public resource commitment could reduce governments' flexibility in allocating public resources should unanticipated needs arise.

Risks that are most likely to impact households or businesses with limited financial capacity may be more difficult to address through a public-private insurance programme if potential beneficiaries are unable to afford the required contributions or premiums. Natural hazards, cyber attacks and incidents and infectious disease outbreaks all have the potential for disparate impacts on more vulnerable segments of the population. If the premium rate limits the reach of the arrangement, there could be significant unprotected financial exposures remaining among vulnerable populations.

3.6. Costs and benefits of insurance market participation

3.6.1. Leveraging (re)insurance market capacity

A public private insurance programme could allow for some of the risk to be assumed by the private (re)insurance sector and thereby reduce the damages and losses that would need to be borne by the government.

There is significant insurance market appetite for assuming **natural hazard risks**. Unprotected financial exposures to natural hazard risks appear to be mainly driven by challenges related to affordability and take-up, rather than availability, although there are current concerns about availability in some high-risk regions and concerns about future availability in the context of a changing climate. Currently, there is significant (re)insurance and capital market capacity and appetite for natural hazard risks and insurance markets are generally maintaining, if not increasing, their contribution to providing financial protection against these risks. Overall, insurance markets have absorbed an increasing amount of natural hazard losses and a larger share of most natural hazard losses in OECD Members and accession candidate countries,³⁶ with some exceptions for specific types of hazards and in specific countries.³⁷ The reinsurance market capacity to absorb natural hazard losses, in terms of catastrophe budget allocations, has increased along with the outstanding value of the catastrophe bonds and insurance-linked securities that are mostly focused on providing protection against natural hazard risks.

Unprotected financial exposures to **cyber attacks and incidents** appear to be driven by challenges related to take-up in the case of idiosyncratic cyber risks, although with some challenges related to availability for smaller companies and companies operating in some sectors and in terms of capacity for higher limits sought by larger companies. There are also challenges related to availability of coverage for cyber attacks and incidents with the potential to lead to cyber catastrophes such as major nation-state attacks and critical infrastructure disruptions. Insurance and reinsurance sector appetite for idiosyncratic cyber risks appears to be growing with a significant projected increase in premiums³⁸ and some signs of higher limits being offered by insurers (Amwins, 2024^[66]; Robinson, 2025^[115]). There are signs of increasing reinsurance and retrocession market capacity for excess-of-loss coverage (Howden Re, 2025^[98]). Efforts are also being made to address the gap in availability for some of the types of incidents that have been excluded from cyber insurance policies, including coverage for indirect damages and losses from an act of war, although with relatively low limits available (Markel, 2025^[116]).

A public private insurance programme could potentially enhance the availability of private insurance market coverage if the programme is able to respond to the constraints that limit private insurance market appetite. For example, a reinsurance coverage or guarantee to protect against extreme losses could lower the amount of capital that insurance companies need to set aside to protect against such losses (Romanosky et al., 2025^[29]). Such a measure could support affordability of coverage for natural hazard and cyber risks and could potentially unlock additional capacity and appetite for cyber catastrophes (Brew and Lewis, 2025^[26]). A public-private insurance programme could also facilitate the implementation of a requirement to acquire insurance which could eliminate adverse selection and create a more diversified pool of risks. These types of measures could help address unprotected financial exposures due to limited take-up of insurance for natural hazard and cyber risks.

The risk-sharing benefits of a public-private insurance programme will likely be more limited for risks for which the private insurance sector has very limited capacity or appetite for assuming risk (i.e. where a significant share of risk would need to be borne by governments). The unprotected business interruption exposures related to major **infectious disease outbreak** are driven by a lack of availability of coverage, which also makes it impossible to evaluate challenges to affordability or take-up based on insurance market practice. The revenue and income losses resulting from COVID-19 were significantly greater than the existing financial capacity of the insurance sector (Hartwig and Gordon, 2020^[95]; Schanz, 2020^[96]). The

potential for correlated global losses is likely a major impediment to the availability of reinsurance market capacity, while significant uncertainty in risk assessment and quantification and potential for adverse selection would likely lead to high private insurance sector premiums for even a limited amount of coverage (GAO, 2023^[103]). While any risk assumed by private (re)insurance and capital markets would reduce the fiscal burden for governments, these benefits would need to be weighed against the potentially high cost of private sector coverage for risks that are challenging to insure. A decision on offering public compensation and financial assistance for this risk should, however, take into account the potential that such assistance is likely to discourage the purchase of insurance and impede the development of an insurance market.

3.6.2. Support for quicker payments and reduced fraud

Offering government-supported financial protection in collaboration with private insurance markets through a public-private insurance programme could have additional benefits. Private insurance companies may be able to provide faster payments to households and businesses that would support a quicker recovery and potentially reduce the overall level of losses. Private insurance companies might also have expertise that could better detect fraudulent claims and therefore reduce the overall cost of compensating losses.

Increasing the speed of payment

The main objective in ensuring adequate financial protection is to provide an effective source of funding to recover from the damages and losses incurred. The capacity to provide funds quickly to those in need is also of critical importance as delays in making payments to those impacted will lead to a slower recovery and a longer disruption in economic activity, which is likely to increase the overall cost of the event.

A number of factors could impact the speed at which funds are disbursed to those that have suffered a covered loss, including the time it takes for the financial protection provider to be notified of a loss and the amount of time needed to assess the loss and make payment. If payment amounts are large overall, there may also be a need to raise sufficient funds to meet the payment obligations.

There is a general perception that public compensation and financial assistance provided by governments is slower to reach beneficiaries than private insurance (Romanosky et al., 2025^[29]). Government programmes might have complicated application processes that are difficult for applicants to complete and may be slower in processing the applications received. For example, a report by the Ombudsman for the Canadian province of British Columbia that examined the delivery of public compensation and financial assistance after major flooding in 2022 identified participant concerns about confusing application processes, insufficient assistance for completing the application, and delays in processing and payment (Ombudsperson British Columbia, 2023^[117]). Similar concerns about application processes have also been raised in other parts of Canada as well (Schmunk, 2023^[118]).

Delays in processing and payment are likely to be greater where programmes are only established and defined in the aftermath of a major event resulting in large unprotected losses, which has often been the case for public compensation and financial assistance arrangements. In the United States, the Government Accountability Office found that some of the income and revenue support programmes launched in response to COVID-19 suffered from delays due to a lack of critical programme information and confusion about eligibility (GAO, 2023^[103]). A lack of sufficient human resources to process claims was identified as a challenge in responding to financial assistance requests following the floods in British Columbia (Ombudsperson British Columbia, 2023^[117]), while a lack of systems capacity delayed COVID-19 response payments in the United States (GAO, 2023^[103]).

There might also be limited awareness of the availability of public compensation and financial assistance and misunderstanding about eligibility. For example, the examination in British Columbia found that a majority of those that were impacted by the flooding did not make an application for assistance (64%), with

the most common reason being that they were not aware of the programme (Ombudsperson British Columbia, 2023^[117]). More than half of the applications were closed without any payment and appeals were filed by almost 8% of all applicants (Ombudsperson British Columbia, 2023^[117]), which could indicate a lack of understanding of what kinds of damages and losses were eligible for programme compensation.

The insurance sector's experience in responding to claims, and the existence of an insurance policy that pre-defines the applicable coverage and process for making claims, could support more efficient payments to those that have faced losses and damages. However, insurers could also face challenges if an event leads to an extreme surge in claims (GAO, 2023^[103]). In the aftermath of some major natural hazards, insurers have also been criticised for payment delays and claims denials, suggesting that insurers might face similar capacity constraints and misunderstandings about coverage (House of Representatives Standing Committee on Economics, 2024^[119]). Box 3.3 provides some examples of recent parliamentary investigations into insurer claims practices in Australia and the United States. Claims denials have also been found to be common in cyber insurance. According to one estimate, insurers denied 44% of cyber-related claims in 2023 and did not pay 27% of claims because of exclusions that were found to be applicable (Hoffman, 2024^[50]).

Box 3.3. Parliamentary and Congressional hearings on insurer claims processing

In the United States, the Senate Committee on Homeland Security and Governmental Affairs held a hearing in May 2025 to examine the insurance sector's claims practices in the aftermath of recent disasters, with a focus on Hurricanes Helene and Milton. The Committee heard testimony from individual policyholders and loss adjusters who suggested that claims had been denied unfairly and from policyholder representatives who worked to demonstrate a pattern of claims denials aimed at minimising losses and enhancing insurance company profitability (Dahl, 2025^[120]; Quinn, 2025^[121]). It also heard and received submissions from insurance companies and an insurance association that indicated that less than 1% of the claims had led to policyholder complaints (APCIA, 2025^[122]).

In Australia, the House of Representatives Standing Committee on Economics undertook an inquiry into the insurance sector's response to major flood claims in 2022. In its report, the Standing Committee highlighted inconsistencies in claims decisions and lengthy disputes. The report also highlighted a relatively low level of success for insurers in cases that reached the Australian Financial Complaints Authority (AFCA) and suggested that this might put into question the fairness of the internal dispute resolution processes that precede a referral to the AFCA (House of Representatives Standing Committee on Economics, 2024^[119]).

There is mixed evidence on whether public compensation and financial assistance provide a quicker or slower response in the aftermath of an event. In British Columbia, approximately 80% of requests for financial assistance were processed within the first eleven months and more than 99% were closed within 16 months of the event (Ombudsperson British Columbia, 2023^[117]). The experience in providing public compensation and financial assistance in response to COVID-19 also demonstrated that such assistance can be delivered quickly. For example, in the United States, more than 4.6 million loans allocating approximately 76% of the available funds under the Paycheck Protection Program were extended within the first three months after COVID-19 was identified as a pandemic (GAO, 2023^[103]). Similarly, the U.S. Small Business Administration approved 5.8 million loan advances under the COVID-19 Economic Injury Disaster Loan in just over three months, almost three times more loans than had been approved during the agency's 67-year pre-COVID history (GAO, 2023^[103]).

Some insurance sector responses to major natural hazard events have been rapid. For example, just under 84% of Hurricane Helene and 80% of Hurricane Milton (mostly wind) claims were settled within three months (APCIA, 2025^[122]). Hurricane Helene and Hurricane Milton flood claims covered by the public

sector National Flood Insurance Program were settled slightly more slowly (approximately 70% of claims had been settled within 4-5 months) (APCIA, 2025^[122]). In Spain, the *Consorcio de Compensación de Seguros*, with the support of the private insurance sector, was able to pay 95.7% of claims for damages to homes and vehicles by the 10th month after the Valencia floods in 2024. However, in Australia, more than 16% of all claims remained open after 12 months for one flooding event (House of Representatives Standing Committee on Economics, 2024^[119]).

Reducing fraud and overpayment

There will always be some risk of fraudulent or overpayments when distributing funds, whether through a public-private insurance programme or as public compensation and financial assistance.

Fraudulent claims are a significant cost for private insurance companies and their policyholders. According to one estimate, approximately 20% of all insurance claims in the United States are fraudulent, with an annual cost of USD 308.6 billion (Kilroy, 2025^[123]). In the property and casualty insurance sector, the share of fraudulent claims is slightly lower, approximately 10%, costing USD 122 billion annually (Kamalapurkar, Sharma and Canaan, 2025^[124]). Large-scale events often attract fraudulent insurance claims and requests for government assistance (Kilroy, 2025^[123]).

Public compensation and financial assistance provided by governments after major events is also prone to fraud. A report by the Office of Inspector General of the U.S. Small Business Administration found that at least 17% of the USD 1.2 trillion in Economic Injury Disaster Loan and Paycheck Protection Program funds were disbursed to “potentially fraudulent actors” (Office of Inspector General, 2023^[125]). In the United Kingdom, approximately GBP 4.5 billion of funding provided through the Coronavirus Job Retention Scheme, the Self Employed Income Support Scheme and the Eat Out To Help Out programme was lost to fraud (Nevett, 2023^[126]), out of the approximately GBP 99 billion provided through these programmes (i.e. approximately 4.5% of provided funds were lost to fraud) (Francis-Devine, Powell and Clark, 2021^[127]; Evaluation Task Force, 2024^[128]; Cuffe, 2023^[129]). In Canada, approximately 7% of the CAD 49.1 billion funds provided under the Canada Emergency Business Account were found to have been disbursed to ineligible applicants (Office of the Auditor General of Canada, 2024^[130]).

According to one estimate, insurance companies are able to detect between 20% and 40% of more common “soft fraud”, such as intentional overstatement of costs in claims, and between 40% and 80% of “hard fraud”, such as the creation of fake claims (Kamalapurkar, Sharma and Canaan, 2025^[124]). Insurer investments in leveraging artificial intelligence for fraud detection could reduce overall costs of fraud by an estimated 20-40% (Kamalapurkar, Sharma and Canaan, 2025^[124]). By comparison, the Office of the Auditor-General of Canada found that the vast majority (99%) of the ineligible applicants under one stream of the Canada Emergency Business Account programme were not identified by the programme administrator, although almost 100% of the ineligible applicants under the other programme stream were identified by the administrator (Office of the Auditor General of Canada, 2024^[130]).³⁹

3.6.3. Potential contribution to risk management and reduction

Offering government-supported financial protection through a public-private insurance programme, instead of through public compensation and financial assistance, could leverage private (re)insurance market expertise in risk assessment and incorporate risk-based pricing to incentivise risk reduction by individuals, households and businesses.

Enhancing risk understanding and providing advice on risk management and reduction

The (re)insurance sector has developed risk assessment tools, particularly catastrophe models, to address the gaps in historical data that hinder its ability to assess and quantify low-frequency risks. The development of risk assessment tools such as catastrophe models for specific risks or perils is positively

correlated with the level of private insurance coverage for that risk or peril. As a result, forms of government-supported financial protection that involve the private (re)insurance sector in assuming risk, such as public-private insurance programmes, should support the development of risk assessment tools.

However, there are inherent challenges in modelling some risks. The development of risk assessment tools and models is most advanced for natural hazard risks although important gaps in model coverage for many countries and natural hazard perils remain. A number of models have been developed for cyber risks although there remains significant variability in modelling outputs for cyber catastrophes. Modelling of the business disruption losses linked to infectious disease outbreaks is much more limited.

These risk assessment tools can be used to provide risk signals and advice to individuals, households, businesses and governments on effective investment in risk reduction and preparedness. Insurance sector risk assessment tools are being used to support public risk awareness and to provide advice to individuals, households, businesses and governments on risk management (AXA, 2024^[131]; Allianz Commercial, 2024^[105]).⁴⁰ Businesses expect insurance companies to be a source of knowledge on risks, risk prevention and building resilience and do receive, and appreciate, advice from insurers and intermediaries on risk reduction (AXA, 2024^[131]).

For natural hazard risks, there are many examples of insurance company efforts to provide risk information and risk reduction advice to corporate policyholders (OECD, 2023^[101]).⁴¹ However, the sharing of insurance sector expertise with the smaller businesses and households that would likely benefit the most from insurance sector advice on risks and risk management may be more limited. There is some evidence that such information is not being provided, received and acted upon (OECD, 2023^[101]). For example, one survey of non-life insurers in Europe found that only 25% of the responding insurers provided climate-related information to policyholders and only some provided specific information on practical risk reduction measures that policyholders could take (EIOPA, 2023^[132]). It is likely more challenging for insurers and intermediaries to provide tailored advice to smaller companies and households as the amount of premiums involved are not sufficient to cover the costs of individualised risk assessment and advice (OECD, 2023^[101]). Some insurance sector representatives have indicated that, in cases where the premium is not sufficient to cover the costs of individual risk assessment and advice, insurers and intermediaries may try to find ways to provide these services.

In the case of cyber risks, insurers and intermediaries appear to be providing significant advice on risk reduction as well as services aimed at reducing *ex ante* risk and *ex post* costs. Cyber insurers have been providing a broad range of risk assessment, risk mitigation and incident response services as part of their insurance offering to companies of all sizes (OECD, 2017^[133]). The service offering has continued to expand to include employee training, penetration testing, dark web monitoring and even specific detection and response tools (Gupta, 2025^[134]; Robinson, 2025^[115]). One survey of SMEs found that those with cyber insurance coverage had significantly greater access to critical cyber security prevention and response capacities, such as incident response teams, intrusion detection and prevention systems, and forensic analysis (Howden, 2025^[67]).

The insurance sector is also investing in analysing the effectiveness of different cyber security measures. For example, one insurance intermediary has been comparing data from its clients on implemented cyber security measures with claims experience for the purpose of identifying which measures have been the most effective in reducing losses (Marsh, 2025^[135]). One recent survey found increasing trust in the services provided and recognition of their value for risk reduction (Marsh, 2025^[136]).

Encouraging risk reduction through risk-based premiums and coverage restrictions

The application of risk-based premiums can encourage investment in risk reduction by individuals, households and businesses. If investments in risk reduction are recognised through sufficient reductions in premium rates, the ultimate cost of investing in such measures will be reduced, which should encourage greater risk reduction investment.

There are many examples of insurance companies offering premium discounts for measures that reduce the risk of natural hazards (OECD, 2023^[101]).⁴² However, insurers do not consistently offer premium discounts (EIOPA, 2021^[137]) and households are not often aware of the available premium discounts (Hanger et al., 2018^[138]). A number of examinations have found limited evidence that risk-based pricing of natural hazard insurance coverage has had a demonstrable impact on incentivising household risk reduction (OECD, 2023^[101]). The limited impact on risk reduction investment may be driven by a number of potential impediments including a limited willingness or capacity of households to invest in risk reduction, few effective risk reduction options at the property-level, insurer concerns about the effectiveness of some measures, as well as the overall costs and benefits of substantial investments for all but those at highest risk (OECD, 2023^[101]).

A key missed opportunity could be the limited insurance sector support for resilient reinstatement. Most residential and commercial property insurance coverage only requires insurance companies to reinstate damaged property to the same, or a materially equivalent condition as prior to incurring the loss (Rosenfield, 2022^[139]). Cash settlements can provide an opportunity to build back better or to rebuild in a less risky location although the negotiation of cash settlements could create risks for consumers and some insurers may discourage cash settlements (Senate Select Committee on the Impact of Climate Risk on Insurance Premiums and Availability, 2024^[140]).

Insurers appear to be applying risk-based premiums and often set risk management conditions when providing cyber insurance coverage. For larger companies, insurers will often undertake comprehensive security assessments involving detailed questionnaires, site visits and hardware examinations before extending coverage. While cyber risk assessments appear to be more limited for smaller companies, the increasing availability of technological and third party solutions for risk assessment is likely to support improvements in the capacity of insurers to support cyber resilience (Mauro and Grossman, 2025^[141]).

The potential for incentivising risk reduction is likely more limited in the case of infectious disease outbreaks. There are few steps that a business can take to reduce revenue losses in the context of a required closure, particularly in sectors where revenue depends on consumer interaction (GAO, 2023^[103]).

3.7. Conclusion

Unprotected financial exposures to large-scale risks could have important social, economic and financial implications and create financial vulnerabilities for those impacted. Governments play an important role in ensuring that adequate financial protection, whether through insurance or other forms, is available to respond to these financial vulnerabilities.

This chapter applied the framework for considering government-supported financial protection from Chapter 2 to three large-scale risks. Natural hazards, cyber attacks and incidents and infectious disease outbreaks all have the potential to result in material impacts for a significant share of the population. There are gaps in the adequacy of financial protection for these risks that can lead to unprotected financial exposures. For natural hazard risks, the gaps are driven by challenges related to affordability for some households and businesses and a lack of take-up. For cyber attacks and incidents, the gaps result from some gaps in the adequacy of limits, limited take-up as well as the application of exclusions aimed at protecting insurers from large correlated losses. For infectious disease outbreaks, the availability of coverage for business revenue losses is extremely limited.

Governments should consider various factors when evaluating whether to address these gaps through an offer of government-supported financial protection. These factors include the likelihood, frequency and severity of the risk, potential implications for economic activity, such as access to credit, and the distribution of potential losses, including the possibility that vulnerable segments of the population will be particularly

impacted. This evaluation should also consider the potential for expanding the availability, affordability and take-up of financial protection through private insurance markets.

The rationale for offering some form of government-supported financial protection is likely to be higher for the natural hazard risks that occur with greater frequency and are more likely to affect access to credit. However, in some cases, unprotected financial exposures are driven almost exclusively by gaps in take-up of available and affordable coverage which may be better addressed through other policy and regulatory interventions such as investments in risk reduction and efforts to improve risk awareness. There may also be a rationale for offering government-supported financial protection for cyber risks given the increasing impact of unprotected cyber exposures on contractual relationships and the potential that government support could mitigate a substantial impediment to the availability of insurance coverage.

If a decision is taken to offer government-supported protection, governments should consider the nature and implications of the unprotected financial exposures and the potential contribution of private (re)insurance market participation. Public-private insurance programmes might be more appropriate for addressing risks that would lead to more frequent funding demands, where certainty of financial protection is necessary for those exposed, and where the insurance sector can potentially contribute to assuming losses, making speedy payments, reducing fraud and encouraging risk management and risk reduction.

The insurance sector has greater appetite and capacity to assume natural hazard and cyber risks and there is some evidence that the sector contributes to natural hazard and cyber risk reduction. However, that contribution appears to be more limited for households and smaller businesses. Insurance markets and reinsurance markets have more limited appetite for providing coverage for the revenue losses related to major infectious disease outbreaks and their ability to incentivise risk reduction is likely to be more limited.

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Notes

¹ These main categories have been identified based on surveys of leaders and risk experts aimed at identifying the most significant risks to the economy and society, including: (i) *World Economic Forum Global Risks Report*, which focuses on global risks to economies and societies and is based on global surveys of leaders from across the public, private and academic sectors (Elsner, Atkinson and Zahidi, 2025^[159]); (ii) *AXA Future Risks Report*, which focuses on risks to society and is based on a survey of global experts and individuals (AXA, 2025^[160]); (iii) *Allianz Risk Barometer*, which focuses on risks to businesses and is based on a survey of global risk management experts (Allianz Commercial, 2025^[161]); and (iv) *FERMA’s Global Risk Manager Survey*, which focuses on risks to businesses and is based on a survey of global risk managers (FERMA, 2024^[49]). While there is some variation in ranking and classification, there is a general level of consistency among these various reports in terms of this set of identified risks. Some other risks were commonly identified, including geopolitical and social tensions, critical infrastructure and supply chain disruptions, risks related to nature, ecosystems and biodiversity and risks related to pollution and harmful substances (including Per- and polyfluoroalkyl substances or PFAS) as well as risks related to demographic changes, ageing and critical illnesses and risks related to economic crises and financial stability. These other risks were not included in the analysis for a variety of reasons related to the nature of the risk and potential impacts and the availability of data on impacts, insurance coverage and other information necessary for this analysis.

² OECD calculations based on data from (Centre for Research on the Epidemiology of Disasters (CRED), n.d.^[144]) on total affected population estimates from all types of natural hazards and total population estimates from (World Bank, n.d.^[145]). The average total population affected was more than 1% of the total population in Brazil, Chile, Costa Rica, Czechia, Israel, Slovenia, Thailand, Türkiye and the United States. The total affected population since 2010 (overall) accounted for more than 5% of the population in these countries as well as Colombia, Croatia, Indonesia, Mexico, New Zealand and Peru. OECD Members and accession candidate countries are: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Thailand, Türkiye, the United Kingdom and the United States.

³ The number of deaths is significantly higher if measures based on excess deaths, equivalent to approximately 0.19% of the global population (WHO, 2022^[146]).

⁴ EIOPA assessed the availability of coverage for households as low for flood risk in Estonia and Lithuania, coastal flood risk in Germany and Lithuania, earthquake risk in Poland (although earthquake risk is low in Poland and mostly related to mining operations, which limits the demand and supply of coverage) and wildfire risk in Portugal (EIOPA, 2025^[71]).

⁵ The US states identified are Arkansas, California, Colorado, Florida, Louisiana, Minnesota, Oklahoma, South Carolina, South Dakota and Washington (Golnaraghi and Vichev, 2025^[44]).

⁶ For example, in the United States, deductibles for earthquake coverage are usually 10%-20% of the sum insured (NAIC, 2024^[147]) which means that policyholders could face a significant uninsured loss.

⁷ In response to the COVID-19 restrictions on economic activity, a number of governments provided subsidies for job retention programmes that reduced the loss of income for employees in sectors where business operations were disrupted (OECD, 2021^[7]).

⁸ Business interruption coverage is normally incorporated as an endorsement or add-on to property insurance coverage and, in many countries, is generally only triggered when the insured suffers property damage. Many policies include some coverage for losses incurred due to restrictions in access to the policyholder's premises, including as a result of orders by a civil authority, but this coverage is also often linked to a requirement for property damage to have occurred in the vicinity of the insured premises. In addition, some insurance companies apply exclusions for any damages or losses resulting from a pollutant, contaminant, virus and/or bacteria. With some exceptions, most of the disputes over coverage related to the restrictions imposed during COVID-19 found that the presence of a virus in the vicinity of the property did not constitute property damage. In the case of policies that provided some coverage for business interruption losses related to communicable diseases, it was usually concluded that COVID-19 was not covered as a listed disease (Fearnhead and Stubing, 2025^[148]).

⁹ For example, one global reinsurance company is offering a customisable risk transfer solution for epidemic and pandemic risks although it is noted that the available coverage will be limited (Munich Re, n.d.^[149]).

¹⁰ In many countries, insurers are not authorised to provide coverage for some types of fines and penalties. In addition, in some countries or in some circumstances, insurers are not allowed to reimburse the cost of ransom payments (OECD, 2020^[164]).

¹¹ For example, one 2024 survey of individuals found that only 19% of respondents had been offered coverage for cyber risks (von dem Knesebeck and Kreuzer, 2024^[150]) although it's not clear whether this was due to limited availability of cyber coverage for individuals and households.

¹² In the case of infectious disease outbreaks, coverage is not generally available so no conclusions can be drawn on the affordability of such coverage.

¹³ Based on an EIOPA analysis of premium costs and disposable income (as outlined in (EIOPA, 2025^[162]), 25-50% of households in Lithuania could face premiums for wildfire and windstorm risks that are unaffordable. In Poland, more than 25% of households could face unaffordable flood insurance premiums, more than 50% could face unaffordable premiums for coverage of coastal floods and wildfires (although these are not generally treated as separate perils in offered insurance coverage), and more than 75% could face unaffordable premiums for earthquake coverage (although earthquake risk is low in Poland). In Romania, 25-50% of households could face unaffordable coverage for coastal flood, earthquakes and

floods, and 50-75% could face unaffordable coverage for wildfires and windstorms. In Slovenia, 25-50% of households could face unaffordable coverage for floods, and 50% to 75% could face unaffordable coverage for earthquakes (EIOPA, 2025^[71]).

¹⁴ The Actuaries Institute has proposed that households that pay more than four weeks of gross income in household insurance premiums are “affordability-stressed” (Paddam et al., 2024^[62]).

¹⁵ Average household insurance premium rates reportedly increased by 56% in Florida, 55% in Louisiana, 51% in the District of Columbia, 43% in Colorado and 42% in Utah (Golnaraghi and Vichev, 2025^[44]).

¹⁶ In EIOPA’s *Dashboard on insurance protection gap for natural catastrophes*, insurance penetration is measured as the sum insured against each natural hazard risk relative to the overall value of property in the given country (EIOPA, 2025^[71]).

¹⁷ Insurance penetration is estimated to be below 50% for one or more natural hazard perils in Austria (flood, wildfire), Bulgaria (all included hazards), Croatia (all included hazards), Czechia (earthquake), Denmark (earthquake), Estonia (coastal flood, flood, wildfire), Finland (coastal flood), Germany (coastal flood), Greece (all included hazards), Hungary (wildfire), Italy (all included hazards), Latvia (coastal flood, earthquake, flood, wildfire), Lithuania (all included hazards), the Netherlands (coastal flood, earthquake, flood), Portugal (all included hazards), Romania (all included hazards), the Slovak Republic (all relevant included hazards), Slovenia (coastal flood, earthquake, flood) and Sweden (coastal flood) (EIOPA, 2025^[71]). It is also estimated to be below 50% for earthquake, coastal flood and wildfire risk in Poland. However, earthquake risk is low in Poland and wildfire and coastal flood risk are not considered separate perils in the insurance policies offered in Poland (wildfire is considered part of fire coverage and coastal flood is considered part of flood coverage).

¹⁸ OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.).

¹⁹ Less than 20% economic losses since 2000 were insured In Argentina, Brazil, Bulgaria, Colombia, Costa Rica, Croatia, Estonia, Greece, Hungary, Indonesia, Italy, Korea, Latvia, Lithuania, Peru, Poland, Portugal, Romania, the Slovak Republic, Slovenia and Türkiye (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.).

²⁰ More than 50% of economic losses since 2000 were insured In Australia, Belgium, Canada, Denmark, Finland, France, Ireland, Luxembourg, the Netherlands, New Zealand, Norway, Switzerland, the United Kingdom and the United States (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.).

²¹ The data on annual economic losses is from Swiss Re (Swiss Re, sigma database. All rights reserved.).

²² The period 2005-2014 included significant earthquake losses in Chile, Japan and New Zealand.

²³ According to one report, the average number of significant cybersecurity incidents reported each quarter was 650% higher in 2024 relative to 15 years earlier, the likelihood of an organisation experiencing a cyber event has quadrupled, median losses have increased from USD 190 000 to nearly USD 3 million – and extreme events have increased to USD 32 million (Cyentia, 2025^[142]).

²⁴ For the purpose of this estimate, cyber catastrophes were defined as events that resulted in more than USD 800 million in losses and affected more than one company (Johansmeyer, 2024^[32]).

²⁵ One recent study in the United States, for example, found some evidence that a lack of insurance coverage could be linked to significantly higher rates of mortgage foreclosure in the aftermath of significant events. The study analysed foreclosure rates in communities impacted by hurricanes, wildfires and floods and found that foreclosure rates were more than 50% higher in areas outside of Special Flood Hazard Areas where insurance coverage was less likely to have been required by mortgage lenders (in the United States, mortgage lenders usually require property insurance that includes coverage for wildfire and wind and coverage for flood within Special Flood Hazard Areas) (First Street, 2025^[151]).

²⁶ A review of examinations of the relationship between COVID-19 mortality and indicators of deprivation from across the world found that 91% of those examinations observed significantly higher mortality rates in areas of social disadvantage (McGowan and Bambra, 2022^[92]).

²⁷ In the United States, for example, some of the most impacted sectors included accommodation and food services; arts, entertainment, and recreation; educational services; health care; manufacturing; and retail trade (GAO, 2023^[103]).

²⁸ Large internationally-active insurance companies can also establish diversified pools of risk by assuming uncorrelated risks from their different regions of operation.

²⁹ In 2025, the top 19 reinsurers had catastrophe budgets of just over USD 20 billion (Bhojani et al., 2025^[163]) compared to USD 12.5 billion allocated by the top 20 reinsurers in 2020 (S&P Global Ratings, 2019^[153]).

³⁰ In 2025, the outstanding value of issued catastrophe bonds and insurance linked securities for all perils was USD 58.883 billion relative to 33.351 billion in 2020 (Artemis, n.d.^[154]).

³¹ Between 2020 and 2023, the largest reinsurers covered an average of 14.7% of insured catastrophe losses, down from 23.3% between 2016 and 2019 (simple average), indicating that the share covered by primary insurers through their retentions increased (Bhojani, 2024^[152]). In 2025, the largest reinsurers only covered 11% of total insured catastrophe losses (Bhojani et al., 2025^[163]).

³² For example, an examination of model outputs for a cyber catastrophe with a 1-in-50 year return period found that loss estimates varied significantly across the different commercially-available models (ranging from USD 5.5 billion to USD 24.4 billion) (Cordonnier and Davis, 2023^[143]).

³³ An OECD analysis in 2021 examined the potential impact of lower revenues and higher leverage ratios on investment and estimated that investment could be 2% lower as a result of the impacts of the pandemic on revenues and leverage (Demmou et al., 2021^[155]).

³⁴ Simple average based on growth in outstanding business loans at current prices in national currency.

³⁵ Business bankruptcies were higher in Canada, Finland, Hungary, New Zealand, Sweden and the United Kingdom.

³⁶ Between 2015 and 2024, the (re)insurance sector absorbed approximately USD 103 billion in natural hazard losses annually, compared to approximately USD 59 billion annually between 2000 and 2014. The

share of losses insured increased from 40.3% in 2000-2014 to 50.8% in 2015-2024. OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

³⁷ The share of earthquake losses insured declined from 21.4% in 2000-2014 to 19.2% in 2015-2024, although this may have been driven by differences in the level of coverage where earthquakes occurred during the two periods. The share of overall natural hazard losses insured declined by more than 10 percentage points in 2015-2024 (relative to 2000-2014) in Estonia, New Zealand and Thailand. OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

³⁸ According to one reported estimate, cyber insurance premiums are expected to almost double from USD 15.3 billion in 2024 to USD 30 billion by 2030 (Shiltagh and Meley, 2025^[156]).

³⁹ The report found that, under the “Payroll stream” of the programme, the administrator identified 50 970 of the 51 010 ineligible recipients of loans. However, under the “Non-deferrable expenses stream”, the administrator only identified 30 of the estimated 26 150 ineligible recipients due to a lack of post-payment verifications (Office of the Auditor General of Canada, 2024^[130]).

⁴⁰ For example, insurance associations and companies are making natural hazard risk maps, claims data and modelling tools available to support risk awareness in many countries around the world (OECD, 2023^[101]).

⁴¹ A number of large insurance companies and intermediaries regularly provide climate risk information to corporate policyholders and have set up specific risk management consulting units to provide risk management and risk reduction advice to corporate clients (OECD, 2023^[101]).

⁴² For example, insurance companies in the United States offer premium discounts for measures that enhance the resilience of homes against hurricane and wildfire risks (Smart Home America, n.d.^[157]). In Germany, insurance companies have offered premium discounts to households with high-levels of exposure to flood risk that have implemented risk reduction measures (Seifert-Dähnn, 2018^[158]).

4 Insurance coverage for wildfire risk

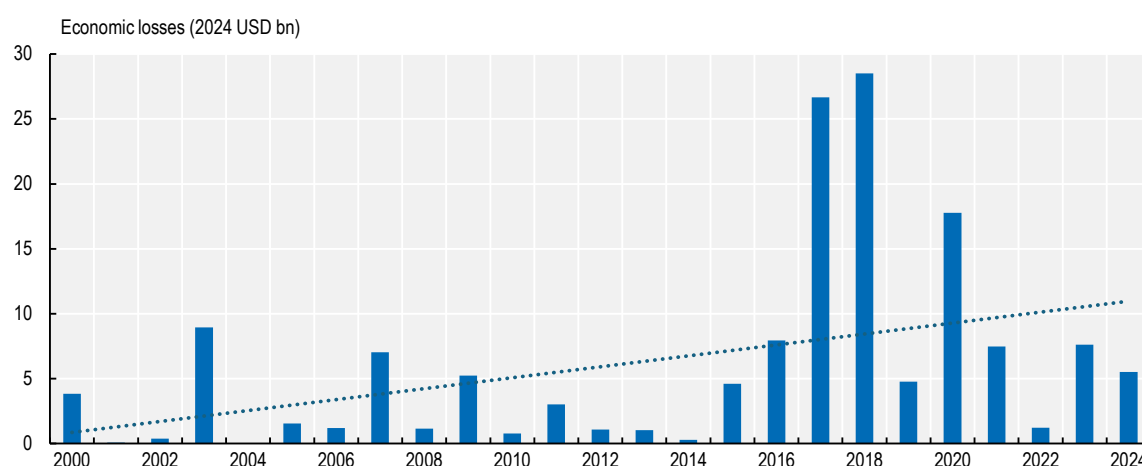
Development in the wildland-urban interface and weather conditions that have become more conducive to fire ignition and spread have led to a dramatic increase in wildfire losses in the last decade. Insurance has absorbed a significant share of past losses in countries with high levels of property insurance take-up. However, increasing losses have led to challenges in accessing affordable property insurance coverage. This chapter outlines the impact of increasing losses on the availability of affordable insurance coverage in wildfire-exposed countries. It also discusses the measures that insurance regulators and the insurance sector have taken to address these challenges, with a particular focus on encouraging risk reduction as a sustainable approach to improving availability and affordability.

4.1. Introduction

Wildfires and the resulting smoke can damage homes, businesses and infrastructure when fires or smoke reach built-up areas. The damage to communities impacted by a wildfire can be substantial as burnt buildings are often a total loss (InsTech, 2023^[1]). For example, a damage assessment found that more than 50% of the approximately 30 000 structures within the communities affected by the January 2025 wildfires in Southern California were destroyed (Horton et al., 2025^[2]).

A number of regions of the world have seen an increase in the frequency, size and severity of wildfires in recent years (OECD, 2023^[3]; Below, Wirtz and Guha-Sapir, 2009^[4]). While most wildfires occur in sparsely inhabited regions and have limited direct impacts on human settlements (Jones et al., 2022^[5]), wildfires that occur near populated areas can have significant economic and human consequences.¹ There has been a notable increase in the frequency of disastrous wildfire since 2015, particularly in the Mediterranean region of Europe and the Western United States (Cunningham et al., 2025^[6]). In OECD Members, average annual economic losses from damaging wildfires increased by 360% in 2015-2024, relative to 2000-2014, (and by 371% in OECD Members and accession candidate countries overall) (Figure 4.1).²

Figure 4.1. Wildfire economic losses (2000-2024)



Source: OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

Development in wildland-urban interface areas is an important driver of losses from wildfires.^{3,4} In some countries, substantial assets and populations are located in wildland-urban interface areas. In Portugal, more than 60% of industrial zones are located near forests exposed to wildfire risk (Swiss Re and Liberty Mutual Insurance, 2025^[7]). In the United States, 30% of the population is located in wildland-urban interface areas (Guy Carpenter, n.d.^[8]). In some regions, wildland-urban interface areas at risk of wildfire have seen significant population growth (Chen et al., 2024^[9]). For example, in the United States, housing unit growth in wildland-urban interface areas was 47% between 1990 and 2020, compared to 33% in other areas (Swiss Re and Liberty Mutual Insurance, 2025^[7]). Wildfires that occur in wildland-urban interface areas can trigger urban conflagrations where fire spreads from structure to structure and the primary source of fuel becomes the structures in the built environment (Cotality, 2025^[10]; Watkins, Brinkmann and Siddique, 2025^[11]). There has been at least ten major urban conflagrations triggered by wildfires in the United States since 2020 (Cotality, 2025^[10]), including the fires that devastated a number of communities in the city of Los Angeles in January 2025 (Box 4.1).

Box 4.1. Southern California wildfires (January 2025)

Two major wildfires devastated several communities in the region around the major city of Los Angeles between 7 and 31 January. The Eaton and Palisades fires damaged or destroyed more than 18 000 structures (Verisk, 2025^[12]), causing approximately USD 40 billion in insured losses and USD 65 billion in economic losses (Bowen, Kerschner and Ng, 2025^[13]).

The spread of the wildfires was driven by an abundance of fuel, delayed onset of winter precipitation, very strong winds and unseasonably warm temperatures that combined with dense construction in the affected areas to trigger urban conflagration (Bowen, Kerschner and Ng, 2025^[13]; Saleh, 2025^[14]).

The two fires led to the largest ever insured loss from a wildfire (Swiss Re and Liberty Mutual Insurance, 2025^[7]) and have had significant impacts on the California insurance market. The state's Fair Access to Insurance Requirements (FAIR) Plan received approval for a USD 1 billion assessment on member insurers in order to ensure the continuous ability to pay claims related to the fires¹ (CDI, 2025^[15]). The state's largest insurance provider faced a two-notch credit rating downgrade triggered, in part², by the impact of losses from the Eaton and Palisades fires (Sclafane, 2025^[16]).

Notes:

¹ As discussed below, the FAIR Plan is a private association of insurance companies that operate in the state that provides basic property insurance coverage to households and businesses that are unable access coverage from the private insurance market. The FAIR Plan, with the approval of the California Insurance Commissioner, can issue an assessment on member insurers if it does not have sufficient financial capacity to pay its claims.

² The credit rating downgrade also reflected uncertainty about regulatory approvals of the company's pricing proposals and concerns about the willingness of the parent company to provide capital support to the affiliate operating in California (Sclafane, 2025^[16]).

Changes in precipitation patterns, temperatures and storm activity are expected to lead to increasing fire losses in the future (Chen et al., 2024^[9]; OECD, 2023^[3]).⁵ For example, one recent study estimated that the duration of fire weather seasons (i.e. "conditions conducive to fire ignition and spread") increased by 27% globally between 1979 and 2019, and by more than 40% in the United States, Central America, Europe, South America (south of the equator) and Central Asia (Jones et al., 2022^[5]). Another study projects a significant increase in seasonal fire weather conditions in 68-91% of fire-prone regions globally by the end of the 21st century, relative to 1980-2014 (Gallo et al., 2025^[17]).

Several factors impact the level of wildfire risk in the OECD Members and accession candidate countries that have been most impacted by this risk.⁶ These include the length of the fire weather season, size and significance of wildland-urban interface areas and the prevalence of the wood-frame housing that is more vulnerable to urban conflagration (Table 4.1) (Giammanco et al., 2023^[18]). In the last ten years, average annual economic losses have been highest in the United States, Canada, Australia and Portugal⁷ and have increased most, relative to 2000-2014, in Chile, Canada and the United States. Australia, Canada, Chile, Greece, Indonesia, Portugal and the United States have all faced severe wildfire loss years with annual economic losses exceeding USD 1 billion.

Table 4.1. Wildfire risk characteristics

	Fire weather season length (annual mean, 1979-2019)	Size and significance of wildland- urban interface areas	Share of population in wood frame housing
Argentina	48 days	40 000 – 80 000 km ² (1-3% of total area)	0-10%
Australia	130 days (50 days (Southeast Australian Forests))	100 000 – 200 000 km ² (1-3% of total area)	50-60%
Brazil	48 days (41 days in Southern Amazonia)	200 000 – 500 000 km ² (2-6% of total area)	0-10%
Canada	12 days	40 000 – 80 000 km ² (0.5-1% of total area)	30-40%
Chile	48 days	20 000 – 40 000 km ² (26-53% of total area)	20-30%
Colombia	27 days	40 000 – 80 000 km ² (3-7% of total area)	0-10%
France	17 days (52 days (Mediterranean))	100 000 – 200 000 km ² (18-37% of total area)	0-10%
Greece	17 days (52 days (Mediterranean))	10 000 – 20 000 km ² (7-15% of total area)	0-10%
Indonesia	10 days (12 days (Indonesian Forests))	200 000 – 500 000 km ² (10-27% of total area)	0-10%
Israel	96 days	Less than 10 000 km ² (less than 45% of total area)	0-10%
Italy	17 days (52 days (Mediterranean))	80 000 – 100 000 km ² (26-34% of total area)	0-10%
Portugal	17 days (52 days (Mediterranean))	10 000 – 20 000 km ² (10-22% of total area)	0-10%
Spain	17 days (52 days (Mediterranean))	80 000 – 100 000 km ² (15-20% of total area)	0-10%
Sweden	17 days	10 000 – 20 000 km ² (2-5% of total area)	0-10%
Türkiye	96 days (52 days (Mediterranean))	100 000 – 200 000 km ² (12-26% of total area)	0-10%
United States	44 days (86 days (Pacific US Forests)) and 10 days (Alaskan Forests))	500 000 – 1 200 000 km ² (5-13% of total area)	30-40%

Notes: Fire weather season length for Global Fire Emissions Database macroregions and (in brackets) focus eco-regions (where available) from Jones et al. (2022^[5]), *Global and Regional Trends and Drivers of Fire Under Climate Change*; Size of wildland-urban interface is from Chen et al. (2024^[9]), *Wildfire risk for global wildland-urban interface areas*; Share of population in wood frame housing is from Daniell, Schaefer and Wenzel (2017^[19]), *Losses associated with secondary effects in earthquakes*.

Increasing wildfire losses are impacting the availability of affordable insurance in some wildfire-exposed countries. As mortgage lenders will often require borrowers to have insurance coverage against fire risk, reduced access to affordable insurance could have implications for housing markets. In the US state of California, for example, 13% of realtors reported that a housing sale had been cancelled in 2024 as a result of a lack of insurance or affordable insurance (Watkins, Brinkmann and Siddique, 2025^[11]). In some high-risk wildfire areas in Australia and the United States, property values have declined by 5% and 7.5%, respectively, relative to lower-risk properties in the same area (Swiss Re and Liberty Mutual Insurance, 2025^[7]).

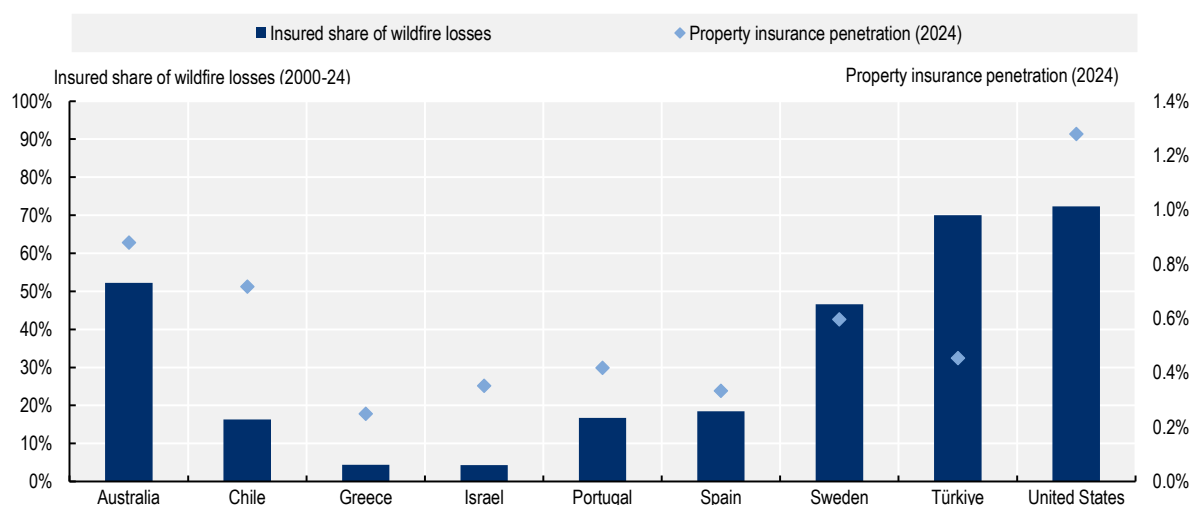
This chapter outlines insurance market and regulatory approaches to wildfire risk in OECD Members and accession candidate counties that face significant exposure to wildfire risks.⁸ The first section provides an overview of the availability, affordability and take-up of residential and commercial insurance coverage against wildfire risk. The second section outlines efforts to support the availability, affordability and take-

up of coverage, including through insurance sector contributions to encouraging risk reduction and adaptation.

4.2. Property insurance coverage for wildfire risk

Standard property insurance coverage provided to households and businesses in most countries includes damages resulting from fire from any source, including wildfires. As a result, the share of losses insured is relatively high, particularly in countries where property insurance penetration is high (Figure 4.2).⁹

Figure 4.2. Insurance coverage of wildfire losses and property insurance penetration



Note: The calculation of the insured share of economic losses only includes loss years where an insured loss was reported. There were no reported insured or economic losses in France during this period. There were no reported insured losses in Argentina, Brazil, Colombia, Italy and Indonesia. The property insurance penetration rate for Spain is likely underestimated as the premiums collected by the *Consorcio de Compensación de Seguros* are not included in the data used for the calculation.

Source: OECD calculations based on insured and economic loss data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.) and property insurance penetration rates, including household and business property insurance, from OECD (2025_[20]), *Insurance business written by class of insurance*.

4.2.1. Wildfire insurance availability

Insurers in some countries limit the coverage provided to some highly exposed households and businesses by applying exclusions for wildfire losses, imposing lower insured limits or higher deductibles for wildfire-related damages, or by not offering any property insurance coverage at all.¹⁰

Those exposed to higher wildfire risk in some countries may face challenges in accessing insurance coverage. For example, in Chile, a sample of online insurance offers in Valparaíso, which has been affected by major fires in recent years,¹¹ found that fewer offers were available for a hypothetical rural property located in a forested area, relative to urban and suburban properties in the area.¹² In Portugal, a 2021 survey (Almeida et al., 2021_[21]) found significant insurer reluctance to provide coverage for properties at risk of rural fire. A limited review of online insurance coverage offers for hypothetical rural homes in five locations in Portugal in April 2023¹³ found that some rural households in higher-risk locations could face challenges in accessing insurance coverage as a result of the age of the structure and/or its construction materials. However, a more recent review for the Coimbra region in 2025 found that a similar number of coverage offers were available for urban, suburban and rural properties in the area.¹⁴

Some households and businesses in the United States that are highly exposed to wildfire risk have faced challenges in accessing property insurance coverage from private insurance markets.

- In 2024, in the face of increasing losses, a number of insurance companies announced that they will not renew existing coverage and/or reduce new business in the state of California, and some announced complete exits from the market (Jacobson, 2024^[22]). A limited review of online insurance coverage offers for homes in one community exposed to wildfire risk in October 2024 found few, and sometimes no, offers of coverage, particularly for addresses located adjacent to forested areas.¹⁵ In 2025, following regulatory changes allowing for the use of forward-looking catastrophe models and the integration of reinsurance costs into insurance pricing (see the section on Enhancing the availability of insurance coverage), a number of private insurers reportedly committed to continue offering coverage in the state (PropertyCasualty360, 2025^[23]). However, a review of insurance coverage offers for hypothetical homes near Santa Rosa in November 2025 found fewer offers of coverage for suburban and rural properties near forested areas.¹⁶ A recent report from an insurance service provider similarly reported continued challenges in accessing insurance for households located in wildland-urban interface areas in California (Cotality, 2025^[10]).
- In the US states of Colorado and Oregon, there are similar reports of private insurers reducing the availability of coverage in high-risk areas (Cotality, 2025^[10]). A limited review of insurance coverage offers available for hypothetical homes near Boulder (Colorado) found a similar level of offers for urban and suburban properties although fewer offers available to a rural property located near a forested area.¹⁷ Challenges in accessing residential and commercial insurance coverage have also been reported in the US state of New Mexico (Hallo, 2025^[24]). In the US state of Arizona, the Department of Insurance and Financial Institutions has established a Resiliency and Mitigation Council to examine challenges in the availability and affordability of insurance for natural hazard risks, particularly wildfire risks, and identify strategies to mitigate potential losses and improve the availability and affordability of coverage (Arizona Department of Insurance and Financial Institutions, 2024^[25]).

4.2.2. Wildfire insurance affordability

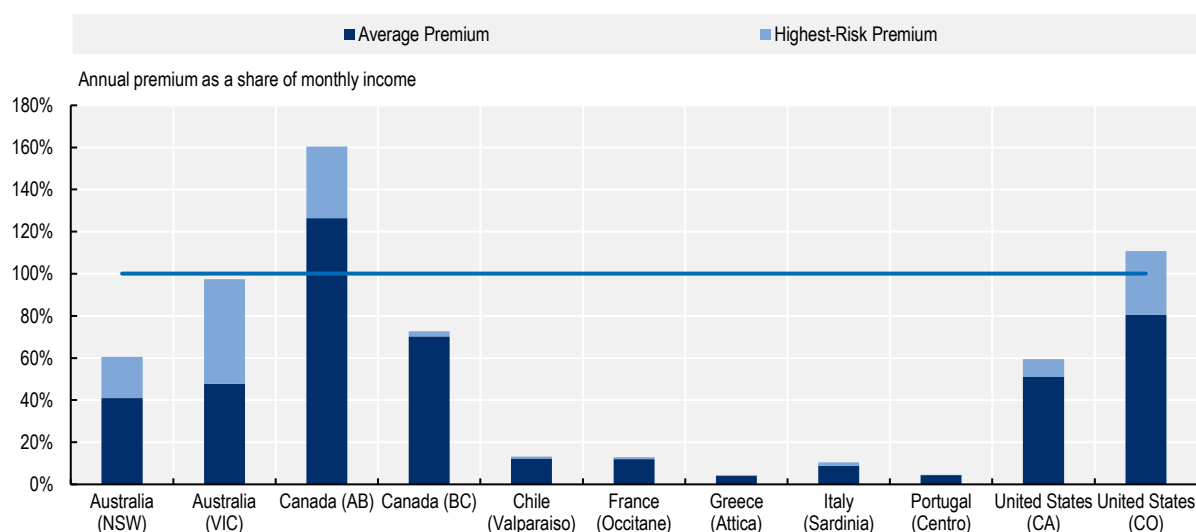
Where insurance is available from private insurance markets, some wildfire-exposed households and businesses could face high premiums for coverage. High premium costs could lead households and businesses to underinsure their property¹⁸ or not acquire any insurance at all, if not required by a lender.

There are no broadly accepted measures of what should be considered an affordable premium cost. One measure of “affordability stress” developed by the Actuaries Institute in Australia suggests that households that face property insurance premium costs above four weeks of gross household income could be considered affordability-stressed (Paddam et al., 2024^[26]). The Actuaries Institute applied this measure in an examination of the impact of natural hazards on insurance affordability in Australia. They found that, while coverage for wildfire (“bushfire”) damage accounts for less than 10% of the direct loss components of premium costs,¹⁹ on average (Paddam et al., 2024^[26]), the wildfire component of the premium cost accounted for 10-25% of the premium cost for about 10% of “affordability stressed households” and more than 25% of premium cost for approximately 2-3% of those households (Paddam, Liu and Philip, 2024^[27]).

Households in Canada and the United States that are exposed to wildfire risk have also faced increasing premiums. One analysis of premium quotes by an insurance rate aggregator found that increases in home insurance costs between 2023 and 2025 were much higher in the Canadian cities most exposed to wildfire risk (Starov, 2025^[28]). In some of the most highly exposed cities, insurance costs reportedly increased by more than 50% during that period (Starov, 2025^[28]). In the United States, average premiums in wildfire-exposed regions of Colorado have reportedly increased by 60% in the last five years (Cotality, 2025^[10]). In the US state of California, average household property insurance premiums increased by 54% between 2015 and 2022 and by more than 80% in the areas facing the highest wildfire risk (Kousky, 2025^[29]).

Home insurance premiums as a share of monthly income appear high in some jurisdictions (Figure 4.3). In Australia, a hypothetical rural household in a high-risk area could face premiums of more than 60% of average monthly income in the state of New South Wales and close to 100% of average monthly income in the state of Victoria.²⁰ In the US state of Colorado, the average insurance premium offers for all of the hypothetical suburban and rural homes were equivalent to 70% or more of average monthly income. In the US state of California, the insurance premium offers were lower overall, although there were few offers available from insurers for the hypothetical suburban and rural households. In the Canadian province of Alberta, insurance premium offers had costs approaching or exceeding the average monthly income for hypothetical households in both urban and suburban areas while, in British Columbia, the insurance premium offers were, on average, approximately 70% of monthly income for hypothetical households in urban, suburban and rural areas.²¹ Conversely, none of the online insurance premium offers in Chile, France, Greece, Italy, Portugal or Spain accounted for more than 15% of average monthly income.

Figure 4.3. Premium costs as a share of monthly income



Note: OECD calculations based on: (i) available online insurance premium offers in the identified regions for hypothetical homes located in a central urban area, two suburban areas adjacent to forested land and a high-risk rural location; and (ii) estimates of gross disposable income per capita of households in 2023 from OECD (2024_[30]), *Gross disposable income per capita of households and NPISH (indicator)*, adjusted for the identified region based on OECD (2024_[31]), *Disposable income, net (indicator)*.

Where insurance companies apply risk-based pricing, policyholders with greater exposure to wildfire risk would normally face higher premiums, which could lead to affordability stress. While the application of risk-based pricing can impact affordability, risk-based premiums can also provide important risk signals on property-level risk exposure and incentives for risk reduction and adaptation if premium discounts or reduced premiums are offered to those that take actions to reduce their exposure to risk.

4.2.3. Wildfire insurance take-up

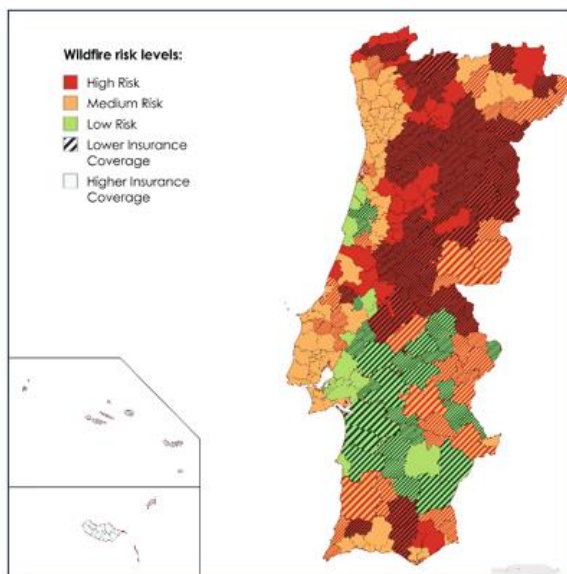
Insurance coverage for wildfire risk may be available and generally affordable although a substantial share of households in some countries may decide not to acquire insurance coverage. Property insurance penetration, measured as premiums as a share of GDP, is below the OECD average in Chile, Colombia, Greece, Israel, Italy, Portugal, Spain, Sweden and Türkiye, although property insurance penetration is an imperfect indicator of the take-up of coverage. In Chile and Colombia, the share of households that have property insurance is reportedly below 10% (Lesmes Díaz, 2025_[32]; Portal Red Salud, 2025_[33]). In Greece, the insurance association estimates that just under 17% of households have property insurance with

building coverage (Hellenic Association of Insurance Companies, 2025^[34]). In Türkiye, less than 30% of households have property insurance (Merkezi, 2025^[35]) while in Italy and Portugal, approximately 49% and 55% of households have coverage, respectively (Assinews.it, 2025^[36]; Carvalho, 2025^[37]). The take-up of household property insurance is higher in Spain (close to 80% (UNESPA, 2025^[38])) and Sweden (over 95% (OECD, 2025^[39])).

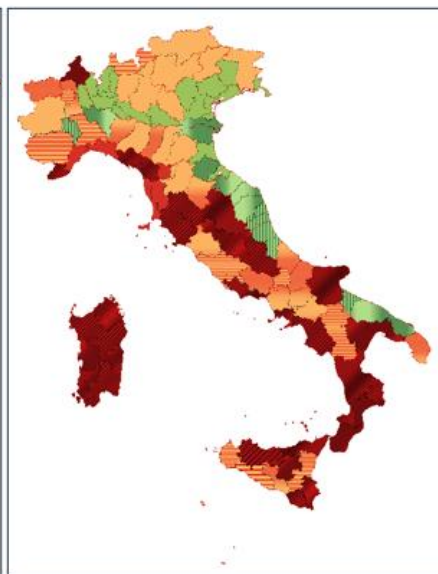
The take-up of insurance coverage in some countries is lower in the rural areas that are likely to face higher exposure to wildfire risk. Homes in rural areas are more likely to be detached structures with lower property values than homes in major urban areas, which means that that these households are less likely to be subject to an insurance requirement. Figure 4.4. Insurance take-up and wildfire exposure in Italy, Portugal and Spain provide an illustration of the correlation between exposure to wildfire hazard and insurance take-up in Italy, Portugal and Spain.

Figure 4.4. Insurance take-up and wildfire exposure in Italy, Portugal and Spain

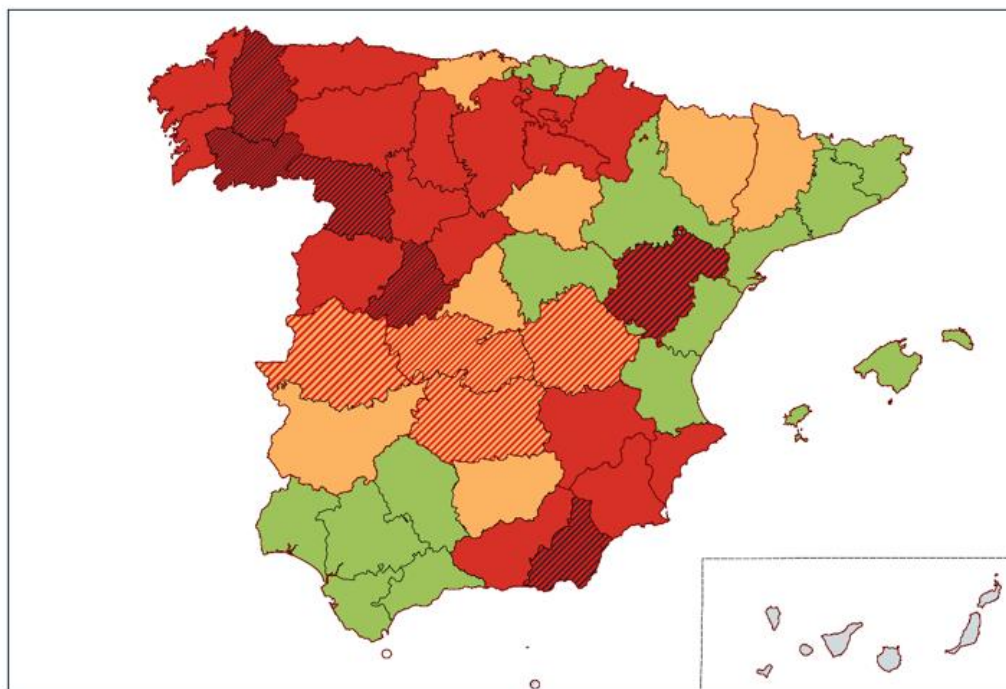
Panel A: Portugal



Panel B: Italy



Panel C: Spain



Note: Data on insurance take-up is from: ASF (2024^[40]), *Relatório de Estabilidade Financeira do Setor Segurador e dos Fundos de Pensões - dezembro 2023* for Portugal; Assonews.it (2025^[36]), *A marzo 2025 erano 12,3 milioni le polizze property a tutela delle abitazioni civili* for Italy; and UNESPA (2025^[38]), *Memoria social del Seguro* for Spain. Due to differences in estimates, higher insurance coverage refers to regions where more than approximately 55% of households have insurance in Portugal, 60% in Italy, and 65% in Spain. Wildfire risk maps are from ICNF (2023^[41]), *Carta de perigosidade de incêndio rural* for Portugal; Kirschner et al. (2024^[42]), *Governance drivers hinder and support a paradigm shift in wildfire risk management in Italy* for Italy; and AEMET (n.d.^[43]), *Interpretación: Incendios* for Spain.

4.3. Measures to support the availability, affordability and take-up of insurance for wildfire risk

4.3.1. Enhancing the availability of insurance coverage

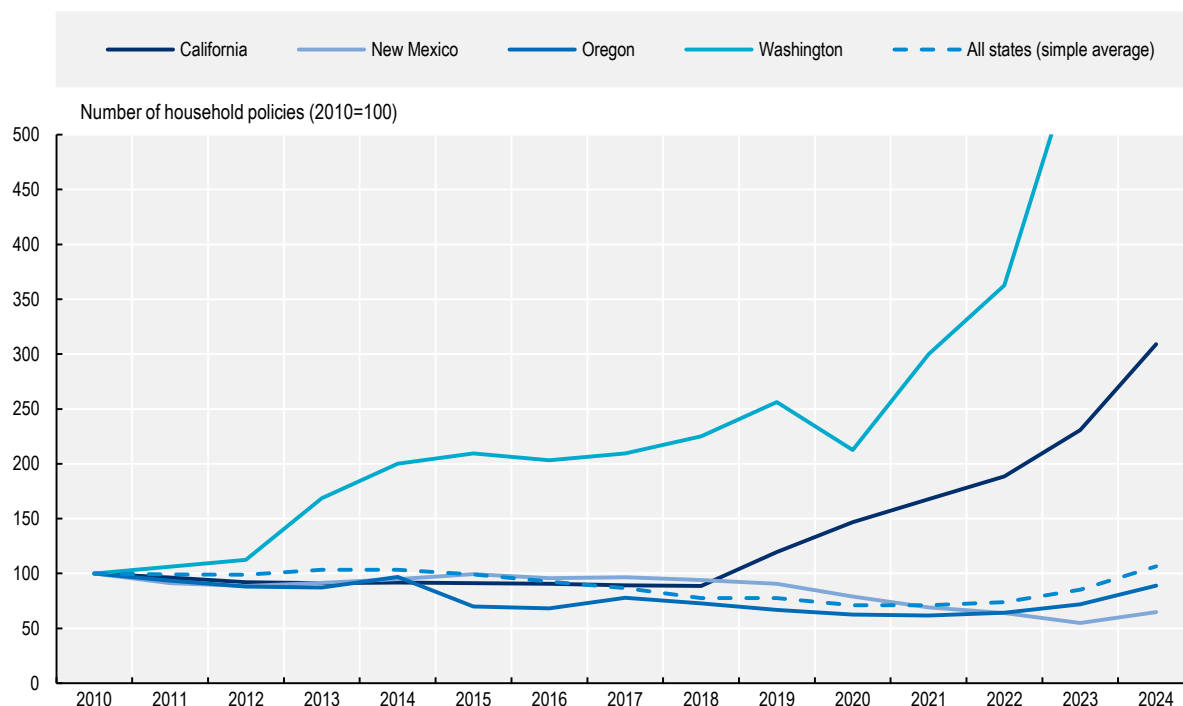
Households and businesses that are highly exposed to wildfire risk may face challenges in accessing insurance coverage. A review of online insurance offers for different types of hypothetical homes in high-risk areas suggests that some households in Portugal and the United States are more likely to face challenges in accessing coverage. For a variety of reasons, these challenges appear to have led to more significant concerns in the United States than in Portugal.²²

A number of US states have established residual insurance arrangements that provide limited coverage to households, and sometimes businesses, that are unable to access coverage from private insurers in order to ensure the availability of basic coverage.²³ Fair Access to Insurance Requirements (or FAIR) Plans have been established in many of the states in the western United States that are highly exposed to wildfire risk, including California, Colorado,²⁴ New Mexico, Oregon and Washington²⁵ (Jablonski, 2025^[44]). In some of these states, FAIR Plans have been established only recently.

As wildfire-exposed households' access to private insurance has declined, the number of households that have acquired coverage from FAIR Plans in the US states of California and Washington has increased significantly and at a much faster rate than in other parts of the country, although from a low base in the case of Washington (Figure 4.5).

The number of commercial policies has also increased. In California, for example, the number of commercial policies written by the FAIR plan more than doubled between 2010 and 2024 (III, 2025^[45]). In some states, including California, New Mexico and Oregon, the amount of coverage that FAIR Plans can provide has also been increased in recent years to address challenges in accessing private insurance market coverage (Hallo, 2025^[24]; Professional Insurance Agents Western Alliance, 2023^[46]; Sellers, 2025^[47]). For example, the California FAIR Plan increased the amount of coverage it could provide to households to USD 3 million (Kousky and Friedrich, 2025^[48]) and has developed a commercial high value policy offering coverage of up to USD 20 million per building and USD 100 million per location (Insurance Journal, 2025^[49]). The total sum insured by FAIR Plans, including both residential and commercial properties where eligible, was more than 8 times higher in Washington, 9 times higher in California and 12 times higher in New Mexico²⁶ (III, 2025^[45]).

Figure 4.5. FAIR Plan policy growth



Note: Policy counts were converted to indices given the significant differences in the size of FAIR Plans in different states. In the fiscal year ending in September 2024, the California FAIR plan had provided coverage for more than 400 000 policies, compared to approximately 7 500 in New Mexico, 2 300 in Oregon and 300 in Washington. The index value for the Washington FAIR Plan was 584 in 2023 and 956 in 2024 (not shown). The index for all states includes all FAIR Plans and Beach and Wind Plans for which complete 2010-2024 data was available. Source: ILL (2025^[45]), *Facts + Statistics: Homeowners and renters insurance* (based on data from the Property Insurance Plans Service Office (PIPSO)).

While the existence of a residual insurance arrangement can ensure that some coverage is available to high-risk households and businesses, the accumulation of risk in the FAIR Plan could have potential implications for the availability and affordability of coverage offered by private insurers. If a FAIR Plan faces losses beyond its financial capacity, private insurers operating in the state will be responsible for addressing the funding gap through mandated assessments linked to market share. As a result, insurers would likely consider their potential exposure to FAIR Plan assessments when determining their appetite for offering their own coverage, which could lead them to limit the amount of coverage that they offer. Insurers are also likely to pass on assessment costs to their policyholders, with potential implications for affordability, and potentially for the insurer if any supplemental fees to be imposed on policyholders do not receive approval from the regulator. In the aftermath of the Los Angeles wildfires, at least 40 insurers filed requests to recoup a portion of their FAIR Plan from policyholders (Kiriluk-Hill, 2025^[50]).

For other natural hazard risks, such as floods and earthquakes, the establishment of public-private insurance programmes has supported the availability of affordable insurance coverage. Public-private insurance programmes have been established in a number of wildfire-exposed countries, including Australia, France, Indonesia, Italy and Spain, although none of these programmes provide coverage for wildfire risk.²⁷ However, the public-private insurance programme that provides basic coverage for earthquake risk in Türkiye will soon expand to include coverage for other natural hazards, including wildfire risk (Bahar, 2024^[51]).

The California Department of Insurance has taken additional regulatory measures to support insurance availability.²⁸ In the context of regulatory changes allowing for the incorporation of catastrophe modelling

assessments²⁹ and reinsurance costs³⁰ in premium-setting, the California Department of Insurance has included a requirement that insurers increase the availability of private insurance market coverage in areas defined as “distressed areas”.³¹ The regulations require that insurers that wish to incorporate these factors into their premium rates commit to maintaining at least 85% of their state-wide market share³² in areas identified as “distressed areas” or achieving that by increasing the coverage they provide in those areas by at least 5% every two years (CDI, 2024^[52]; CDI, 2024^[53]). Since the implementation of the regulation, a number of insurers have requested approval for premium rate increases accompanied by commitments to expand coverage and/or depopulate the FAIR (Hallo, 2025^[54]; Kiriluk-Hill, 2025^[55]; Kiriluk-Hill, 2025^[56]).

Significant demand for insurance coverage in high-risk areas in the United States has also led to insurance sector innovation in risk assessment and product design. Improvements in the quality and availability of earth observations imagery and the development of new tools based on artificial intelligence and machine learning are providing the insurance sector with improved capacities to model wildfire risk and assess the effectiveness of risk reduction measures. Insurance companies and specialised modelling firms can now combine satellite and aircraft imagery with data on building permits, tax assessments and real estate transactions to develop a detailed digital rendering of the physical environment. Data and imagery from historical events can then be used to examine the impact on individual structures and identify the specific factors that drive the susceptibility of structures to fire. These factors can then be used to assess risk at the level of individual buildings by considering the probability that the community might face a wildfire and then the probability that the specific property might be damaged. It also provides a means for continuous monitoring of the implementation of risk reduction and maintenance measures over time.

Insurers are using these advances in wildfire risk models to identify lower risk households within high-risk areas, based on factors such as the distance between individual structures, the susceptibility to ember access through eaves and vents, and whether the area surrounding the home is clear of vegetation that could become fuel that spreads the fire (Watkins and Russell, 2025^[57]). Insurers and insurance sector service providers are using these advanced modelling approaches to provide more granular risk assessment, develop detailed scoring systems on structural vulnerabilities, and offer tailored risk reduction advice that enhances the availability of insurance in high-risk areas through better risk selection (STAND, n.d.^[58]; Faura, n.d.^[59]). According to one coverage provider, 65% of the homes classified as high risk in California could be reclassified as medium or low risk through more granular risk assessment (Dopp, 2025^[60]).

The insurance sector is also developing new types of products that could support the availability of coverage, particularly parametric insurance coverage.³³ Parametric insurance that makes payments based on the occurrence of a covered event, without the need for property-level loss adjustment, can potentially lead to lower premium costs based on reduced underwriting and loss adjustment expenses. Parametric coverage could contribute to protecting households and businesses against wildfire risk given that structures impacted by wildfires tend to be a total loss, and therefore full payments could be made to all policyholders impacted by a fire as they likely suffered a total loss. In the US state of California, excess and surplus line insurers³⁴ offer parametric coverage based on a “fire-at-location” trigger, acquired mostly by homeowners’ associations, golf courses, wineries and other institutional and commercial entities, although there have been some reports of increasing interest in this form of coverage since the early 2025 wildfire in the Los Angeles region (Laman, 2025^[61]; Lerner, 2025^[62]). In some countries, such as Chile, insurance regulators have introduced a legislative and regulatory framework to support the development of parametric insurance coverage options (for all types of perils).³⁵ However, the potential for basis risk (i.e. the risk that payments made under a parametric coverage vary significantly from the actual losses incurred) as well as challenges in confirming the cause of a fire could be impediments to the market’s development. The availability of new data sources and analytical tools could support improvements in the design of parametric wildfire coverages that reduce basis risk.

4.3.2. Improving the affordability of wildfire insurance coverage

Households and businesses that have significant exposure to wildfire risk could face premium costs that are unaffordable where insurance companies apply risk-based pricing. This appears to be a greater concern in Australia, Canada and the United States where affordability challenges have arisen and some households have faced premium costs equivalent to a significant share of household income (Figure 4.6).

Insurance companies in most countries have flexibility in establishing the premium rates that they apply to the coverage they provide. For example, in the European Union, insurance regulators are not allowed to interfere with insurer decisions on premium-setting. In Canada, no restrictions on property insurance pricing are imposed (IBC, 2025^[63]). However, some other jurisdictions impose some controls on premium pricing. In Indonesia, for example, premium rates for households and commercial property insurance are subject to a minimum and maximum rate as a share of sum insured (OECD, 2023^[64]). In the United States, a number of states require insurers to seek prior approval of premium rates or the approach to premium rates that they will apply, including in wildfire-prone states such as California, Nevada and Washington (APCIA, 2022^[65]).

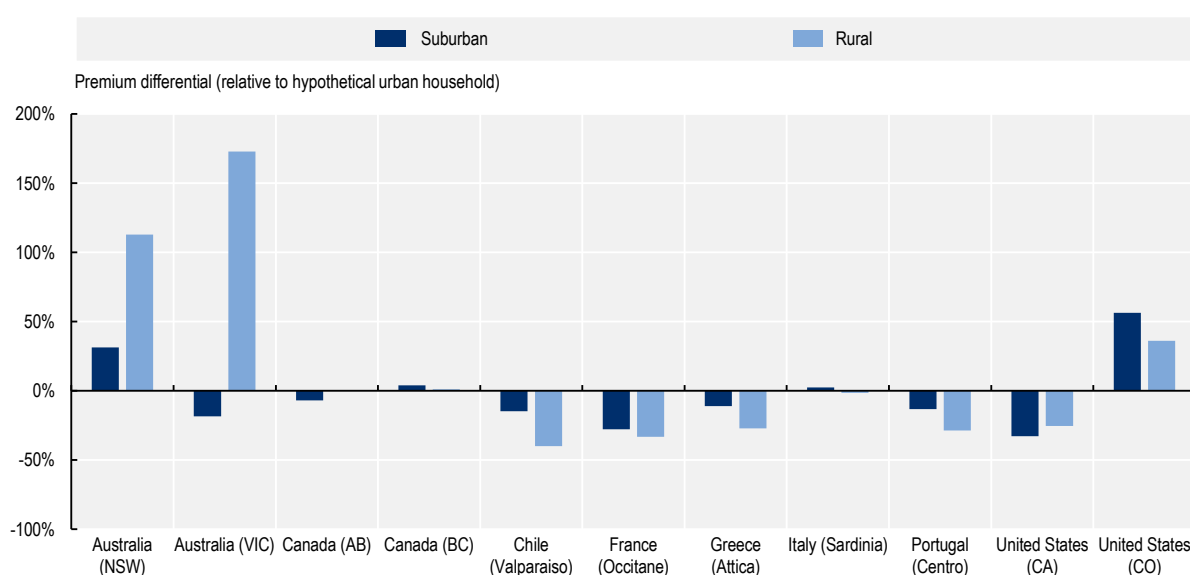
Controls on premium rates could directly impact affordability if applied to ensure that unaffordable premiums rates are not imposed by insurers. However, if insurers are unable to charge premium rates commensurate with the level of exposure they are assuming, they will likely choose not to offer any coverage at all (APCIA et al., 2022^[66]). Regulatory requirements for prior approval or other requirements that impact rate-setting flexibility could also reduce the entry of new capacity providers (Cotality, 2025^[10]).

A more sustainable approach to supporting affordability is to invest in risk reduction and adaptation. There are a number of measures that governments, businesses and households can take to reduce the risk of damaging wildfires, which should support insurance affordability. For example, land-use planning could limit development in the wildland-urban interface in order to reduce the potential for ignitions near populated areas and ensure sufficient space between structures in order to reduce the potential for urban conflagration. Building code improvements that incorporate non-combustible, or less combustible, building materials can greatly increase the ability of homes to survive a wildfire. For example, one insurance service provider's analysis of the 2025 wildfires in the Los Angeles region found that 80% of the structures in the impacted areas that were built with non-combustible materials survived the fires while 80% of those built with combustible materials were destroyed (Shavel, 2025^[67]). Efforts by homeowners and businesses to clear vegetation in areas surrounding buildings (i.e. creating defensible space) could reduce the risk of losses by 20%, based on data from home inspections in California (Nichols Schwartz, 2025^[68]), and potentially double a structure's chance of survival, based on evidence from historical California wildfires (Arrowsmith, Dube Fortier and Cope, 2021^[69]). A combination of sufficient structure spacing, defensible space, and fire-resistant materials and ignition resistance have been found in various post-event studies as significant factors in reducing risk and explaining why some structures survived in neighbourhoods that were otherwise destroyed (Nichols Schwartz, 2025^[68]; Arrowsmith, Dube Fortier and Cope, 2021^[69]; Westhaver, 2017^[70]; Zamanialaei et al., 2025^[71]).

Given that structures themselves are fuel for wildfires and can exacerbate their spread, important benefits could also be derived by ensuring resilience at the community-level (Watkins, Brinkmann and Siddique, 2025^[11]). For example, one study of the impacts of updated building codes on wildfire damage in California found that newer structures not only demonstrated a better chance of survival but also improved the probability that neighbouring homes also survived (Baylis and Boomhower, 2021^[72]). The town of Paradise in California, which was almost completely destroyed by the 2018 Camp fire, is being rebuilt with fire-resistant roofs, screened vents to block the entry of embers and substantial defensible space. While the town remains in a high-risk area, that has been subject to almost continuous moratoriums on insurance non-renewals because of nearby fires, insurance companies are once again offering coverage based on the improvements in community resilience (Kiriluk-Hill, 2025^[73]).

The application of risk-based pricing and the offering of premium discounts can encourage policyholders to implement these types of investments in risk reduction (APCIA, 2022^[65]), particularly where premium costs are high. However, insurers in many wildfire-prone jurisdictions, including in Canada, Chile, France, Greece, Italy and Türkiye,³⁶ are not always imposing higher premiums when covering higher-risk homes. Figure 4.6 provides estimates of the premium differential for the suburban and rural households that would usually be expected to face higher exposure to wildfire risk relative to households in urbanised areas. In most countries, the difference in premium rates charged by insurers appears to be small and premium rates tend to be lower in rural and suburban areas, relative to urban centres. This could reflect differences in exposure to other perils covered by household property insurance, such as crime or vandalism. In some cases, it could also reflect the risk of urban conflagration fires. However, it also suggests that differences in wildfire risk exposure are not always accounted for in premium rates in many countries.

Figure 4.6. Premium differential between urban, suburban and rural households



Note: OECD calculations based on available online insurance premium offers in the identified regions for hypothetical homes located in a central urban area, two suburban areas adjacent to forested land and a high-risk rural location. The premium costs reflect the average for each household type in each area and were transformed into cost per 1 000 in coverage. The premium differential is calculated as the percentage difference in premium cost for the hypothetical suburban and rural households relative to the hypothetical urban households in each area.

A limited examination of online premium offers indicates that insurers in Australia and the US state of Colorado are differentiating premiums based on the difference in potential exposure to wildfire risk in rural, suburban and urban areas. In those jurisdictions, hypothetical suburban and/or rural households, located in wildfire-prone areas and adjacent to a forest, seem to be facing higher premiums than households located in urban centres. In Australia, at least one insurer offered premium rates for hypothetical rural homes that were 15-16% and 30-34% higher if structures were less than 100 meters and 16 meters away from grassland or bushland, respectively.

There are a number of other reasons, beyond regulatory controls on pricing, why insurance companies may be reluctant to apply risk-based premiums (OECD, 2023^[74]). Insurance companies may not have the necessary data and tools to assess risk at a granular level. While better data and analytical tools are helping some insurers improve their ability to assess risk at the level of individual properties, the availability of the catastrophe models used by insurers to underwrite and price coverage and manage exposure is limited. Catastrophe models developed by the main commercial modelling firms and international brokers

are only available in Australia, Canada, Mexico and the United States (Insurance Development Forum, 2025^[75]; Karen Clark & Company, 2025^[76]).

Insurers may be also reluctant to provide lower premiums if there is significant uncertainty about the effectiveness of the risk reduction measure in reducing losses (APCIA, 2022^[65]) or whether households and businesses have properly implemented those risk reduction measures. For example, one review of the implementation of home hardening and defensible space requirements in the US state of California found that few of the households examined had fully implemented compulsory or recommended mitigation actions (Wilkin, Benterou and Stasiewicz, 2025^[77]). There are likely to be specific concerns related to the implementation of defensible space measures given the need for property owners to undertake regular landscaping in order to ensure that areas surrounding the structure remain clear of flammable materials.

The insurance sector is supporting several initiatives to develop specific wildfire resilience standards applicable at both the structure and community-level. In the United States, the insurance sector has established the Insurance Institute for Business and Home Safety (IBHS) which has developed a “wildfire prepared home” certification available to households that implement specific measures related to fire buffers and non-combustible materials (IBHS, 2024^[78]) as well as a “wildfire prepared neighborhood” standard that helps communities reduce the probability of ignitions in adjacent areas and limit fire spread within the community (IBHS, 2025^[79]). In Canada, the national FireSmart programme has outlined a set of development standards, based on the IBHS standards, to reduce wildfire risk through good design practices in roofing materials, vents, eaves, landscaping and outdoor structures (FireSmart, 2019^[80]). Studies using past and modelled events have demonstrated the effectiveness of these standards in supporting survivability (Westhaver, 2017^[70]) and the costs and benefits of implementing these standards in different communities (Czajkowski et al., 2020^[81]).

Efforts are also under way to develop tools to help homeowners undertake their own assessments of wildfire risk and identify measures to improve that risk. For example, in Australia, the Resilient Building Council, with support from the government and the insurance sector, has developed a Bushfire Resilience Rating Home Self-Assessment App that can help households assess their own risk and identify measures to become more resilient (Department of Home Affairs, 2024^[82]). A private sector company in the United States has developed a similar product that will allow households to assess their exposure to wildfire risk and possible actions to mitigate that risk (FireBreak, n.d.^[83]).

The insurance regulators in some US states are requiring insurers to provide premium discounts for risk reduction measures. In the US state of Colorado, recent legislation requires that insurers must recognise property-level and community-level mitigation action and designations when underwriting and pricing insurance coverage, either through models that incorporate risk mitigation or, where risk mitigation is not incorporated into models, by establishing and publishing a list of available discounts and premium reductions (Colorado General Assembly, 2025^[84]). The legislation also requires insurers to provide notice to policyholders annually on the assessment of policyholder risk that was used for pricing and possible mitigation actions that can be taken (Colorado General Assembly, 2025^[84]). Similarly, in the US state of California, the catastrophe models approved for use by insurers in underwriting and pricing coverage must account for mitigation efforts by homeowners, businesses and communities (CDI, 2024^[52]). In addition, the “Safer from Wildfires” regulation requires that, if their premium rates vary based on wildfire risk, insurers must also recognise the risk reduction benefits of a set of community-level mitigation designations, such as Fire Risk Reduction Community and Firewise USA Site in Good Standing, and property-level risk mitigation measures such as clearing of vegetation, debris and combustible materials, and building hardening measures applied to roofs, eaves, vents and windows (Hallo, 2025^[54]; Kiriluk-Hill, 2025^[55]; Kiriluk-Hill, 2025^[56]; CDI, 2022^[85]).

Similar efforts are being implemented in other US states. The US state of Arizona has set up a Resiliency and Mitigation Council that is mandated to identify strategies to mitigate potential losses (Arizona Department of Insurance and Financial Institutions, 2024^[25]). A similar working group has been established

in the US state of Washington to provide recommendations on wildfire mitigation and resiliency standards (Office of the Insurance Commissioner, 2025^[86]). In the US state of Oregon, recent legislation requires the insurance regulator to work with state fire and forestry officials and representatives from insurance companies to develop recommendations to reduce wildfire risk and improve the availability of affordable insurance, including through premium discounts and other incentives for risk reduction through insurance (Nesteroff, 2025^[87]).

Insurers in the United States are offering discounts for risk reduction measures taken by policyholders. A recent review of premium rate submissions to the California Department of Insurance found that insurers are offering a range of discounts for specific property-level mitigation measures and for compliance with property and community standards (Kousky and You, 2025^[88]). The level of discounts varied across different types of measures and among different insurers, and were sometimes relatively limited. The most significant discounts are offered for compliance with IBHS property-level standards and the Fire Risk Reduction Community and Firewise USA Site in Good Standing community designations (Kousky and You, 2025^[88]). Some insurers are also offering more significant additional “completion” discounts for implementing multiple measures, highlighting the importance of a comprehensive approach to wildfire risk reduction (Kousky and You, 2025^[88]). Insurers are also reportedly offering premium discounts in Australia and Canada, including premium discounts to encourage the use of the tools and standards described above. For example, in Australia, two insurers agreed to provide discounts to households that complete an assessment using the Bushfire Resilience Rating Home Self-Assessment App and implement recommended actions (Department of Home Affairs, 2024^[82]). In Canada, insurers are offering premium discounts to households that implement the FireSmart measures (IBC, 2025^[63]).

Some households and businesses may not have the financial means to implement significant risk reduction measures. Governments can establish funding programmes to support risk reduction investments by households and businesses or even communities. In the US state of California, the insurance regulator is administering a California Safe Homes programme, established to provide grants to households and communities to improve wildfire resilience and insurability (CDI, 2025^[89]). Local governments in the Canadian province of Alberta have also provided grants to support household risk mitigation, based on FireSmart assessments and mitigation recommendations, in areas facing high exposure to wildfire risk (IBC, 2025^[90]). A number of the residual insurance arrangements in US states exposed to hurricanes also offer grant programmes to support mitigation (Environmental Defense Fund and Cornell University, 2025^[91]).

Rebuilding in the aftermath of a wildfire offers a cost-efficient opportunity to improve wildfire resilience. One analysis of the cost of rebuilding a home in the US state of California found that rebuilding to be consistent with the requirements of Part 7 of the California Wildland Urban Interface Code, which is the building standard applicable in high-risk areas, would increase reconstruction costs by less than 3% (based on a USD 500 000 reconstruction cost) and by approximately 3% for rebuilding to the IBHS “wildfire prepared home plus” standard (Barrett and Hawks, 2025^[92]). Insurers could potentially offer an endorsement (i.e. add-on) on property insurance that would pay for the additional costs of more resilient reinstatement (OECD, 2023^[74]; Kousky, 2025^[93]). In some hurricane-exposed US states, insurers are required to offer this type of endorsement in order to improve resilience to hurricane risks (Kousky, 2025^[93]). Some insurance companies in Canada are offering these types of endorsements although take-up by policyholders has been limited (IBC, 2025^[63]).

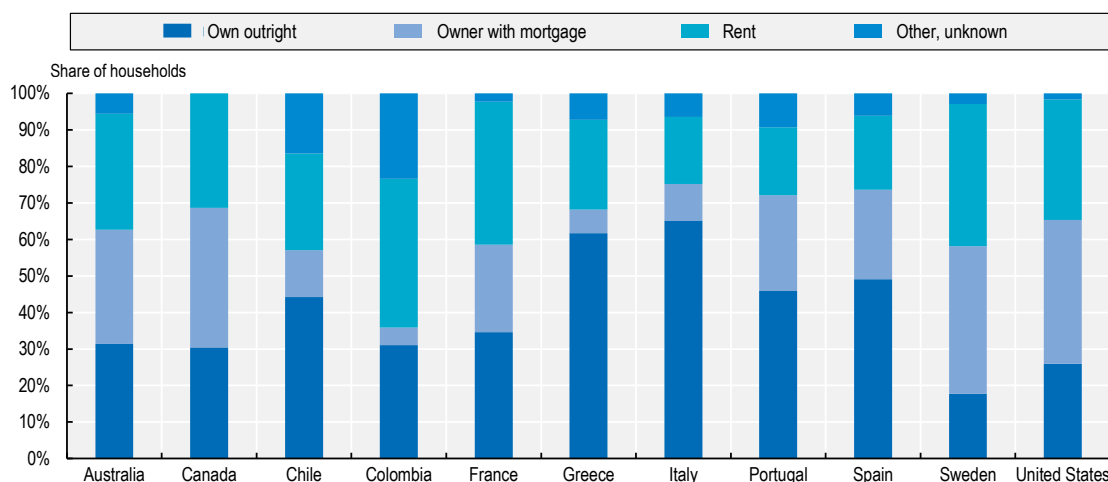
Implementing risk reduction and resilient reinstatement measures is also dependent on the availability of the needed fire-resistant building materials and service providers with the necessary expertise. Addressing gaps in the availability of needed materials, supplies and expertise through workforce development, certification programmes, supply chain monitoring and other measures is critical to ensuring that the measures needed to support insurance affordability can actually be implemented.

4.3.3. Enhancing the take-up of insurance coverage

In a number of wildfire-exposed areas, the most significant impediment to broad insurance coverage of wildfire losses appears to be limited take-up of coverage (e.g. Chile, Colombia, Greece, Türkiye and some regions within Portugal). Take-up of insurance coverage that is generally available and affordable may be low if households and businesses attach limited value to acquiring insurance coverage. This may be the case if, for example, they perceive themselves to have limited exposure to wildfire or other covered risks or if they expect to receive financial assistance from government should they be impacted by a wildfire. Efforts to increase wildfire risk awareness and insurance literacy can contribute to increasing demand for coverage. Limiting the availability of public financial assistance or compensation for those that had access to affordable insurance, and ensuring that households and businesses understand those limitations, would counteract what could otherwise be a significant disincentive to acquiring insurance coverage.

Lenders in many countries require households to acquire property insurance coverage as a condition for extending mortgage finance. This includes lenders in Australia, Canada, Chile, France, Greece, Italy, Portugal, Spain and the United States. As noted, property insurance almost always includes coverage for wildfire risk. This has generally led to broader coverage, particularly in countries and regions where the share of households with outstanding mortgages is high, such as Australia, Canada and the United States (Figure 4.7). Mortgage-related requirements are likely to be less effective in achieving broad coverage in regions where households own their homes outright, including in some of the rural areas that are most exposed to wildfire risk and where lower property values likely means fewer homes with outstanding mortgages.

Figure 4.7. Housing tenures in wildfire-exposed countries (2024)



Note: The share of households in Chile that have outstanding mortgages and are subject to a requirement to have fire (and earthquake) insurance coverage may be higher than the estimate included in the chart (12.8%). According to the *Comisión para el Mercado Financiero*, which oversees a bidding process for insurance coverage associated with mortgage loans, approximately 18.8% of households have outstanding mortgages.

Source: OECD (2025^[94]), *OECD Affordable Housing Database*.

Governments could consider establishing requirements for households and/or businesses to acquire insurance coverage for wildfire risk. In some countries (e.g. France and Portugal), households that reside in multi-unit (“horizontal”) residential buildings are required to have property (fire) insurance coverage. However, multi-unit residential buildings are likely to be more prevalent in urbanised areas that are less exposed to wildfire risk. In Türkiye, households within municipal boundaries are required to purchase the

basic coverage for earthquake risk provided by the public-private insurance programme. The mandatory purchase requirement, which is enforced by banks and utility providers, appears to have led to higher take-up of coverage.³⁷ The expanded coverage that will include other natural hazard risks, including wildfire risk, will be designed to provide coverage in village areas as well as municipalities which should support broader coverage for those most exposed to wildfire risk.

In Greece, business with revenues above EUR 500 000 are now required to have insurance coverage for floods, earthquakes and forest fires, while all motor vehicle owners are required to have coverage for floods and forest fires. Businesses must have insurance that covers at least 70% of the value of assets while motor vehicles must be covered for their full market value. Businesses that fail to comply with the requirement may face a EUR 10 000 administrative fine for non-compliance and state aid will not be available for uninsured businesses and motor vehicles. However, businesses that receive two denials of coverage from insurance companies are exempt from the insurance requirement for two years, and can be permanently exempted from the requirement if they receive two denials again when re-applying after the initial two years (Issaias, Theodoraki and Karakatsani, 2025^[95]). A mandatory insurance requirement for natural hazard risks has also been implemented in Italy for businesses. The requirement applies to the purchase of insurance coverage for flood, earthquakes and landslides but not wildfire (Tayel, 2025^[96]). However, as coverage for these natural hazard risks is usually added to property insurance that would normally include coverage for wildfire risk, take-up of property insurance coverage is also likely to increase. Similar to the case of Greece, businesses that do not comply with the mandatory purchase requirement will be ineligible for state aid (Tayel, 2025^[96]). In Greece, owners of residential properties benefit from a reduction in property tax if their property is insured against natural hazards (i.e. earthquakes, forest fires and floods).

While mandatory insurance for wildfire risk could potentially increase the level of financial protection, such measures would not automatically reduce wildfire risk unless accompanied by measures to reduce the potential for fire ignition and spread. Mandatory insurance requirements with insurance coverage that applies risk-based premiums could incentivise risk reduction but could also leave many households or businesses with an insurance purchase obligation that they cannot afford.

4.4. Conclusion

Increasing wildfire risk, driven by development in the wildland-urban interface and weather conditions more conducive to fire ignition and spread, have led to a dramatic increase in wildfire losses in the last decade. While many countries are exposed to wildfire risk, the risk is concentrated in a few countries with long fire weather seasons and significant populations and structures located in the wildland-urban interface. Unlike some other natural hazard risks, coverage for fire risk is a standard inclusion in property insurance coverage in many countries. As a result, insurance in countries with high levels of property insurance take-up has generally absorbed a significant share of past losses. However, increasing losses have led to challenges in accessing affordable property insurance coverage in a number of regions.

Some highly exposed jurisdictions have taken steps to enhance the availability of property insurance coverage. In many wildfire-prone US states, residual insurance arrangements have provided an increasing share of the coverage for high-risk households and businesses, although the coverage provided is usually limited and expensive. Significant demand for coverage, driven by the broad applicability of mortgage-related insurance requirements in some regions, has led to insurance sector innovation in risk assessment and product design that has expanded availability for lower risk policyholders in high-risk regions. In the US state of California, the insurance regulator has also negotiated a requirement for insurers to offer more coverage in high-risk areas in exchange for flexibility in incorporating catastrophe model estimates and reinsurance in premium pricing.

Addressing affordability challenges is usually more difficult as attempts to suppress premium prices are likely to lead to insurer withdrawals and limit availability. The most sustainable approach to long-term affordability is to invest in risk reduction and adaptation. Risk-based premiums can provide incentives for household and business investment in risk reduction although insurers in some countries do not appear to be reflecting different levels of wildfire risk in premium-setting. For risk-based pricing to be an effective incentive for risk reduction, insurers must be willing to provide premium discounts for policyholders that make investments in risk reduction that can demonstrably reduce losses. The insurance sector is applying its risk management and modelling expertise to identifying effective risk reduction measures. In a few US states, insurance regulators are also requiring that insurers provide premium discounts for specific risk reduction measures. Holistic investments that incorporate home hardening, defensible space and community-level mitigation measures appear to be the most effective in reducing losses and receive the most significant premium discounts from insurers.

Requirements to purchase insurance against wildfire risk could enhance the take-up of insurance, particularly if applied in the rural areas where exposure is high and mortgage-related insurance requirements are not broadly applicable. However, mandatory insurance requirements will only have an impact on reducing wildfire losses if accompanied by measures to encourage or require investments in risk reduction.

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Notes

¹ Burned areas can also have implications on exposure to flood risk as the loss of vegetation can limit water absorption and increase run-off, with the potential to lead to flash flooding and land and mud slides.

² Between 2015 and 2024, average annual economic losses in OECD Member and accession candidate countries reached USD 11.2 billion, relative to USD 2.4 billion for the period 2000-2014 (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.). OECD Members and accession candidate countries are: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece.

Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Thailand, Türkiye, the United Kingdom and the United States.

³ Wildland urban interface areas refer to areas where the built environment (homes, businesses) and wild vegetation such as forest and grasslands converge (OECD, 2023^[3]).

⁴ In some countries, such as Portugal and Spain, vegetation growth in rural areas, particularly on land that has been abandoned, has been an important source of wildfires although wildfires in rural areas are less likely to result in significant economic losses due to lower asset exposure.

⁵ Changes in climate conditions are expected to lead to: (i) heavier or longer duration seasonal precipitation can increase the accumulation of burnable fuel; (ii) higher temperatures (including heat waves), longer periods of limited precipitation or drought as well as the spread of plant diseases can lead to the availability of dry fuel that is more susceptible to being burned and facilitate fire spread (which is also exacerbated by stronger winds expected as a result of climate change); and (iii) increasing storm activity could lead to more lightning and the potential for more frequent natural ignitions (OECD, 2023^[3]; Chen et al., 2024^[9]).

⁶ Several other OECD Member and accession candidate countries are exposed to wildfire risk and have faced significant wildfires in recent years. For example, a wildfire in November 2025 impacted 2 800 hectares in New Zealand's Tongariro National Park (Withers, 2025^[103]). In the context of unseasonably high temperatures and dry conditions in February and March 2025 in Japan and Korea, both countries faced large and destructive wildfires (Barnes et al., 2025^[104]; Climate Central, 2025^[105]; Wade, 2025^[106]).

⁷ As a share of national GDP, economic losses have been highest in Australia, Chile and Portugal (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.) and Gross domestic product (2023), current prices (USD) from IMF (2024^[97])).

⁸ The chapter focuses on specific regulatory and supervisory approaches to addressing the availability of affordable wildfire insurance. In the United States, these efforts are consistent with a broader state-level response under the National Association of Insurance Commissioners' National Climate Resilience Strategy for Insurance, developed by the Climate and Resiliency (EX) Task Force.

⁹ Property insurance penetration, measured as premiums as a share of GDP, is an imperfect measure of the take-up rate of insurance coverage. Data on take-up of insurance coverage was not available for all countries.

¹⁰ Some insurers have suggested that requirements to treat "wildfire" as part of standard "fire" coverage have a negative impact on availability by preventing insurers from offering different terms for wildfire coverage.

¹¹ The Valparaíso region experienced devastating wildfire in 2024. Only 15% of the homes damaged by this fire had insurance coverage as many of the affected areas were located on a hillside that was deemed to be at high-risk and as many of the households in the area were modest- or low-income households who likely had limited funds to acquire insurance.

¹² This review involved seeking insurance offers and premium estimates for hypothetical homes located in or near Valparaíso, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in September 2025.

¹³ This review involved entering data for a hypothetical rural home (principal home of 100 square meters) located in two high-risk rural locations (Isna and Malcata) and three lower-risk rural locations (Campo Maior, São Brás de Alportel and São Cristóvão) into the online simulation tools to calculate premium prices provided by three insurance companies active in Portugal (chosen based on access to a simulation tool). The review was undertaken in April 2023.

¹⁴ This review involved seeking insurance offers and premium estimates for hypothetical homes located in or near Coimbra, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in September 2025.

¹⁵ The review involved entering data for hypothetical homes into online insurance coverage simulation tools to calculate premium prices provided by various insurance companies active in California (chosen based on access to a simulation tool). The homes were all located in the community of Ventura, California which is surrounded by forested areas that have been affected by wildfires. The locations included (centrally-located) urban homes as well as homes located adjacent to a forested area. Online premium quotes were available from all insurers for one of the central urban addresses but only one online premium quote was available for one of the homes adjacent to a forested area (and none for the other).

¹⁶ This review involved seeking insurance offers and premium estimates for hypothetical homes located in or near Santa Rosa, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in November 2025.

¹⁷ This review involved seeking insurance offers and premium estimates for hypothetical homes located in or near Boulder, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in November 2025.

¹⁸ Policyholders that are not required to hold full reconstruction cost insurance coverage could choose a high deductible or an insured limit that is lower than their home's predicted reconstruction cost in order to reduce their premium.

¹⁹ Direct loss components refer to the premium amount collected to specifically cover direct insurer losses (i.e., net of taxes, duties, profit margins, net cost of reinsurance and insurer expenses). For comparison, almost 30% of the direct loss components of premium costs were accounted for by cyclone risk in the Northern Territory (Paddam et al., 2024^[26]).

²⁰ This review involved seeking insurance offers and premium estimates for hypothetical homes located in the Blue Mountains area of New South Wales and the Yarra Ranges in Victoria, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in September 2025.

²¹ This review involved seeking insurance offers and premium estimates for hypothetical homes located in Fort McMurray in Alberta and Williams Lake in British Columbia, including: (i) a central urban area; (ii) two suburban areas adjacent to forested land; and (iii) a high-risk rural location. The review was undertaken in September 2025.

²² In the United States, households are more likely to have an outstanding mortgage which means that insurance coverage against fire, including wildfire, risk is required. As a result, lack of access to insurance coverage could have more significant implications for housing markets in the United States.

²³ Unlike many other types of Public-Private Insurance Programmes, residual insurance programmes in the United States do not benefit from financial support from governments. These programmes generally rely on reinsurance as well as post-event financing and assessments to address extreme losses beyond their capacity. The assessments are usually paid by all policyholders, therefore creating a cross-subsidy between low-risk policyholders and the high-risk policyholders that depend on residual insurance programme coverage (Kousky and Friedrich, 2025^[48]).

²⁴ The FAIR Plan in Colorado was established in 2023 to specifically address challenges in the availability of insurance coverage for wildfire and hail risk (Kousky and Friedrich, 2025^[48]).

²⁵ There are also reported discussions or inquiries into the establishment of residual insurance arrangements in the US states of Idaho, Montana, Nevada and Utah (Jablonski, 2025^[44]).

²⁶ In the fiscal year ending in 2024, the total value insured reached USD 429 billion in California compared to USD 41 billion in 2010. In New Mexico, the total value insured reached USD 950 million compared to USD 69 million in 2011. In Washington, the total value insured reached USD 176 million compared to USD 18 million in 2010. Based on PIPSO data published in (III, 2025^[45]).

²⁷ In France, Italy and Spain, the public-private insurance programmes provide coverage for many natural hazard risks although not for wildfire risk. In Australia, the programme is focused on cyclone-related risks. In Indonesia, the programme is focused on perils on earthquake, tsunami and volcanic eruption risks.

²⁸ On numerous occasions, the regulator has also imposed one-year moratoriums that prevent insurers from cancelling coverage in areas affected by a wildfire, including at least three times during the 2024 fire season (Insurance Journal, 2024^[110]; 2024^[98]; 2024^[99]) and twice in 2025, including for those impacted by the wildfires in the Los Angeles area (CDI, 2025^[111]; 2025^[112]).

²⁹ The California Department of Insurance will examine models before enabling their use in premium-setting (CDI, 2024^[52]). At the time of writing, three wildfire risk models have been approved for use in establishing premium rates in California (Saleh, 2025^[108]; Verisk, 2025^[109]; KCC, 2025^[115]).

³⁰ Currently, under requirements included in electoral Proposition 103 of 1988 (*Insurance Rate Reduction and Reform Act*), insurance companies are generally only able to consider historical losses for the purposes of setting rates (with some exceptions).

³¹ The California Department of Insurance has developed a mapping of areas (at zip code level) where there are indicators of stress in the availability of affordable wildfire insurance coverage (CDI, 2024^[107]). The Department used individual property wildfire risk scores, data on the share of California FAIR Plan policies in the community and information on premium costs relative to income to identify “wildfire distressed areas”.

³² An individual insurance company would commit to achieve 85% of its state-wide market share coverage in distressed areas. For example, if the company has a 10% market share across California, it must achieve an 8.5% market share in distressed areas.

³³ In 2025, the OECD Working Party on Insurance and Pensions launched a project aimed at examining the potential contribution of parametric insurance to enhancing financial protection while minimising risks to consumers.

³⁴ In the United States, excess and surplus insurers (or surplus line insurers) offer non-admitted coverage for specialised risks for which coverage is not available in the admitted market. Surplus line insurers are subject to regulatory requirements although are generally exempt from rate and form regulation and their products and policyholders are not protected through state guaranty funds (NAIC, 2025^[113]; Kelley and Kish, 2017^[114]).

³⁵ In some countries, insurance legislation or regulation may impede the ability of insurance companies to offer parametric insurance coverage, often due to a legislative requirement that insurance payments only be made based on actual loss. For example, in Chile, the introduction of parametric insurance has involved an amendment to legislation that was included in a 2023 Fintech Law and the development of regulations to establish a set of conditions for offering parametric insurance and the type of risks that can be covered.

³⁶ The basic coverage that will be provided through the expanded public-private insurance programme in Türkiye will apply a fixed premium structure for wildfire risk (Bahar, 2024^[51]).

³⁷ For example, an estimated 55% of households have basic earthquake coverage provided by the public-private insurance programme even though less than 30% of households have property insurance (Merkezi, 2025^[35]).

5 The design of flood risk insurance programmes

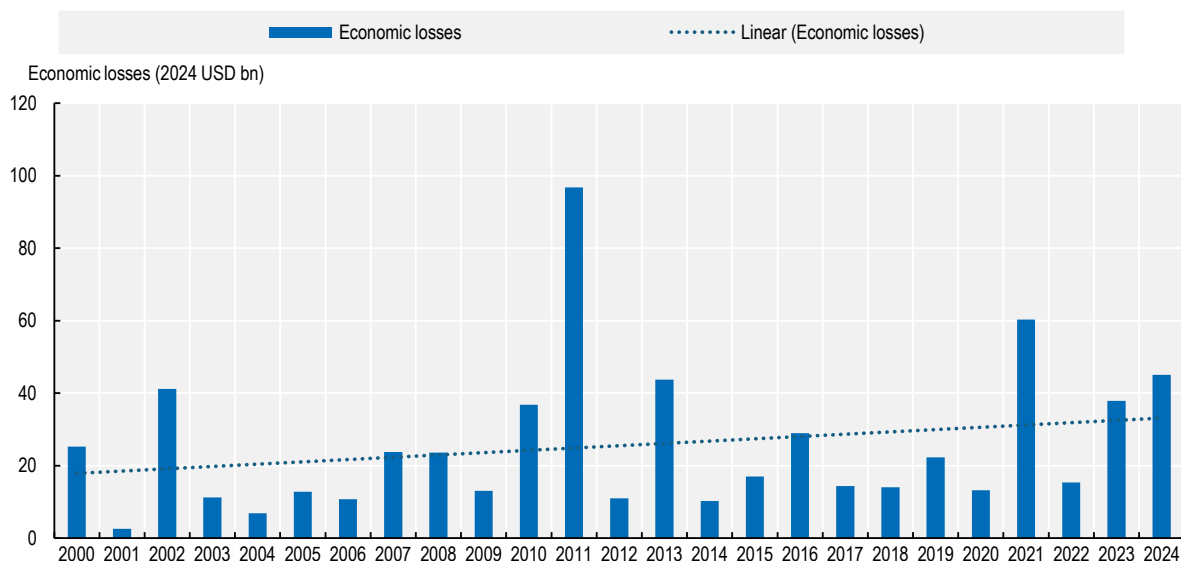
In the context of increasing losses from floods, a growing number of countries have, or are establishing or expanding, public-private insurance programmes to support the availability of affordable insurance coverage for flood risks. The design of these programmes differs in terms of the type and scope of coverage provided, role of the programme in the market and approach to premium pricing. This chapter examines the implications of different programme design choices on four important programme objectives: (i) achieving broad flood insurance coverage; (ii) leveraging private insurance sector expertise and capacity; (iii) minimising impacts on public finances; and (iv) encouraging and supporting flood risk reduction.

5.1. Introduction

Flooding occurs when there is an overflow of water that submerges normally dry land. There are different types of floods, including: (i) flash or pluvial floods that are usually caused by excessive and/or intense precipitation; (ii) riverine or fluvial floods that are caused by an overflow of water from a stream or river channel, usually caused by excessive precipitation or snowmelt; and (iii) coastal floods and storm surge, which are an abnormal rise in sea level that is usually associated with high winds due to a storm or cyclone (OECD, 2016^[1]).¹ Flooding can cause significant damage to buildings and contents. The infiltration of water can impact the structural integrity of buildings and damage electrical wiring. It can cause irreparable damage to flooring as well as to furniture, appliances and other contents, including as a result of the spread of mould. Riverine flooding can lead to long periods of water inundation, particularly in areas that are relatively flat. Floods in areas with varying elevations and storm surges can lead to high-velocity water flows that have the potential to result in more significant damages.

Economic losses resulting from floods have increased. Average annual economic losses from flood events in OECD Member and accession candidate countries were almost 78% higher in the first few years of this decade (2020-2024) relative to the previous five years (2015-2019), in constant 2024 USD, although this is likely the result of increases in both exposure and hazard (Figure 5.1).²

Figure 5.1. Economic losses from floods



Note: Includes all events classified as floods in the Swiss Re sigma database.

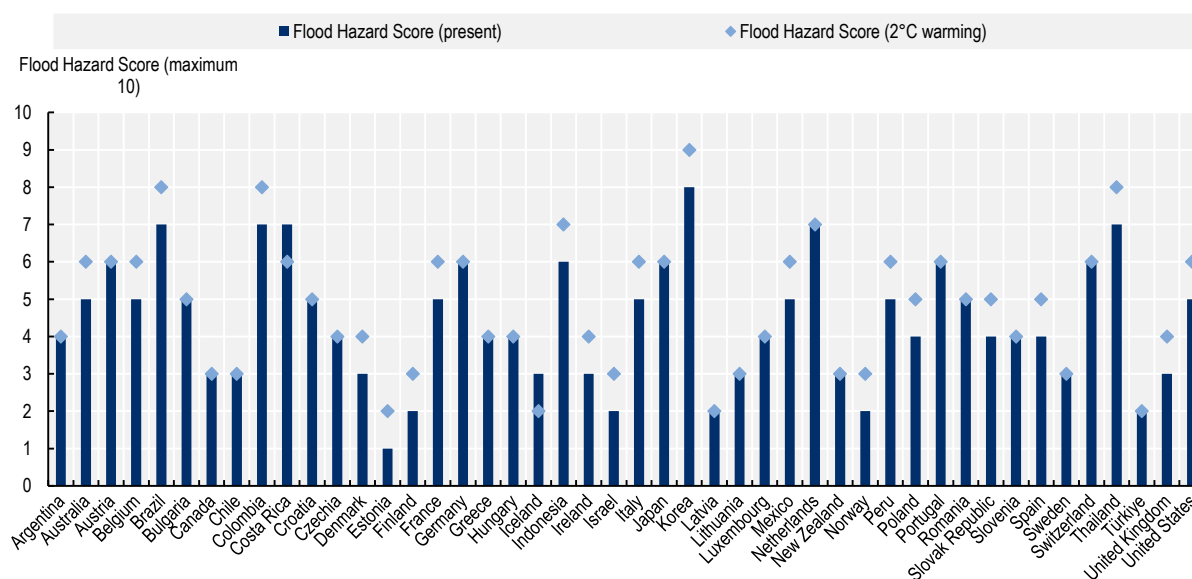
Source: OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

Continued development in high-risk areas could lead to increasing flood risk. One recent analysis using earth observation to identify changes in human settlement patterns found that there was continuous and rapid development in flood zones between 1985 and 2015 and that human settlement growth is much higher in the most hazardous flood zones in many regions (Rentschler et al., 2023^[2]).

More frequent severe precipitation, sea-level rise and other factors could increase the level of flood hazard in the future. Many OECD Member and accession candidate countries are expected to face increasing flood hazard under future climate conditions (Figure 5.2). One recent analysis found a high likelihood of climate-driven intensification of floods as well as convective storms and tropical cyclones (where exposed) in Central and Western Europe, including Austria, Czechia, Germany, Luxembourg and Poland, and in

East and Southeast Asia, including Indonesia, Japan, Chinese Taipei and Thailand (Banerjee et al., 2024^[3]). It also found a medium likelihood of hazard intensification in many other countries and regions, including Belgium, Brazil, Denmark, France, Ireland, Mexico, Norway, Switzerland, the United Kingdom and the United States (Banerjee et al., 2024^[3]). A number of regions have already faced an increase in heavy precipitation, including North America, Northern Europe and Central and Eastern Asia (Swiss Re sigma, 2023^[4]). The average annual number of very heavy precipitation days is projected to at least double in 28 of 46 OECD Member and accession candidate countries³ by 2080-2099, relative to 2020-2039, under an intermediate emissions scenario (Shared Socio-economic Pathway 2-4.5) (OECD, 2025^[5]).

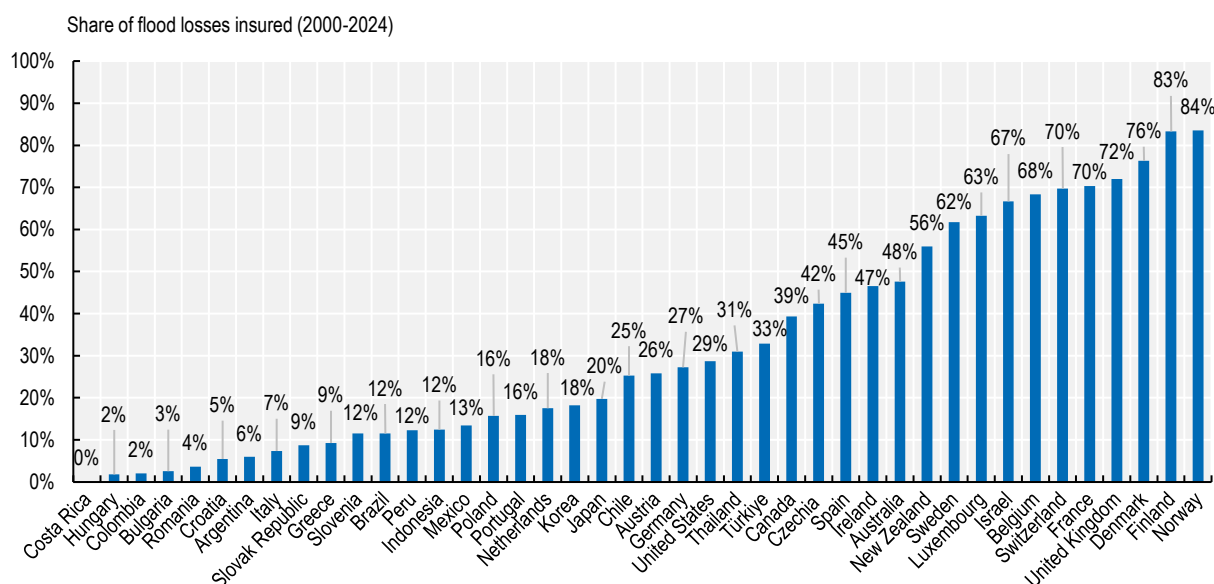
Figure 5.2. Flood Hazard Scores (present and 2°C of warming)



Note: Flood Hazard Scores refer to "Total" hazard scores reported by Marsh McLennan and calculated as the average of the hazard scores riverine (fluvial), coastal, and rainfall (pluvial) flooding. Hazard scores were calculated based on 100-year return period flood maps under present day climate and different future climate change scenarios.

Source: OECD calculations based on Total Flood Hazard Scores provided in the Marsh McLennan Flood Risk Index (Surminski et al., 2023^[6]).

The share of economic losses resulting from floods that is insured is low in many countries. Between 2000 and 2024, approximately 28-31% of reported economic losses from flood risks in OECD Member and accession candidate countries were insured (and approximately 32% in OECD Members).⁴ The share of flood losses that is insured is higher than in the case of earthquake losses but lower than the share of wildfire and storm losses insured. In 20 OECD Member and accession candidate countries, less than 20% of flood losses were insured. The insured share of flood losses equalled or exceeded 70% in only five OECD Members (Figure 5.3). The share of insured losses between 2020 and 2024 (35%) was higher than in 2010-2019 (29-30%) and 2000-2009 (23-27%), suggesting some progress in reducing financial protection gaps for flood risk.

Figure 5.3. Insured share of flood losses (2000-2024)

Note: Calculated as sum of insured losses (2000-2024) divided by sum of economic losses (2000-2024), including only events with both insured and economic loss estimates reported.

Source: OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

While flooding can occur almost anywhere, some communities and individual properties face very high exposure to flood risk due to their proximity to water bodies (seas or rivers) prone to overflowing.⁵ In countries where risk-based pricing is applied in setting premiums, some households and businesses may face unaffordable premiums due to the possibility that they will incur severe and/or frequent damage from flooding. High-risk households unable to afford coverage are at high risk of facing significant uninsured losses that are likely to be beyond their financial capacity to absorb. They could also face challenges in accessing financing as lenders increasingly take flood and other climate risks into account in lending decisions.⁶

Public-private insurance programmes can support the availability, affordability and take-up of insurance for flood and other natural hazard risks. Public-private insurance programmes that provide coverage for flood risks have been established, or are being established or considered, in at least 14 of 38 OECD Members.

This chapter provides an overview of the design features of these programmes and an examination of how these features impact four possible objectives for public-private insurance programme.^{7,8} Section 5.2 provides an overview of the design features of flood risk insurance programmes. The following sections assess how the different design features might impact the set of possible objectives for the establishment of a programme: (i) achieving broad coverage of flood losses (Section 5.3); (ii) leveraging (re)insurance and capital market capacity (Section 5.4); (iii) limiting public sector exposure to flood risk (Section 5.5); and (iv) supporting flood risk reduction and adaptation (Section 5.6). Section 5.7 concludes.

5.2. Design features in flood risk insurance programmes

A number of countries have established, or are establishing, public-private insurance programmes that provide compensation, insurance coverage or reinsurance for flood risks. Public private insurance

programmes⁹ that cover some flood risk have been established in Australia, Belgium, Denmark, France, Iceland, Italy, Morocco, New Zealand, Norway, Romania, Spain, Switzerland, United Kingdom and the United States. In addition, a programme is currently under consideration in Canada¹⁰ and an existing earthquake insurance programme in Türkiye¹¹ is being expanded to include coverage for flood risk. In some cases, these programmes provide coverage for a broad range of natural hazard risks, including flood risk. In others, the programmes are targeted specifically at flood and flood-related risks. In the case of Australia, the programme is targeted at cyclone risk and provides limited coverage for cyclone-related flooding. A description of these programmes is provided in Table 5.1.

Table 5.1. Public-private insurance programmes that cover some flood hazards

	Programme	Basic description
Australia ¹	Cyclone Reinsurance Pool (Australian Reinsurance Pool Corporation)	A reinsurance coverage offered by a state-owned reinsurer for cyclone-related flooding, including storm surge (as well as wind)
Belgium	Bureau de Tarification and Caisse(s) de Compensation	A co-insurance/pooling arrangement between insurers supplemented by government compensation for losses due to natural hazard risks
Canada	Currently under consideration	A reinsurance product to be offered by a state-owned corporation to support flood insurance availability
Denmark	Danish Natural Hazards Council	A compensation arrangement for storm surge and flood losses funded by a surcharge on property insurance policies
France	Caisse centrale de réassurance (CCR)	A reinsurance coverage offered by a state-owned reinsurer for natural hazard (and other catastrophe) risks
Iceland	Náttúruhamfaratrygging Íslands	A state-owned insurer for natural hazard risks
Italy	SACE (reinsurance) and voluntary industry co-insurance/pooling arrangement	A voluntary industry co-insurance/pooling arrangement for natural hazard risks with reinsurance available from a state-owned reinsurer
Morocco	Regime EVCAT and Fonds de Solidarité contre les Événements Catastrophiques	A co-insurance/pooling arrangement between insurers supplemented by a compensation fund for uninsured households funded by a surcharge on property insurance policies
New Zealand	Natural Hazards Commission	A state-owned insurer for earthquake and other natural hazard risks
Norway	Norsk Naturskadepool and Naturskadeordningen	A co-insurance/pooling arrangement established by the insurance sector for natural hazard risks supplemented by a compensation fund for uninsured losses
Romania	Pool-ul de Asigurare Impotriva Dezastrelor Naturale (PAID)	An insurance company established by the insurance sector to provide coverage for selected natural hazard risks
Switzerland	Public Insurance Companies for Real Estate/ Interkantonale Rückversicherungsverband/ Elementarschaden-Pool	In some cantons, public insurers that provide coverage for natural hazard (and other property) risks supported by a co-insurance/pooling arrangement. Private insurers operating in other cantons have established a separate co-insurance/pooling arrangement.
Spain	Consorcio de Compensación de Seguros	A state-owned insurer for natural hazard (and other catastrophe) risks
Türkiye	Doğal Afet Sigortaları Kurumu	A state-owned insurer for earthquake and, in the future, other natural hazard risks that is operated by a private entity.
United Kingdom	Flood Re	A reinsurance company established by the insurance sector to provide coverage for flood risk
United States	National Flood Insurance Program	A government insurance programme for flood risk

Note: ¹ The programme in Australia is focused on cyclone risk and includes some limited coverage for cyclone-related flood risk.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*, <https://doi.org/10.1787/338ba23d-en>; Kingdom of Belgium (2014^[8]), *Loi de 4 avril 2014 relative aux assurances*.

The objectives for establishing public-private insurance programmes differ slightly across countries. Some have been established to either ensure the availability of coverage for residential and/or commercial properties that are highly exposed to flood and/or other natural hazard risk(s) or address a broader lack of affordable insurance coverage for flood and/or other natural hazard risk(s). Some are focused on supporting solidarity across the country in responding to flood and/or other natural hazard losses. In some

countries, they have also been established as a mechanism for supporting other risk management objectives, such as incentivising effective management of flood or other natural hazard risks at national or local level.

5.2.1. Programme scope

The public-private insurance programmes that provide coverage for flood risks differ in terms of the scope of eligible perils and potential insureds.

Eligible hazards

Some programmes target multiple hazards while others are focused mainly on flood risk. The programmes established in Belgium, France, Iceland, Italy, Morocco, New Zealand, Norway, Romania, Spain and, in the future, Türkiye, provide coverage for multiple natural hazard perils. Others are more targeted towards providing coverage for flood or flood-related hazards, including the programmes in Denmark, the United Kingdom and the United States. In addition, some programmes limit the coverage provided to specific types of floods or flood damages (Table 5.2).

- In Australia, the programme provides coverage for cyclone-related flooding, including storm surge, as well as wind, which means that flood damage is only covered when linked to a cyclone and when the damage or loss occurs within a “Cyclone Event Period”, defined as the period from when the cyclone begins until 48 hours after the cyclone ends.¹²
- In Denmark, the compensation for inland flooding is limited to flood damages caused by an overflow from a waterway or lake and only where the water level in that waterway or lake has reached a level that occurs no more frequently than 1-in-20 years, as assessed by the Agency for Green Transition and Aquatic Environment and decided by the Danish Natural Hazards Council (Danish Natural Hazards Council, n.d.^[9]). The same conditions apply to the compensation of damages storm surge, although with the assessment undertaken by the Danish Coastal Authority.
- In Iceland, the programme does not provide coverage for damage resulting directly from pluvial/rainfall flooding.
- In Italy, the obligation to acquire insurance coverage, and the accompanying co-insurance/pooling arrangement and state-backed reinsurance coverage, only applies to overflow from a waterway or artificial drainage network, including overflow caused by precipitation (ANIA, 2025^[10]).
- In New Zealand, the programme coverage for flood and storm damages is limited to damages to residential land (not buildings), within 8 metres of the home and outbuildings or 60 metres of the primary accessway, along with any bridge or culvert.
- In Norway, the programme does not provide coverage for damage resulting directly from precipitation¹³ and only covers coastal flooding in the context of storm conditions and if water levels exceed the water level for a 1-in-5 year return period (Norsk Naturskadepool, n.d.^[11]; n.d.^[12]).
- In Spain, the programme covers riverine, pluvial and coastal flood events with a natural origin, which excludes, for example, flood losses related to the breach of a dam if that breach was not the result of a natural hazard.
- In Switzerland, the Public Insurance Companies for Real Estate do not provide coverage for flooding originating from an artificial body of water, such as from the failure of a dam.

Table 5.2. Types of flood hazards covered by the programme

	Riverine	Storm surge	Other coastal flooding	Pluvial
Australia				
Belgium				
Denmark				
France				
Iceland				
Italy				
Morocco				
New Zealand				
Norway				
Romania				
Spain				
Switzerland				
Türkiye				
United Kingdom				
United States				

Note: Darker blue indicates that the programme provides broad coverage for the given type of flooding. Lighter blue indicates that the programme provides some coverage for the given type of flooding. For example, there are exclusions or conditions related to coverage provided for all types of flood hazards in Australia, flooding and storm surge in Denmark, and storm surge and pluvial flooding in Norway. White indicates that the programme does not provide coverage for the given type of flooding.

Source: OECD survey on the design and operation of flood risk insurance programmes; Danish Natural Hazards Council (n.d.^[13]), *How to receive compensation after a storm surge*; Danish Natural Hazards Council (n.d.^[9]), *How to receive compensation from the flooding scheme*; Norsk Naturskadepool (n.d.^[11]), *Flom*; Norsk Naturskadepool (n.d.^[12]), *Stormflo*; Kingdom of Belgium (2014^[8]), *Loi de 4 avril 2014 relative aux assurances*; World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*; Tayel (2024^[15]), *Mandatory catastrophe insurance: Insurers' duty to contract*; ANIA (2025^[10]), *Guida Cat Nat: Obbligo di assicurazione contro le Catastrofi Naturali per le imprese*.

Eligible insureds

Programmes also differ in terms of the type of potential insureds that are eligible for programme coverage (Table 5.3).

- In Canada, Romania, Türkiye¹⁴ and the United Kingdom¹⁵, only residential buildings are, or will be eligible for programme coverage, while in New Zealand only damage to residential land is included. In other countries, businesses are also eligible for programme coverage although insured limits are applied: AUD 5 million in Australia¹⁶, EUR 1.447 million in Belgium (Bureau de Tarification catastrophes naturelles, n.d.^[16]) and USD 500 000 in the United States (FEMA, 2021^[17]). These limits limit eligibility to small or medium-sized businesses. In Morocco, the co-insurance/pooling arrangement covers households and businesses although the compensation provided is only available to uninsured households. In Italy, the obligation to acquire insurance, and the accompanying co-insurance/pooling arrangement and state-backed reinsurance, only applies to non-agricultural businesses registered in the Italian Business Register, with some conditions on minimum coverage limits.¹⁷
- In Iceland and Spain, the programmes also provide coverage for state-owned buildings and infrastructure. In France and Norway, the programmes provide coverage for state-owned buildings and for infrastructure assets that are covered by property insurance.

Some programmes also apply others limits on eligibility, linked to flood risk management requirements or objectives.

- In Belgium, buildings constructed more than 18 months after a zone has been defined as high risk are ineligible for programme coverage.¹⁸

- In Italy, illegal structures or structures without required legal authorisations are excluded (ANIA, 2025^[10]).
- In the United Kingdom, homes built after 2009 are ineligible for programme coverage.
- In the United States, flood insurance from the National Flood Insurance Program is only available to households and businesses located in communities that participate in the programme by agreeing to adopt and implement local floodplain management regulations (FEMA, 2022^[18]) although the vast majority of the flood exposed population is located in participating communities (Kousky et al., 2018^[19]).

Table 5.3. Types of insureds eligible for programme coverage

	Households	Small businesses	Medium and large businesses	Public assets
Australia				
Belgium				
Canada				
Denmark				
France				
Iceland				
Italy				
Morocco				
New Zealand				
Norway				
Romania				
Spain				
Switzerland				
Türkiye				
United Kingdom				
United States				

Note: Darker blue indicates that the programme provides broad coverage for the given type of insured. Lighter blue indicates that the programme provides some coverage for the given type of insured. For example, some residential and commercial properties are not eligible for programme coverage in Belgium and the United States, and some residential properties are not eligible for programme coverage in the United Kingdom. In Australia, Belgium and the United States, limits on the sum insured would likely limit eligibility to small (and potentially medium-sized) businesses. In Australia, the programme would also provide coverage for strata properties, as long as the strata is at least 50% dedicated to residential purposes. In Türkiye, offices, commercial or (light) industrial companies that are located in a residential building are also required to acquire programme coverage. White indicates that the programme does not provide coverage for the given type of insured. The establishment and possible design features of the programme in Canada are under consideration.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; Kingdom of Belgium (2014^[8]), *Loi de 4 avril 2014 relative aux assurances*; Bureau de Tarification catastrophes naturelles (n.d.^[16]), *Les biens concernés*; FEMA (2021^[17]), *Flood Insurance and the NFIP*; Tayel (2024^[15]), *Mandatory catastrophe insurance: Insurers' duty to contract*; ANIA (2025^[10]), *Guida Cat Nat: Obbligo di assicurazione contro le Catastrofi Naturali per le imprese*; Department of Finance Canada (2024^[20]), *Budget 2024: A clean and safe environment for the next generation*.

5.2.2. Type of coverage provided and role in the market

The coverage for flood risk offered by programmes differs between countries along with the role of the programme in the market.

- In Iceland, New Zealand, Spain, Türkiye and the United States, the programmes provide direct/primary insurance coverage for flood risk through a state-owned insurance company or provider. In Switzerland, a number of state-owned insurance companies are the sole providers of property, including flood, insurance coverage in the cantons where they operate. In Denmark,

compensation is provided by a public council mandated to collect a tax on each insurance policy and use those funds to compensate flood and storm surge losses, subject to the conditions noted above. In Romania, the programme provides direct flood insurance coverage and is owned collectively by private insurance companies.

- In Belgium, Italy, Morocco, Norway and Switzerland, private insurers operate a co-insurance/pooling arrangement that may share some or all of the claims across participating insurance companies and/or collectively acquire reinsurance. For example, in Italy, the main function of the arrangement, in which participation is voluntary, is to acquire reinsurance on behalf of the member companies (ANIA, 2025^[21]). In Switzerland, there is also a co-insurance/pooling arrangement among the Public Insurance Companies for Real Estate.¹⁹ A co-insurance/pooling arrangement among insurers can be similar to a reinsurance arrangement, as the co-insurance/pooling arrangement acts like a reinsurer for the direct insurers.
- In Australia, France, Italy and the United Kingdom, the programmes offer a reinsurance coverage for flood risk, or cyclone-related flood risk in the case of Australia, which is also the approach under consideration in Canada.

Table 5.4. Type of coverage provided by programme

	Compensation	Insurance	Co-insurance/pooling arrangement	Reinsurance
Australia				
Belgium				
Canada ¹				
Denmark				
France				
Iceland				
Italy ²				
Morocco				
New Zealand				
Norway				
Romania				
Spain				
Switzerland				
Türkiye				
United Kingdom				
United States				

Note: Blue indicates that the programme provides the given type of coverage. White indicates that the programme does not provide the given type of coverage. ¹ The establishment and possible design features of the programme in Canada are under consideration. ² In Italy, the programme legislation allows for the creation of a co-insurance/pooling arrangement by private insurers although it is not a mandated component of the programme and the participation of private insurers is voluntary.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; Kingdom of Belgium (2014^[8]), *Loi du 4 avril 2014 relative aux assurances*; Bureau de Tarification catastrophes naturelles (n.d.^[16]), *Les biens concernés*; Tayel (2024^[15]), *Mandatory catastrophe insurance: Insurers' duty to contract*; ANIA (2025^[10]), *Guida Cat Nat: Obbligo di assicurazione contro le Catastrofi Naturali per le imprese*; Department of Finance Canada (2024^[20]), *Budget 2024: A clean and safe environment for the next generation*.

The different programmes play different roles relative to the private insurance or reinsurance market. The public insurance companies in Iceland and Switzerland (in cantons where Public Insurance Companies for Real Estate have been established) are the only providers of insurance coverage for flood risk for households and businesses. The public insurance company in Spain is also the only provider of insurance coverage for flood risk although private insurers could choose to offer coverage for this risk to their

policyholders. However, as outlined below, they may transfer risk to private reinsurance markets. In Romania and Türkiye, the programmes are the main source of flood insurance coverage for households although private insurers provide supplemental coverage for households and all coverage for businesses. In New Zealand, the programme only covers flood damage to residential land so all flood insurance coverage for residential buildings and businesses is provided by private insurers. In the United States, private insurers provide flood coverage for larger businesses and offer alternative (and supplemental) coverage for households and smaller businesses.

The co-insurance/pooling arrangements established in Morocco, Norway and among private insurance companies in Switzerland assume all flood risk provided by participating private insurers.²⁰ In Belgium, the co-insurance/pooling arrangement only applies in the case of high-risk households and businesses and compensation is provided only when overall losses exceed a specific threshold, which suggests that private insurers and reinsurers provide most of the coverage for flood risk in Belgium. In Switzerland, the co-insurance/pooling arrangement among Public Insurance Companies for Real Estate involves risk sharing among members if annual losses exceed a specific threshold. In Italy, the co-insurance/pooling arrangement is voluntary²¹ and there is, thus far, no requirement on members to cede a minimum amount of risk to the pool (ANIA, 2025^[21]).

The programme that provides reinsurance in the United Kingdom is designed to target high-risk households which means that private insurers and reinsurers should assume some or most of the flood risk related to lower-risk households.²² In Australia, insurers that do not provide significant coverage for cyclone risk in higher risk areas are not required to transfer their cyclone and cyclone-related flood risk to the reinsurance programme.²³ In France, the programme offers a quota-share reinsurance coverage for 50% of the assumed risk from floods and other natural hazards as well as an unlimited stop-loss coverage, although there is no requirement for insurers to cede risk to the programme. This means that insurers can retain their flood risk or cede some flood risk to private reinsurance markets. The public reinsurance coverage available in Italy similarly limits the amount of risk that can be transferred to 50% (Tayel, 2024^[15]) and there is also an overall limit based on the public reinsurer's financial capacity.²⁴

5.2.3. Approach to premium pricing

The programmes providing coverage for flood risk use two main types of approaches to setting premiums for the coverage that they provide.

- In Belgium, Iceland, Morocco, New Zealand, Norway, Spain and Switzerland (with some exceptions²⁵), premiums for programme coverage of eligible properties are established as a fixed share of the sum insured, although the rate is higher for commercial properties in Spain and lower for infrastructure in Iceland. In France, an additional premium of 20% of the base premium is collected for property risks and 9% for motor vehicle risk for coverage of the natural hazard risks included in the programme. In Romania, the premium, and the amount of coverage provided, is based on the type of construction. More resilient homes receive higher amounts of coverage and pay higher premiums (World Forum of Catastrophe Programmes, n.d.^[14]).²⁶ In the United Kingdom, the premium for reinsurance coverage offered by Flood Re is established based on the relevant Council Tax band where the home is located, which means that higher value properties pay higher premiums.
- Only the insurance coverage provided by programmes in Türkiye and the United States, and the reinsurance coverage provided by the programmes in Australia and Italy apply risk-based premiums. In Australia, a complex rating algorithm is used with separate rating tables for wind, storm surge and flood that reflect risk, location, building characteristics and risk mitigation undertaken by policyholders. In Türkiye, premium rates for flood coverage will be based on five risk categories applied at the district level (Bahar, 2024^[22]) that were derived based on a model that integrates flood maps provided by other government agencies, synthetic loss amounts and a

building inventory developed by the programme. In the United States, the National Flood Insurance Program began implementing “Risk Rating 2.0” in October 2021 which sets premiums based on flood frequency for multiple types of flooding, distance to water source and property characteristics such as elevation and rebuilding cost (subject to some limitations, as discussed below) (FEMA, 2023^[23]).

Table 5.5. Approach to setting premiums for programme coverage

	Fixed rate	Risk based
Australia		
Belgium		
France		
Iceland		
Italy		
Morocco		
New Zealand		
Norway		
Romania		
Spain		
Switzerland		
Türkiye		
United Kingdom		
United States		

Note: Darker blue indicates the programme’s approach to setting premiums, either fixed rate or risk based. Lighter blue indicates that programme premiums are partially risk based. For example, programme coverage in Romania takes into account the type of construction of the home and some Public Insurance Companies for Real Estate in Switzerland apply differentiated premium pricing.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; Bureau de Tarification catastrophes naturelles (n.d.^[16]), *Les biens concernés*; World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*; ACAPS (n.d.^[24]), *La couverture contre les conséquences d’événements catastrophiques: Système assurantiel*; FEMA (2023^[23]), *NFIP’s Pricing Approach*.

However, as discussed below, private insurance companies might still incorporate a risk-based approach to premium pricing even where the approach to pricing programme coverage is based on fixed rates. For example, while the reinsurance programme in the United Kingdom applies fixed rates for the reinsurance coverage it provides, private direct insurers remain responsible for establishing the premiums that they charge to their policyholders, even if the risk is then ceded to the programme. In France, since the fixed rate is applied to the premium base set by private direct insurers, private insurers could incorporate risk-based pricing into setting the premium base.

5.2.4. Governance arrangements

Countries have established different governance arrangements in implementing the programmes that provide coverage for flood risk. The programmes have taken different approaches in terms of the applicability of insurance regulatory and supervisory requirements and the role of the government, executive or legislative, in decisions on the scope of programme coverage, approach to premium-setting and programme risk retention.

The programmes that have been established by the private insurance sector in Romania and the United Kingdom and the programme operated by a private insurance company in Türkiye are subject to the same regulatory and supervisory requirements applied to private insurance or reinsurance companies. This includes both prudential and market conduct regulation and supervision in the case of Romania and the United Kingdom²⁷ and prudential supervision in Türkiye. The public (re)insurers in Iceland and Spain²⁸ are also subject to the same requirements as private (re)insurers and are supervised by the insurance

supervisor. The co-insurance/pooling arrangements in Italy²⁹, Morocco³⁰ and among private insurers in Switzerland do not appear to be specifically subject to insurance supervision, although the insurers that participate in those arrangements would be subject to insurance regulatory and supervisory requirements. The programmes in Australia and New Zealand are operated by “Crown” or government entities that are overseen by a board that is accountable to a Minister, while the Public Insurance Companies for Real Estate in Switzerland are subject to requirements established in cantonal law.

For most of the programmes, including those in Australia, France, Italy, Morocco, New Zealand, Romania, Switzerland (public and private insurers) and the United Kingdom, the scope of eligible hazards and policyholders covered by the programme are defined in legislation. In Spain, the scope of eligible hazards and policyholders covered is defined in regulation and there is a board of directors with equal representation from the public and private sectors that makes recommendations on design elements to the government (*Ministerio de Economía, Comercio y Empresa*) for decision. In Türkiye, the programme is responsible for establishing the scope of coverage, as well as the programme’s approach to premium pricing and risk retention.

The approach to premium pricing is defined in legislation in Romania and in Switzerland (for private insurers) and subject to a government or ministerial decision in most other countries, with the exception of Australia and Türkiye, where decisions on premium pricing are made by the programme. Most programmes are responsible for decisions on risk retention and the use of reinsurance or retrocession to transfer programme risk, with the exception of Australia and the United Kingdom,³¹ where these decisions are made by the government or responsible minister.

Table 5.6. Authority for programme design

	Eligible hazards	Eligible policyholders	Approach to premium pricing	Risk retention and reinsurance
Australia	Legislature	Legislature	Programme (Management or Board)	Government or Minister
France	Legislature	Legislature	Government or Minister	Programme (Management or Board)
Italy	Legislature	Legislature	Programme (Management or Board)	Programme (Management or Board)
Morocco	Legislature	Legislature	Government or Minister	Programme (Management or Board)
New Zealand	Legislature	Legislature	Government or Minister	Programme (Management or Board)
Romania	Legislature	Legislature	Legislature	Programme (Management or Board)
Spain	Government or Minister	Government or Minister	Government or Minister	Programme (Management or Board)
Switzerland (private insurers)	Legislature	Legislature	Legislature	Programme (Management or Board)
Switzerland (Public Insurance Companies for Real Estate)	Legislature	Legislature	Programme (Management or Board)	Programme (Management or Board)
Türkiye	Programme (Management or Board)	Programme (Management or Board)	Programme (Management or Board)	Programme (Management or Board)
United Kingdom	Legislature	Legislature	Government or Minister	Government or Minister

Note: Dark blue indicates that the authority for making decisions on the given programme design element rests with the legislature. Medium blue indicates that the authority for making decisions on the given programme design element rests with the government or responsible minister. Light blue indicates that the authority for making decisions on the given programme design element rests with the programme management or board.

Source: OECD survey on the design and operation of flood risk insurance programmes; Tayel (2025^[25]), *Policies covering catastrophes: new obligations for Italy-based companies and insurers*.

5.3. Achieving broad flood insurance coverage

Achieving broad coverage of flood-related losses should be one of the primary objectives in establishing a flood risk insurance programme. Achieving broad coverage requires that coverage is widely available, affordable and acquired. The approaches taken to supporting availability, affordability and take-up differ across the established programmes, based on factors such as the level of exposure to extreme losses, the capacity of private insurance markets, as well as policy objectives related to solidarity and protection of the most vulnerable.

5.3.1. Ensuring the availability of coverage for flood risk

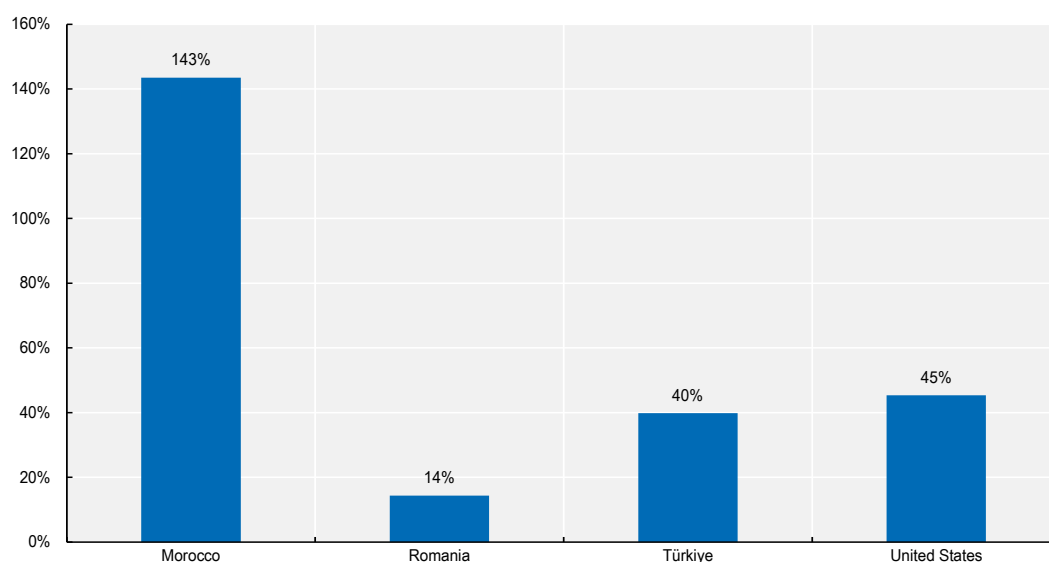
Programmes that provide comprehensive coverage for a broad set of flood hazards to both households and businesses should be able to ensure that flood insurance is broadly available for all types of potential policyholders. The programmes in Spain and Switzerland provide comprehensive insurance coverage for all households and businesses against most, if not all, relevant flood hazards. Residential and commercial flood insurance appears to be widely available in both countries³² (EIOPA, 2025^[26]; Insurance Europe, n.d.^[27])

Some programmes apply limits to the types of insureds or flood hazards eligible for programme coverage or the amount of programme coverage available, which could result in gaps in the availability of coverage.

- Some potentially significant flood hazards are excluded from programme coverage in Australia (losses unrelated to cyclones),³³ Denmark, Iceland and Norway (pluvial flooding) and Italy (coastal and pluvial flooding). In Denmark and Norway, programme support or coverage is not available for more frequent inland flooding (Denmark) and more frequent coastal flooding (Denmark and Norway). Despite these limitations, residential and commercial flood insurance appears to be widely available in Australia, Iceland and Norway, although coverage availability has been more limited for some types of flood hazards in Italy (Chow et al., 2023^[28]; EIOPA, 2025^[26]; Lilly, 2024^[29]).³⁴ Flood insurance is also reported to be widely available in Denmark (EIOPA, 2025^[26]), although this likely refers to the coverage for pluvial flooding coverage available from private insurers.³⁵
- Larger businesses are not eligible for programme coverage in Australia,³⁶ Belgium and the United States, and all businesses are ineligible for coverage in New Zealand, Romania, Türkiye, the United Kingdom and the programme under consideration in Canada. Flood insurance is generally available for commercial properties in Australia, Belgium, and the United Kingdom³⁷ (BMG, 2022^[30]; Browning, 2023^[31]; Chow et al., 2023^[28]; EIOPA, 2025^[26]). In Romania, the availability of commercial flood insurance is more limited (EIOPA, 2025^[26]).³⁸
- Households are not included within the scope of the mandatory insurance requirement for natural hazard risks in Italy and are therefore not eligible for the programme coverage. Building damage is excluded from programme coverage in New Zealand. Flood insurance is generally available for residential buildings in New Zealand although more limited in Italy (Finity Consulting, 2023^[32]; EIOPA, 2025^[26]).³⁹
- Some communities are not eligible for programme coverage in Belgium and the United States. Flood insurance is generally available for residential properties in Belgium.⁴⁰ In the United States, the communities that participate in the National Flood Insurance Program reportedly account for the vast majority of the population exposed to flood risk (Kousky et al., 2018^[19]), which suggests that flood insurance is generally available through the programme to most households and businesses exposed to flood risk.
- The amount of programme coverage available to individual insureds is limited in Morocco, Romania and the United States and is expected to be limited in Türkiye.⁴¹ The applied limits might not provide

full coverage for a total loss in some cases. Figure 5.4 compares insured limits with average home values, although home prices may not provide a good proxy for the reconstruction costs for which insurers will be responsible. Where supplementary coverage would be necessary to provide sufficient financial protection against flood damages and losses, limited availability of supplemental coverage could be considered a gap in flood insurance availability.⁴²

Figure 5.4. Programme coverage limits relative to housing prices



Note: Calculated as the programme coverage limit as a share of the median price for a 2 bedroom home, based on the average of reported median prices for all cities included in Global Property Guide (2025^[33]), *Average Property Prices by Country/City*. The coverage limits are MAD 2 000 000 in Morocco, RON 100 000 in Romania (Type A building), TRY 1 272 000 in Türkiye (the limit applicable to earthquake insurance coverage) and USD 250 000 in the United States. Exchange rates for 3 October 2025 were used to calculate the ratio.

Source: OECD calculations based on housing price data from Global Property Guide (2025^[33]), *Average Property Prices by Country/City*; and insurance coverage limits from ACAPS (n.d.^[24]), *La couverture contre les conséquences d'événements catastrophiques: Système assurantiel*; PAID Romania (2021^[34]), *What is PAD?*; DASK (2024^[35]), *Guarantees and Coverage*; and FEMA (2021^[17]), *Flood Insurance and the NFIP*.

The type of programme coverage provided could also have implications for flood insurance availability. The programmes that provide reinsurance in Australia and the United Kingdom may not be able to ensure the availability of direct insurance for eligible policyholders as direct insurers will be responsible for offering insurance (or not) to those policyholders. If the programme limits the amount of reinsurance coverage provided to insurers, insurers may be unwilling to offer direct insurance if they are unwilling or unable to retain the risk that cannot be transferred to the programme (or cede that risk to another reinsurer). In France, a stop-loss reinsurance coverage is provided and coverage for flood and other natural hazard risks is a compulsory inclusion in commercial and residential property insurance policies which eliminates the risk that insurers will choose not to offer coverage for flood risk.⁴³ In Italy, insurers are required to offer coverage for certain hazards, including flood, to businesses covered by the mandatory purchase requirement (Tayel, 2024^[15]), subject to some exemptions that can help ensure that insurance companies have sufficient capacity.⁴⁴ In Australia and the United Kingdom, the reinsurance provided by the programme will cover all losses, net of applicable policyholder and/or insurer deductibles,⁴⁵ which means that insurers' maximum liability for a given policy is limited and known in advance.

Residential and commercial flood insurance is generally available in Australia, France, Italy and the United Kingdom⁴⁶ (BMG, 2022^[36]; Chow et al., 2023^[28]; EIOPA, 2025^[26]; Lilly, 2024^[29]). An early examination of the impact of the Cyclone Reinsurance Pool in Australia estimated that the establishment of the programme has led to an 11% increase in the probability of insurance coverage being offered in high-risk areas

(Solomon, 2024^[37]). However, the Australian Competition and Consumer Commission (ACCC), which has been mandated to monitor the impact of the Cyclone Reinsurance Pool on the premiums charged by private insurers, found that the Pool has had limited impact on the availability of coverage in high-risk areas in its most recent monitoring report (ACCC, 2025^[38]).⁴⁷

5.3.2. Supporting the affordability of flood risk insurance coverage

The establishment of a flood risk insurance programme that creates a large pool of mostly independent and uncorrelated risks should support the affordability of flood insurance coverage. Building a diversified portfolio of risk within a programme should lower the aggregate cost of coverage, reduce economic and regulatory capital needs, where applied, and lower reinsurance costs⁴⁸ (other things equal). In addition, a flood risk insurance programme can limit the magnitude of losses that insurers or reinsurers might face by providing coverage for high severity or high frequency events and/or for high-risk policyholders, and therefore lower the premiums that insurers and reinsurers would need to collect to cover their exposure (OECD, 2021^[7]).

Flood risk insurance programmes might also benefit from tax exemptions, either corporate taxes or premium taxes, and may be operated on a not-for-profit basis, both of which would be expected to lead to lower premium costs and improved affordability. For example, the Public Insurance Companies for Real Estate in Switzerland have been established as non-profit organisations with any excess profits returned to their customers.

In addition, programmes that benefit from a government backstop could theoretically target a lower level of underwriting profitability. A programme could operate with a higher claims or combined ratio than a private insurer or reinsurer that would be subject to market, and potentially supervisory,⁴⁹ requirements or pressures to maintain a margin of safety. In doing so, the programme would have the ability to charge lower premiums than a private insurer or reinsurer, and therefore support affordability. However, as discussed below, operating with lower levels of underwriting profitability could create potential risks for public finances and it does not appear that many, if any, of the programmes are operating at a lower level of financial soundness than (re)insurers in the private sector (see the section below on Programme financial soundness).

Programmes can also incorporate cross-subsidies in order to mitigate the risk that premiums become unaffordable for those at higher risk of flooding. Programmes that provide coverage for multiple natural hazards can also provide cross-subsidies between the different hazards covered. The direct insurance programmes and co-insurance/pooling arrangements that apply fixed pricing in Iceland, Morocco, Norway, Spain and Switzerland are likely providing some cross-subsidies to high-risk policyholders,⁵⁰ although all of these programmes also provide coverage for multiple natural hazards. These cross-subsidies are being applied directly into the premium rates that low- and high-risk policyholders pay for coverage and are broadly applied given the broad scope of these programmes.⁵¹ As a result, programmes in these countries, through low-risk policyholders, are supporting the affordability of coverage for high-risk policyholders and would likely mitigate most if not all affordability challenges. For example, in Spain, EIOPA estimates that between 0-25% of households and businesses could find flood insurance unaffordable (EIOPA, 2025^[26]).

The reinsurance programmes in Australia, France and the United Kingdom integrate cross-subsidies into the reinsurance coverage that they provide. In the United Kingdom, reinsurance premiums are established at a fixed rate applied to the value of the property, based on the applicable Council Tax band, and a levy is charged on all property insurance policies to subsidise the cost of the reinsurance provided for high-risk properties. In Australia, the reinsurance programme applies risk-based pricing although a cross-subsidy is incorporated by transferring the profit margins earned on the reinsurance coverage provided to low-risk policyholders to subsidise the reinsurance coverage provided to high-risk policyholders. In France, the cost of programme reinsurance coverage is priced as a fixed share of the premium base, without regard to the level of risk.

However, direct insurers in Australia, France and the United Kingdom may still apply risk-based pricing, including for policies ceded to the programme, although they may be encouraged to transmit the cross-subsidies provided in programme reinsurance coverage. In the United Kingdom, the subsidised reinsurance for high-risk properties provided by Flood Re likely acts as a constraint on premium rates for high-risk properties as Flood Re assumes almost all of the risk from the direct insurer, with the exception of a GBP 250 deductible. The establishment of Flood Re appears to have had an impact on affordability in the United Kingdom. One study estimated that the average difference in cost for household property insurance, inclusive of flood coverage, for those at high-risk of flooding was significantly lower in 2022 relative to 2018 (10% in 2022 relative to 34% in 2018) (BMG, 2022^[36]). However, according to Flood Re, the difference may currently be higher for homes at high-risk of flooding.⁵²

In Australia, the design of the programme should also support the transmission of the cross-subsidies incorporated into its reinsurance pricing into the pricing imposed by private insurers as the programme assumes all of the risk from direct insurers, without a retention or deductible. As a result, insurers would have little incentive to charge higher risk-based premiums than they will be charged by the programme for reinsurance coverage, as they are not retaining any of that risk. In addition, insurers are required to pass on the premiums savings achieved through the establishment of the reinsurance programme and this is monitored by ACCC. The most recent ACCC monitoring report found that the Cyclone Reinsurance Pool has supported more affordable premiums for households and small businesses in areas facing medium and high levels of cyclone risk, relative to rates before the pool was operational (ACCC, 2025^[38]).⁵³

In France, the premium applied by direct insurers for the coverage for natural hazard risks included in the programme is fixed as a share of the base premium, although direct insurers could charge high-risk policyholders a higher base premium to account for more significant exposure to natural hazards. Insurers might have some incentive to incorporate higher risk into their pricing as the programme will only assume up to 50% of the risk. However, the stop-loss protection included in the programme's reinsurance coverage should reduce the incentive to charge higher premiums. There is some evidence that some insurers in France have increased premiums in highly-exposed areas in response to increasing natural hazard losses (AM Best, 2025^[39]).

In Italy, there are no requirements applicable to the premium rates that insurance companies charge although the establishment of the co-insurance/pooling arrangement and the availability of public reinsurance should support affordability. In addition, the insurance supervisor (IVASS) is required to establish a portal that will allow businesses to compare offers from multiple insurers and is regularly monitoring insurance coverage pricing.⁵⁴ Insurance companies are also required to recognise risk reduction measures implemented by policyholders when establishing premiums (Tayel, 2025^[25]), which can also support affordability.

Affordability challenges may emerge where direct insurance programmes (i.e. programmes that operate as direct insurers) apply risk-based pricing to the direct insurance coverage that they provide. The direct insurance programme in the United States applies, and the expanded direct insurance programme in Türkiye will apply, risk-based pricing. As a result, higher-risk policyholders could face high premiums for programme coverage that may be, or may become, unaffordable. In the United States, the National Flood Insurance Program is implementing a transition towards risk-based premiums over a number of years and premium increases are limited to 18% per year. As a result, those at highest risk of flood may continue to benefit from subsidised premiums for some time (GAO, 2023^[40]).⁵⁵ The programme in Türkiye may include premium subsidies to mitigate some of the affordability challenges that could accompany risk-based pricing. However, at the time of writing, a decision on possible premium subsidies had not been taken.

Affordability challenges in flood insurance might also exist or emerge where coverage for some types of flood risks or some types of policyholders are excluded from the scope of the programme, such as coverage for non-cyclone flooding in Australia, pluvial flooding in Denmark and Iceland, coastal and pluvial flooding in Italy, as well as coverage for all or larger businesses in Australia, Romania and the United

Kingdom, coverage for households in Italy, and coverage for building damage in New Zealand. There appears to be some affordability challenges in Australia and the United Kingdom (Table 5.7). In Denmark, for pluvial flooding, and New Zealand,⁵⁶ affordability challenges appear limited as private insurers may not have fully applied risk-based pricing for flood insurance coverage (Seifert-Dähn, 2018^[41]; Lilly, 2024^[29]).

Affordability challenges are more significant in Romania. The share of businesses that are estimated to face flood insurance affordability challenges is relatively high. The share of households is also estimated to be moderately high. The programme in Romania has likely contributed to reducing affordability challenges for households by offering low-cost basic coverage. However, some households may still face affordability challenges due to the cost of the voluntary supplemental insurance that is offered by private insurers.

Table 5.7. Flood insurance affordability challenges in selected countries

	Households	Businesses	Evidence
Australia		No available data	Approximately 12% of Australian households are facing affordability challenges (premiums that cost more than 4 weeks of gross household income), among which approximately 14% may face unaffordable premiums due to high flood risk (as 50% or more of their premium is for flood coverage). An estimated 77% of the 242 000 households with the highest flood risk are uninsured due, in part, to affordability challenges.
New Zealand		No available data	Insurance companies are, thus far, not broadly charging higher premiums to those at high-risk of flooding. Approximately 20% of high-risk households may face a premium charge of NZD 250 or more for flood coverage (approximately 10%-15% of average annual premium cost).
Romania			Based on EIOPA estimates, the share of households that could find flood insurance unaffordable is between 25% and 50% and the share of businesses that could find flood insurance unaffordable is between 50% and 75%.
United Kingdom			One report estimated that the average premium paid by households in higher risk areas is only about 10-15% higher and only 4% of households decided to not purchase flood insurance because the premium for flood coverage was too high (and 3% because the deductible was too high) – although Flood Re has indicated that this may be an underestimation as high-risk households can receive quotes that are 50-60% more costly. Approximately 14% of SMEs in at-risk areas chose not to acquire coverage for business interruption due to flooding as a result of high premium costs.
United States		No available data	Approximately 30% of NFIP policyholders could face premium increases of more than 100% as a result of the transition to Risk Rating 2.0, leading 10 US states to initiate a lawsuit to block the premium rate increases.

Note: Dark blue indicates that there are significant challenges related to the affordability of flood insurance coverage. Medium blue indicates that there are some important challenges related to the affordability of flood insurance coverage. Light blue indicates that there are some minor challenges related to the affordability of flood insurance coverage.

Source: The data for Australia is from Paddam, Liu and Philip (2024^[42]), *Home Insurance Affordability Update*; and ICA (2025^[43]), *Insurance Catastrophe Resilience Report 2024–25*. The data for Romania is from EIOPA (2025^[26]), *Dashboard on insurance protection gap for natural catastrophes*. The data for New Zealand is from Lilly (2024^[29]), *Insurance availability and risk-based pricing*; and Finity Consulting (2023^[32]), *Insurance Price Monitoring*. The data for the United Kingdom is from BMG (2022^[36]), *Availability and affordability of flood insurance: Integrated household report*; BMG (2022^[30]), *Availability and affordability of flood insurance: Small and medium-sized enterprises (including agricultural businesses)*; and correspondence with Flood Re. The data for the United States is from GAO (2023^[40]), *Flood Insurance: FEMA's New Rate-Setting Methodology Improves Actuarial Soundness but Highlights Need for Broader Program Reform*; and Mindock (2024^[44]), *US judge refuses to block new FEMA flood insurance rate overhaul*.

5.3.3. Supporting take-up of flood insurance coverage

Efforts to ensure availability and support affordability may not be sufficient to ensure take-up, and ultimately broad coverage, if households and/or businesses have a limited willingness-to-pay for flood insurance coverage. There are a number of reasons why households and/or businesses might have a limited willingness-to-pay for flood insurance coverage (OECD, 2016^[1]; 2021^[7]), including: (i) underestimation of their exposure to flood risk, which may be particularly relevant for those whose property is located at higher

altitudes or at a significant distance from bodies of water or where their property is somewhat protected by flood barriers or other protective infrastructure; (ii) misunderstandings about whether their existing coverage responds to flood damages and losses, such as if they do not realise that their property insurance coverage does not include flood coverage; (iii) expectations that potentially substantial government financial assistance or compensation will be provided to those impacted by floods; and/or (iv) unaffordability in the context of other pressing financial needs.

In some countries with flood risk insurance programmes, insurance sector practices and/or legislative or regulatory requirements have been implemented that support the purchase of insurance coverage for flood risk (Table 5.8).

- In some countries, some households and/or businesses are required to acquire insurance coverage for flood risk (i.e. mandatory purchase),⁵⁷ including residential tenants and co-owners of multi-dwelling properties in France, households in Romania, households and some businesses located within municipal boundaries in Türkiye, businesses in Italy⁵⁸ and all households and businesses in Iceland and many parts of Switzerland.⁵⁹ In France, Iceland and the applicable Swiss cantons, the requirement applies to property insurance coverage that includes coverage for flood risk. In Italy, the obligation is to acquire insurance coverage against flood as well as earthquakes and landslides. In Romania and Türkiye, the requirement applies specifically to the coverage offered by the programme.
- In other countries, the property insurance that is offered to households and businesses by direct insurers includes coverage for flood risk by default (i.e. automatic inclusion) – which may be the result of a regulatory or supervisory requirement or expectation, or simply the market practice in that country. Property insurance in Belgium, France, Morocco, Norway, Spain, all Swiss cantons and the United Kingdom automatically includes coverage for flood risk. In Denmark, insurers must pay a tax on each property and contents insurance policy which provides funding for the compensation programme available to all policyholders, which is similar to an automatic inclusion of the coverage provided by the compensation programme. In New Zealand, the programme coverage for flood damage to land is automatically included in residential property insurance and most residential and commercial policies include the private sector coverage for flood damage to buildings.
- In Türkiye, the United Kingdom and the United States, some or all households and/or businesses with a mortgage are required to acquire insurance that covers flood risk.⁶⁰ In Türkiye, the requirement applies to households with a bank loan that are subject to the mandatory purchase requirement described above. In the United Kingdom, the requirement to acquire flood coverage is applied as a result of lender practice. In the United States, it is a legislative requirement applicable to lenders that provide federally-backed mortgages that households and businesses located in Special Flood Hazard Areas⁶¹ obtain flood insurance (FEMA, 2020^[45]). In addition, in the US state of Florida, all households that have acquired wind coverage from the state-owned insurer (Citizens) will be required to purchase flood insurance based on legislation passed in 2022, subject to a transition period and some exceptions for those who live on upper floors of buildings (Insurance Journal, 2023^[46]).

While not applied in countries with flood risk insurance programmes, some countries, or administrative jurisdictions, have incorporated a mandatory offer requirement that obliges insurers to offer coverage for a specific peril, although policyholders may decide not to acquire that coverage. For example, earthquake insurance must be offered to households in Japan and the US state of California.

Table 5.8. Measures that can support the purchase of insurance for flood risk

	Mandatory purchase	Automatic inclusion	Mortgage requirement ¹
Australia			
Belgium			
Denmark			
France	Tenants and some property owners		Property insurance requirement
Iceland			
Italy	Corporate entities		
Morocco			
New Zealand			
Norway			
Romania	Households		
Spain			Property insurance requirement
Switzerland	Most cantons	All cantons	Property insurance requirement
Türkiye	Households only ²		Households only ²
United Kingdom			
United States			Only in Special Flood Hazard Areas

Note: Dark blue indicates that the given measure to support the purchase of flood insurance is universally applicable. Medium blue indicates that the given measure to support the purchase of flood insurance is broadly applicable. Light blue indicates that the given measure to support the purchase of flood insurance is only applicable to some households or businesses. ¹ There are also property insurance requirements for households with mortgages in a number of countries where flood insurance is automatically included in standard property insurance (e.g. France, Spain, Switzerland) which means that, in practice, flood insurance is also a requirement for those with mortgages. ² In Türkiye, the mandatory purchase requirement applies to households as well as offices, commercial or (light) industrial companies located in a residential building within the boundaries of a municipality.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; and World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*.

The effectiveness of these measures in achieving broad take-up depends on a number of factors.

- In the case of mandatory purchase requirements, broad take-up may only be achieved if the requirements are broadly applicable and there is a high level of compliance with the requirements. As noted above, the requirements only apply to households in Romania, to households and some specific businesses within municipal boundaries in Türkiye and only to businesses in Italy. According to *Pool-ul de Asigurare Împotriva Dezastrelor Naturale* (PAID - the Romanian programme), despite the applicability of the requirements to all households and the potential for fines and benefit ineligibility,⁶² only 21% of Romanian households have acquired the compulsory coverage. In Türkiye, approximately 56% of all households have acquired compulsory earthquake insurance, up from 54% before the devastating earthquake in February 2023 (Bahar, 2024^[22]). The mandatory purchase requirement is enforced by credit institutions, for homes with mortgages, and as part of the process for subscribing to electricity and water supply services (DASK, n.d.^[47]; n.d.^[48]). In Italy, businesses that do not comply with the mandatory purchase requirement will be unable to benefit from various public financial support facilities, including financial assistance for post-event reconstruction (Tayel, 2025^[25]).
- In the case of automatic inclusion, broad take-up will only be achieved if the vast majority of households and businesses acquire the property insurance to which coverage for flood risk is automatically included. Belgium, Denmark, France, Norway and Switzerland have property insurance penetration levels above the simple OECD average (OECD, 2025^[49]).⁶³ In France, more than 95% of households reportedly have property insurance (Lavarde, 2024^[50]). In Spain, just

under 80% of households reportedly have property insurance coverage (UNESPA, 2025^[51]).⁶⁴ The penetration of property insurance is also high in New Zealand although slightly lower in Morocco.⁶⁵

- In the case of mortgage-related requirements or practices, broad take-up may only be achieved if: (i) the requirements apply to all or most households and businesses with mortgages; (ii) mortgage lenders universally apply and enforce those requirements; and (iii) a large share of households and businesses have outstanding mortgages. In Türkiye and the United States, the requirement is only applied to a sub-set of households, and businesses in the case of the United States. In Türkiye, close to 95% of the population was considered to be residing in municipal areas in 2024, which provides an indication of the share of the population that might be subject to the mortgage and mandatory purchase requirements (Turkish Statistical Institute, 2025^[52]). In the United States, one estimate suggests that less than 5% of single-family homes are located within a Special Flood Hazard Area and are therefore subject to the mortgage requirement (Evans et al., 2020^[53]). In the United Kingdom and the United States, approximately 28.9% and 39.3% of households had a mortgage in 2022 and 2023, respectively⁶⁶ (OECD, 2025^[54]).

Table 5.9. Estimates of the take-up of flood insurance coverage

	Households	Businesses	Evidence
Australia		No available data	According to one recent report, approximately 3% of Australians have opted out of acquiring flood insurance although data collected by the programme found that 15% of residential buildings do not have insurance coverage for flood.
Belgium			The take-up and penetration of flood insurance is estimated to be high by EIOPA and Insurance Europe (89%) among both households and businesses.
France			The take-up and penetration of flood insurance is estimated to be high by EIOPA, Insurance Europe (100%) and in a recent report to the French Senate (95%) among both households and businesses.
Iceland			The take-up of flood insurance is estimated to be high by EIOPA for both households and businesses.
Italy			The take-up of flood insurance is estimated by EIOPA to be low among households and medium among businesses. One estimate suggests that only 6% of homes have insurance against natural hazard risks while the penetration among businesses ranges from 5% for micro-enterprises to 78% for large businesses.
New Zealand		No available data	An estimated 96% of households have “all-risk” property insurance coverage which would normally include coverage for flood risk.
Norway			The take-up and penetration of flood insurance is estimated to be high by EIOPA and Insurance Europe (100%) among both households and businesses.
Romania			The take-up of flood insurance is estimated by EIOPA to be low among households and businesses. Approximately 21% of households have acquired programme coverage and Insurance Europe estimates that approximately 20% of businesses have flood coverage.
Spain			The take-up and penetration of flood insurance is estimated to be high by EIOPA and Insurance Europe (100%) among both households and businesses (although with slightly lower penetration of coverage for flooding due to torrential rain (75%-100% among households, 85% among businesses). UNESPA reported that 79.5% of households have coverage against climate risks.
Switzerland			The penetration of flood insurance is estimated by Insurance Europe to be 99% among both households and businesses.
United Kingdom			Approximately 91% of households (owner occupied) have property insurance and 99% of property insurance includes coverage for flood risk. Approximately 55% of SMEs have property insurance, of which approximately 45% includes flood coverage.
United States		No available data	An estimated 15% of households have flood insurance coverage.

Note: The estimates of penetration of flood insurance provided by Insurance Europe may refer, in some cases, to the share of residential and commercial property insurance policies that include coverage for flood risks. The share of households or businesses that have property insurance may be less than 100%. Dark blue indicates that take-up of flood insurance coverage is relatively high. Medium blue indicates that take-up of flood insurance coverage is moderate. Light blue indicates that take-up of flood insurance coverage is relatively low.

Source: EIOPA (2025^[26]), *Dashboard on insurance protection gap for natural catastrophes*; Insurance Europe (n.d.^[27]), *Sustainability Hub: National natcat solutions*; BMG (2022^[36]), *Availability and affordability of flood insurance: Integrated household report*; BMG (2022^[30]), *Availability and affordability of flood insurance: Small and medium-sized enterprises (including agricultural businesses)*; Fanning (2024^[55]), *Flood cover could become mandatory for some home owners — and it may lead to having no protection at all*; ARPC (2025^[56]), *Cyclone Reinsurance Pool Statistics as at 31 December 2024*; ICNZ (2022^[57]), *You have more insurance than you know*; Simply Insurance (2023^[58]), *How Many Homes Have Flood Insurance In The U.S.? Plus Over 30 Flood Insurance Statistics! (May 2024)*; Persano Adorno (2025^[59]), *Legislative and financial innovation tools for reducing the insurance protection gap for natural catastrophes in Italy*; UNESPA (2025^[51]), *Memoria social del seguro*.

Applying these types of measures to support the purchase of flood insurance will likely have other implications that need to be taken into account.

- It may be difficult to implement a mandatory purchase requirement without some form of subsidisation of premiums for those at highest risk, as some households and businesses may be forced to purchase coverage that they cannot afford. In Iceland and in most Swiss cantons, premiums are set based on a fixed share of the sum insured, which means that households and businesses in Iceland and Switzerland that face high levels of exposure to flood risk would not

likely face premium rates that reflect that exposure. In Romania, there is some variation in premium rates although the amount of available programme coverage is limited, and premiums are low to reflect the limited amount of coverage provided.

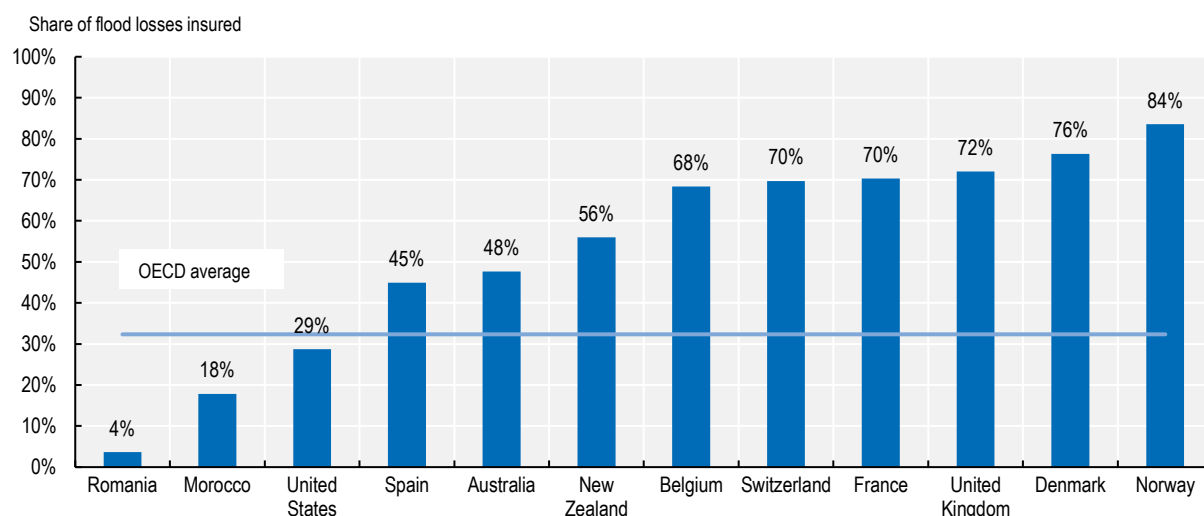
- A similar challenge would exist in countries with mortgage-related requirements. In the United Kingdom, the reinsurance coverage provided by the programme assumes all flood losses and is priced as a fixed rate based on Council Tax Band, with an explicit cross-subsidy incorporated. This should allow for affordable premiums among high-risk households with a mortgage, as competition among direct insurers would likely mean that Flood Re's pricing is ultimately passed on to households. In the United States, the programme coverage is risk-based, or transitioning towards risk-based, which could lead to challenges for high-risk households and businesses with a mortgage loan. An ongoing legal challenge by some US states to the implementation of "Risk Rating 2.0" includes concerns about the ability of households with mortgages to meet the flood insurance requirement when premium rates are increased (McGill, 2023^[60]). Draft legislation was also introduced in the United States in 2025 to provide tax credits to lower income households that acquire flood insurance, although the legislation has not been passed (S.586 - 119th Congress (2025-2026), 2025^[61]).
- Automatic inclusion of coverage for flood risk in property insurance policies, as well as the mandatory offer approaches applied in some countries for earthquake insurance, would force insurance companies to offer flood coverage to high-risk policyholders, particularly if it is a regulatory or supervisory requirement. In countries that do not impose any controls on premium pricing, insurance companies could simply incorporate high exposure to flood risk into the cost of premiums, which could lead to affordability challenges. However, if pricing controls are imposed, automatic inclusion of flood risk could lead insurers to limit the availability of any property insurance coverage for households or businesses facing high exposure to flood risk.⁶⁷ Premiums are established as a fixed share of the sum insured in almost all of the flood risk insurance programme countries where flood risk is automatically included in property insurance, which should mitigate these potential challenges to availability and affordability. In Italy, where there is an obligation on insurers to offer coverage for flood risks or potentially face pecuniary fines, insurers may refuse to offer coverage and avoid the penalties if they have reached their pre-defined "tolerance limit" (d'Elia and Fumarola, 2025^[62]).

However, requirements to purchase insurance coverage could also have implications for policyholder incentives for investing in risk reduction. If the premiums applied to required coverage do not reflect the level of risk, policyholders would likely face reduced incentives to invest in risk reduction, insofar as there is meaningful scope for them to reduce risks.

5.3.4. Levels of coverage for past flood losses

The broad availability of affordable insurance coverage that is largely acquired by households and businesses should lead to lower levels of uninsured losses. Figure 5.5 provides an estimate of the share of economic losses resulting from floods that were insured during the period 2000-2024 in countries with programmes that provide coverage for flood risk.

Figure 5.5. Estimated share of flood losses insured (2000-2024)



Note: Calculated as sum of insured losses (2000-2024) divided by sum of economic losses (2000-2024), including only events with both insured and economic loss estimates reported. The line provides the OECD (simple) average for the same period (32.3%).

Source: OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)

The share of flood losses insured in most countries with a flood risk insurance programme was higher than the OECD average for the period although some countries faced a relatively lower share of insured losses.

- In Morocco, all of the flooding events that were included in the dataset occurred before the establishment of the programme (2020). In Romania, most of the losses (over 90%) occurred before the establishment of the programme in 2010.
- As noted above, while flood insurance is widely available and affordable in the United States, take-up is low and mortgage-related requirements only apply to a limited share of the population. There is also some evidence that significant flooding has occurred outside of the Special Flood Hazard Areas where insurance requirements are applied. For example, a significant share of the flooding due to Hurricane Debby and Hurricane Helene in 2024 reportedly occurred outside of these flood hazard areas (Insurance Journal, 2024^[63]; Kaufman and Nicoletti, 2024^[64]). According to one report, more than 40% of programme claims between 2017 and 2019 were for properties outside of Special Flood Hazard Areas (The Washington Post, 2024^[65]).⁶⁸
- In Australia, the programme became operational in 2022 and has been paying claims since the 2022/2023 cyclone season, although the requirement for insurers to join the pool was implemented in phases up until the end of 2024. Therefore, the vast majority of the losses included in the dataset occurred before the programme was established. In addition, the overall share of losses insured was driven by the cyclone-related Queensland flooding in 2010-2011 which involved many disputes related to insurance coverage (OECD, 2016^[1]). The share of insured losses was 55% if flooding losses in 2010-2011 are excluded.
- In Spain, coverage for flood risk is included with standard residential and commercial property insurance, although the share of households covered by property insurance is slightly lower in Spain than some other OECD Members.⁶⁹
- The programme in the United Kingdom was not operational until 2016. The share of flood losses insured in the United Kingdom has increased since 2016 (77% in 2016-2024 compared to 71% in 2000-2015).

The programmes that operate in countries that have achieved higher levels of coverage of flood risk, including Belgium, Denmark, France, Norway, Switzerland, Spain and the United Kingdom, have a number of common characteristics.

- Most of the programmes provide broad coverage, either in terms of: (i) eligibility for programme coverage, as the programmes in Belgium, France, Norway, Spain and Switzerland provide coverage to households and most or all businesses; (ii) covered hazards, as the programmes in Belgium, France, Norway, Spain and Switzerland provide coverage for most types of flood risk as well as for other natural hazards; and/or (iii) comprehensive coverage, as the programmes operating in all of these countries provide comprehensive coverage for flood risk and do not apply limits on the sum insured that are significantly below the value of the property.
- Most of the programmes have specific measures to support affordability: some form of cross-subsidies are applied in France, Norway, Spain, Switzerland and the United Kingdom and a ceiling on premium rates is applied directly in Belgium and indirectly in the United Kingdom through competitive pressures.⁷⁰
- Insurance coverage in all of these countries automatically includes coverage for flood risk, either as an industry practice or legal/regulatory requirement (e.g. France, Spain, Switzerland, United Kingdom).

5.4. Leveraging market expertise and capacity

The design of flood risk insurance programmes should aim to leverage insurance market expertise, distribution networks and available risk bearing capacity, while serving to mitigate any contingent public sector liabilities arising from any backstop to the programme (see the section below on Minimising impacts on public finances). Different approaches to the design of flood risk insurance programmes have different implications for the participation of private insurance and capital markets in risk assessment, policy distribution and loss absorption.

In almost all of the countries with flood risk insurance programmes, flood insurance coverage is distributed through, and often provided by, the private insurance sector. The only exceptions are the Swiss cantons where Public Insurance Companies for Real Estate are the sole providers of property insurance, including flood insurance. The direct insurance or compensation programmes in Denmark, Iceland, New Zealand and Spain collect a surcharge, levy or premium from private insurers that distribute policies to which the programme coverage or compensation is attached. The direct insurance programmes in Romania, Türkiye and the United States offer their coverage as a separate policy available through participating private insurers. In countries where programmes operate as co-insurance/pooling arrangements or provide reinsurance coverage, policy distribution would also, by definition, be undertaken by private insurers who distribute and underwrite the policy and transfer some or all of the risk to the co-insurance/pooling arrangement or reinsurer.

Most of the flood risk insurance programmes that provide direct insurance coverage share risk with the private sector in different ways. Some limit the scope of insureds eligible for coverage or provide limited amounts of coverage, and leave it to the private insurance sector to provide flood insurance coverage for those that are not eligible for programme coverage or for losses above the programme limits. For example, private insurers provide all or most flood insurance coverage for businesses in New Zealand, Romania and Türkiye. They also provide coverage for damages or hazards outside the scope of the programme coverage, such as building damage in New Zealand, and supplementary insurance coverage for amounts greater than the basic coverage provided by the programme in Romania, Türkiye and the United States. The compensation programme in Denmark is limited to providing compensation for uninsurable storm surge losses and lower frequency inland flooding, and ultimately provides a level of compensation that appears small relative to losses covered by private insurers after major flood events.⁷¹ Among the direct insurance programmes, only the US National Flood Insurance Program provides coverage that is an alternative to, and competes with, coverage offered by the private insurance sector (see Box 5.1).

Box 5.1. Private flood insurance in the United States

In the United States, private insurers offer flood insurance coverage that is an alternative to the coverage provided by the National Flood Insurance Program, as well as coverage to supplement the coverage provided by the programme which applies limits on the sum insured. The number of private insurers offering flood insurance in the United States increased from 16 to 79 insurers between 2016 and 2023 while premiums collected grew from USD 410 million to USD 1.45 billion (III, 2024^[66]). According to estimates by the Insurance Information Institute and AM Best, private insurers account for approximately 32-40% of total flood insurance premiums (III, 2024^[66]; Kiriluk-Hill, 2025^[67]). The private insurance market share of residential flood insurance premiums is lower, although it may have increased significantly in recent years. One study estimated that only about 3.5% to 4.5% of residential flood insurance was provided by private insurers in 2018 (Kousky et al., 2018^[19]), although a more recent examination estimated that private insurers collected approximately 20% of residential flood insurance premiums (Neptune, 2025^[68]).

A number of measures have been implemented in recent years to address impediments to the growth of private insurance market coverage. For example, a non-compete clause applicable to insurers distributing National Flood Insurance Program coverage was eliminated in 2018 which allows insurers that participate in distributing programme coverage to offer their own competing coverage for flood (Grzadkowska, 2018^[69]). Regulatory changes were also made to ensure that mortgage lenders consider private flood insurance coverage to be equivalent to programme coverage for the purposes of complying with the flood insurance requirements in Special Flood Hazard Areas (Kousky et al., 2018^[19]). State regulators in the United States, through the National Association of Insurance Commissioners, have worked to encourage private flood insurance market growth by supporting legislative and regulatory actions at the state level and building consumer awareness of flood risk, private flood insurance options and flood risk reduction measures.

However, the National Flood Insurance Programme is offering subsidised coverage for some policyholders, either through the community-level premium discounts that are being offered to encourage local flood risk management (see the section below on Incentivising risk reduction through premiums and access conditions) or as a result of the imposed cap on annual premium increases during the transition to “Risk Rating 2.0.” In addition, as outlined below in the section on Programme financial soundness, the programme has a relatively high claims ratio and has had to borrow funds from the US Treasury to respond to losses beyond its financial capacity. This suggests that premium rates are insufficient at an aggregate level, which would make it difficult for regulated and privately-funded insurers to compete based on price. A recent analysis by the US Government Accountability Office found limited evidence that the transition to risk-based pricing has, thus far, led to significant changes in private market conditions as National Flood Insurance Program premiums are still generally lower than what the private insurers would need to collect to underwrite flood risk profitably (GAO, 2023^[40]). There is also some evidence that growth in private flood insurance has recently stalled (Rabb, 2024^[70]).

Private insurers may also face other obstacles to competing on a level playing field with the coverage provided by the National Flood Insurance Program.

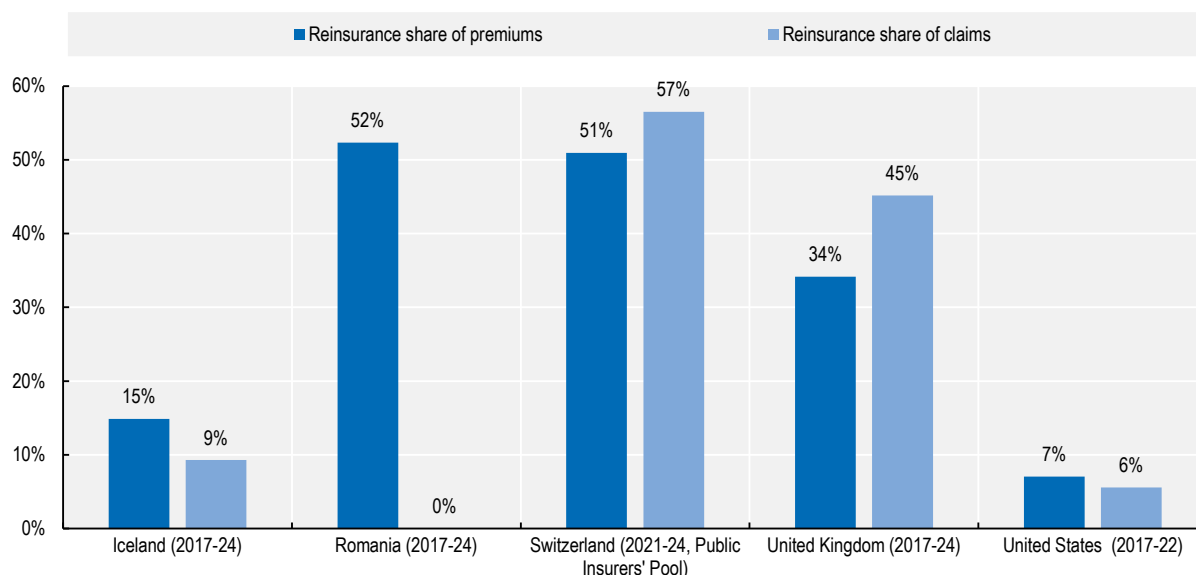
- Higher-risk policyholders that continue to benefit from reduced premiums through the transition to risk-based pricing are required to maintain continuous coverage in order to retain access to the premium discounts. Currently, only National Flood Insurance Program coverage is considered in determining continuous coverage, which means that policyholders that switch to private insurance coverage would lose access to this benefit (GAO, 2023^[40]).
- The intermediaries who distribute National Flood Insurance Program coverage receive a commission that some have suggested is high and likely more than those intermediaries would

receive for distributing private flood insurance coverage. High commissions could create an incentive for agents to recommend programme coverage to their clients, although one study found differing views among private insurers as to whether this is a significant issue (Kousky et al., 2018^[19]).

The programmes that provide direct insurance could also transfer a portion of the risk that they assume to private reinsurance or capital markets. The pooling of domestic flood risk through a programme should provide a more diversified pool of risk that could achieve lower pricing for reinsurance coverage than if insurers ceded their risk to the reinsurance market individually (i.e. the aggregate cost of reinsurance for domestic flood risk should be lower).

Most of the direct insurance programmes have transferred, often increasing, risk to reinsurance and capital markets, with the exception of the direct insurance programme in Spain (Figure 5.6).⁷² In New Zealand, the programme acquired NZD 10.3 billion in (multi-peril) reinsurance coverage for 2025-2026, its highest level ever, including NZD 225 million in continuing coverage through the issuance of its first catastrophe bond in 2023 (Natural Hazards Commission, 2025^[71]). The direct insurance programme in Iceland also acquires multi-peril reinsurance coverage although losses from floods, which are expected to be limited, would likely be retained within the programme's reinsurance retention (Natural Catastrophe Insurance of Iceland, 2021^[72]). The direct insurance programme in Romania has acquired EUR 1.4 billion in reinsurance coverage for the earthquake, flood and landslide risks that the programme covers (PAID Romania, 2025^[73]). In the United States, the National Flood Insurance Program acquired USD 757.8 million in traditional reinsurance and had additional coverage through three outstanding catastrophe bonds that provide approximately USD 2 billion in overall private reinsurance and capital market coverage (FEMA, 2025^[74]). In Switzerland, the co-insurance/pooling arrangement among the Public Insurance Companies for Real Estate, which shares losses above a threshold, acquires reinsurance coverage to support the arrangement.

Figure 5.6. Estimates of the reinsurance or retrocession share of premiums and claims: selected programmes (2017-2024, cumulative)



Note: Includes all hazards covered by the programme (i.e. not just flood risk) in Iceland, Romania and Switzerland.

Source: NTI (2019^[75]; 2021^[76]; 2023^[77]), *Ársskýrsla*; NTI (2025^[78]), *Ársreikningur*; PAID Romania (2019^[79]; 2020^[80]; 2021^[81]; 2022^[82]; 2023^[83]; PAID Romania, 2024^[84]), *Raport privind Solvabilitatea și Situația Financiară*; AECA (2023^[85]), *Rapport Annuel 2022: La solidarité crée la sécurité*; UIR (2025^[86]), *Rapport financier 2024*; Flood Re (2018^[87]; 2019^[88]; 2020^[89]; 2021^[90]; 2022^[91]; Flood Re, 2023^[92]), *Annual Report and Financial Statements*; Flood Re (2024^[93]), *Annual report and accounts 2023-2024*; FEMA (2018^[94]; 2019^[95]; 2020^[96]; 2021^[97]; 2022^[98]), *The Watermark*; NFIP (2021^[99]), *National Flood Insurance Program's Reinsurance Program*.

The private sector plays a substantial role in assuming risk in the programmes in Belgium, Italy, Morocco, Norway and Switzerland that operate as private sector co-insurance/pooling arrangements. These pooling arrangements share risk among direct insurers through the pool, which acts like a reinsurer for the participating insurers, and the pool transfers the risk that it has assumed to international reinsurance markets. There are no state-owned reinsurers assuming a part of the risk from the co-insurance pool, except in the case of Italy where the co-insurance/pooling arrangement is expected to transfer some risk to a state-owned reinsurer. For example, the co-insurance/pooling arrangement in Norway acquired a quota share coverage for losses up to NOK 2 billion and two layers of reinsurance coverage for losses above NOK 2 billion and NOK 6 billion, up to the regulatory ceiling of NOK 16 billion (Norsk Naturskadepool, 2025^[100]).

The programmes that provide reinsurance coverage for flood risk in Australia, France, Italy and the United Kingdom, as well as the programme under consideration in Canada, rely or will rely on private direct insurers to distribute coverage. These programmes impose different levels of retention on direct insurers.

- In Australia, the programme assumes all of the cyclone-related flood risk (i.e. there is no insurer deductible or retention) and is mandatory for direct insurers with more than AUD 10 million in gross written premiums for residential property insurance (ARPC, 2022^[101]).⁷³ However, as noted, only cyclone-related flood risk can be assumed by the programme which means that private insurers, and reinsurers, assume all flood risk that is unrelated to a cyclone.
- In France and Italy, acquiring programme reinsurance is optional and limited to 50% of the risk. As a result, the private direct insurers must retain at least 50% of the risk or reinsure that risk in private reinsurance markets and may choose not to cede any risk to the programme. However, in France, the programme also offers an unlimited stop-loss protection⁷⁴ on the 50% of the risk retained by

private insurers that have agreed to cede the other 50% of the risk to the programme through the quota-share arrangement, providing additional reinsurance protection.

- In the United Kingdom, acquiring reinsurance coverage from Flood Re is optional although 100% of the risk, net of a GBP 250 insurer deductible per policy, is assumed by Flood Re, meaning that there is no significant insurer retention.

As in the case of programmes that offer direct insurance, programmes that offer reinsurance can transfer risk to private retrocession markets. In the United Kingdom, Flood Re transfers a significant share of the risk it assumes to private retrocession markets. Flood Re has agreed with the government to limit its retention to GBP 250 million but accepts risk up to a liability limit of GBP 3.2 billion, with the difference retroceded to private reinsurance and capital markets (Flood Re, 2025^[102]). In 2025, the programme issued its first catastrophe bond which provides GBP 140 million in protection over three years (Flood Re, 2025^[103]). The Cyclone Pool in Australia does not currently retrocede risk to private retrocession markets. In France, the state-owned reinsurer has not acquired retrocession coverage under its new structure.⁷⁵

All of the programmes that provide reinsurance coverage either compete with, or displace, private reinsurance markets. As noted, direct insurers in France and the United Kingdom can choose whether to retain risk, transfer risk to private reinsurers or transfer risk to the programme. The programme in France has paid, on average, 52% of overall insured losses related to natural hazards covered by the programme which suggests that insurers usually cede the maximum allowed to the public reinsurer (CCR, 2025^[104]).⁷⁶ As a result, the transfer of risk by direct insurers in France to private reinsurers is likely limited, unless direct insurers retain significantly less than 50% of their flood risk. In the United Kingdom, the amount of claims paid by Flood Re suggests that direct insurers continue to retain most flood risk or transfer that risk to private reinsurers.⁷⁷ In Australia, on the other hand, direct insurers that provide coverage in regions at risk of cyclone-related flooding are required to transfer that risk to the programme, therefore displacing private reinsurance coverage for cyclone-related risks.⁷⁸

The private sector role in distributing flood insurance coverage and assuming flood risk varies substantially across countries (Table 5.10). The potential for private sector involvement in assuming risk is generally higher in countries where: (i) flood insurance programmes operate as private sector co-insurance/pooling arrangements, including Belgium, Italy, Morocco, Norway and the Swiss cantons where private sector insurers operate; (ii) where programme coverage provides limited direct insurance coverage, such as New Zealand, Romania and the United States, although private flood insurance remains limited in Romania and the United States; (iii) where programmes provide limited or optional reinsurance coverage, such as Australia (non-cyclone flood), France, Italy and the United Kingdom; and/or (iv) where significant risk assumed by the programme is transferred to private reinsurance, retrocession or capital markets, such as in New Zealand, Romania and the United Kingdom.

Table 5.10. Private sector involvement in distributing flood insurance and assuming flood risk

	Distribution of flood insurance coverage	Assumption of flood risk (direct insurance)	Assumption of flood risk (through co-insurance/pooling arrangement)	Assumption of flood risk (reinsurance or retrocession)
Australia		Non-cyclone flood		Private sector exposure
Belgium			High-risk (ceiling on private sector liability)	
Denmark	Pluvial	Pluvial		Pluvial
France				
Iceland				Programme exposure
Italy				
Morocco				

	Distribution of flood insurance coverage	Assumption of flood risk (direct insurance)	Assumption of flood risk (through co-insurance/pooling arrangement)	Assumption of flood risk (reinsurance or retrocession)
New Zealand				
Norway		Pluvial		
Romania				
Spain ¹				
Switzerland (Public)				Programme exposure
Switzerland (Private)				
Türkiye				To be determined
United Kingdom				
United States				Programme and private sector exposure

Note: Dark blue represents a more substantial private sector role in the given activity. Light blue indicates some private sector role in the given activity. White indicates no private sector role in the given activity. ¹ In Spain, the private insurance sector provides flood insurance and assumes flood risk under policies that are not included within the scope of the programme, such as those related to transport, construction and erection risks.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*; SVV (2022^[105]), *Die Elementarschadenversicherung basiert auf doppelter Solidarität*.

Leveraging private insurance and reinsurance market capacity can have a number of advantages, including.

- Reducing the amount of risk assumed by the public sector: as discussed in the next section on Fiscal risks related to government financial support, programmes that ultimately assume a significant share of all flood risk could face a greater risk of catastrophic losses from a major event, with potential implications for public finances where a government backstop is provided.
- Limiting moral hazard: where the private insurance sector is involved in distributing or underwriting coverage, the potential for moral hazard could be reduced by ensuring that the private sector retains some of the risk.
- Unlocking private sector risk assessment expertise: ensuring that the private market assumes significant levels of flood risk can potentially increase private (re)insurance sector involvement in developing analytical tools for risk assessment. Some countries where the private sector assumes significant flood risk appear to be better covered by insurance sector modelling and mapping than overall market size might otherwise warrant (and vice versa) (see Table 5.11). For example, there appears to be a greater availability of private sector modelling and mapping tools covering Belgium, New Zealand and Switzerland relative to Spain where almost all of the risk is assumed by the programme and is priced as a share of the sum insured, rather than based on risk. The development of insurance sector models and mapping tools can benefit private insurers and programmes, for example by allowing for more favourable access to reinsurance coverage,⁷⁹ and can also be used to support risk reduction. However, as outlined below, many of the programmes also leverage their risk assessment expertise and their own models in support of risk reduction.

Table 5.11. Availability of private market catastrophe models for flood risk

	Verisk	Moody's RMS	JBA Risk Management	KatRisk	Aon Impact Forecasting	Fathom
United States						
United Kingdom						
France						
Canada						
Australia						
Italy						
Spain						
Switzerland						
Belgium						
Türkiye						
Denmark						
Norway						
New Zealand						
Romania						
Morocco						
Iceland						

Note: Countries are ordered based on the size of the non-life insurance market (2022, USD premiums collected) from (Casanova Aizpun et al., 2023^[106]). Blue shading indicates the availability of a private market catastrophe model for flood risk. White indicates that there is no available private market catastrophe model.

Source: Insurance Development Forum (2025^[107]), *CatRiskTools*.

However, reliance on private market capacity can also have disadvantages if reductions in market appetite lead to a decrease in insurance availability or affordability, and the emergence of protection gaps. For example, reliance on reinsurance or retrocession market appetite can lead to volatility given the nature of reinsurance market cycles. A number of programmes that responded to the OECD survey on flood risk insurance programmes noted that increasing reinsurance costs have had an impact on operating performance and/or are making it difficult to maintain existing premium rates or other programme parameters. For example, increases to Flood Re's liability limit, loss limit and industry levy were partly driven by rising reinsurance costs (Flood Re, 2024^[108]).⁸⁰ Reinsurance can also be a costly way to protect against claims if there are few extreme events. As can be seen in Figure 5.6 (and Figure 5.7 below), some programmes have paid significantly more in reinsurance premiums than they have received in reinsurance claims payments in recent years. However, this would be expected if the reinsurance arrangements have been calibrated to only be triggered infrequently for the most extreme events.

Programmes that are designed to play a limited role in the market, such as residual providers of coverage for risks that the private sector does not want to assume, are likely to be left with a risk pool made up of high-risk properties likely to face more frequent and/or more severe flood damages, which could have implications for the financial soundness of the programme. Programmes that provide coverage for a broader set of hazards and insureds should be able to build a more diversified risk pool subject to more limited volatility in losses and potentially improved reinsurance or retrocession pricing.

Programmes that assume a large portion of the flood risk will also collect significant data for the development of maps and modelling tools that can provide an alternative to models and maps developed by the insurance sector.⁸¹ In many cases, programmes also have linkages to the government that might allow insurance-based risk analytics to make a greater contribution to risk management and risk reduction.

5.5. Minimising impacts on public finances

The establishment of a flood risk insurance programme will have implications for public finances. Flood risk insurance programmes that involve the assumption of flood risk by the public sector as a provider of insurance, reinsurance or a government backstop could create fiscal risks if the amount of premiums collected for the coverage is insufficient to pay all claims and programme operating costs. At the same time, to the extent that the programme leads to broader coverage, it could reduce the demand and need for public compensation and financial assistance. Minimising overall public sector financial exposure to flood risk should be a core objective in the design of a flood risk insurance programme.

5.5.1. Financial support provided to flood risk insurance programmes

Flood risk insurance programmes can create fiscal risks as a result of the government backstops that are provided to the programmes. Most of the flood risk insurance programmes that operate as state-owned direct insurers or reinsurers benefit from some form of explicit government backstop, with the exception of the Public Insurance Companies for Real Estate in Switzerland.

- The programmes in New Zealand and Spain benefit from explicit and unlimited government guarantees (World Forum of Catastrophe Programmes, n.d.^[14]). In these countries, the government will assume responsibility for any losses that are beyond the capacity of the programme to absorb. The programme in France benefits from an explicit and unlimited state guarantee that is triggered when the state-owned reinsurer's annual aggregate claims exceed 90% of its reserves, ensuring the state-owned reinsurer's solvency regardless of the level of claims, whether due to their severity or frequency. The state-owned reinsurer in Italy (SACE) also benefits from an explicit government guarantee although a ceiling of EUR 5 billion will be imposed on the risks it can assume under the programme, with the possibility that the ceiling may be increased in future years based on amounts paid by the state-owned reinsurer in the preceding year (Tayel, 2025^[25]). The Cyclone Reinsurance Pool in Australia benefits from an explicit AUD 10 billion government guarantee to address losses beyond the programme's financial capacity, although the government is required under legislation to adjust the limit to cover all losses if necessary.
- The programme in Türkiye may be provided with an "excess-of-loss" financial protection from the government if it has not been able to secure sufficient financial protection in private reinsurance markets (DASK, 2012^[109]). An excess-of-loss reinsurance coverage has been provided to the programme for its assumed earthquake risk, although decisions on government support for the flood risk coverage that the programme will provide have not yet been taken.
- The National Flood Insurance Program in the United States can borrow funds from the US Treasury to fund losses to meet payment needs (OECD, 2021^[7]). The programme in Iceland can borrow funds from banks with the benefit of a government credit guarantee if needed (Government of Iceland, 1992^[110]).

The compensation programmes in Denmark for uninsurable losses and Morocco for uninsured losses are funded by a surcharge on insurance policies and would only create fiscal risks if demands for compensation exceed the amount collected through the surcharge and if the government decided to meet those demands. In Denmark, the compensation fund was depleted as a result of compensation demands following storm surge damages in December 2013. The Government of Denmark provided DKK 400 million to help the Council meet those demands which was repaid in 2019, funded by increases in the fee charged per policy (Stormrådet, 2020^[111]). In Morocco, the compensation fund is designed to meet all compensation needs for events with a return period of up to 1-in-100 years with benefits to be reduced for more severe events (i.e. with a less frequent than 1-in-100 year return period).

The programmes that provide compensation in Belgium for excess losses and Norway for uninsurable losses are funded by budgetary resources and therefore could create fiscal risk should they be faced with significant demands for compensation. However, these programmes may not have any legal or contractual obligation to meet those demands. In the aftermath of the severe 2021 floods in Belgium, insurers reportedly agreed to increase the amount of compensation provided to impacted property owners beyond the defined insurance sector share of losses to make up for a shortfall in the compensation that the regional government would normally provide, with the expectation to be repaid by the regional government (de Thier and Heureux, 2023^[112]). The per event ceiling on the amount that insurers would be obliged to pay before government compensation is provided was subsequently increased from EUR 320 million to EUR 1.6 billion (Arnoudt, 2023^[113]).

The programmes that are operated by the private sector do not generally benefit from an explicit government backstop, with the exception of the direct insurance programme in Romania which can access loans from the government if necessary to meet claims payments. The co-insurance/pooling arrangements in Belgium, Italy, Morocco, Norway, the co-insurance/pooling arrangement among Swiss private insurers as well as the reinsurance programme in the United Kingdom do not benefit from any form of explicit government backstop for the coverage that they provide, although as noted, there are compensation arrangements in Belgium, Morocco and Norway to supplement the coverage provided by the co-insurance/pooling arrangements.

5.5.2. Fiscal risks related to government financial support

The extent of the fiscal risk that could result from the government backstops provided depends on: (i) the level of risk assumed by the programme, net of any risk transferred to private insurance, reinsurance or capital markets; (ii) whether the programme is collecting sufficient premiums to meet its potential claims (i.e. the programme's financial soundness); and (iii) the nature of the government backstop provided, including whether it is limited, compensated through a premium or fee paid to government, and/or repayable.

Scope of risks assumed and retained

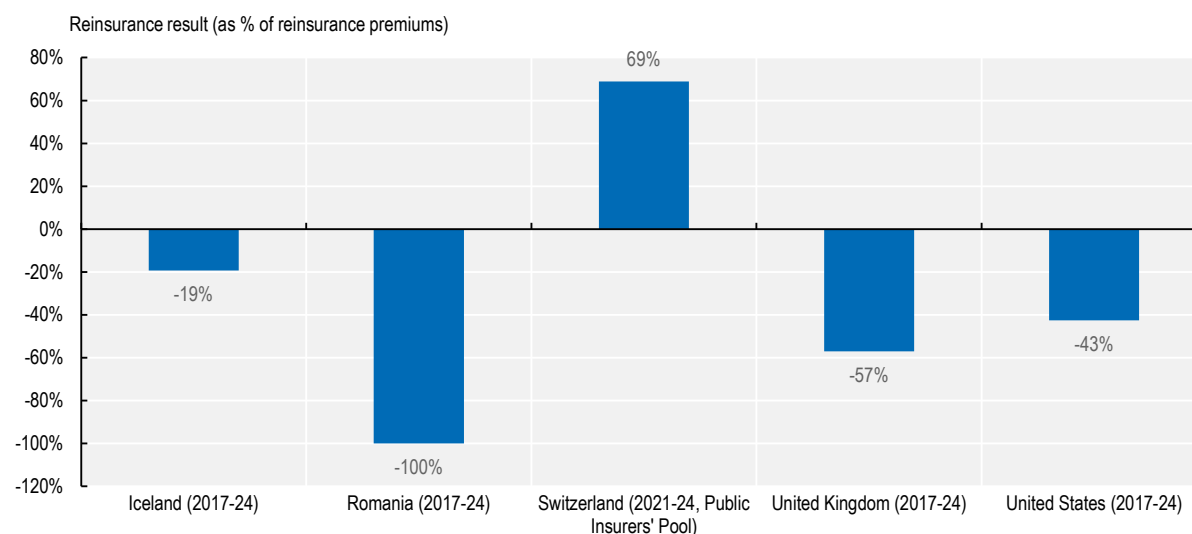
As noted above (see Table 5.10), some of the programmes play a more significant role in assuming flood and often other natural hazard risks and make more limited use of opportunities to transfer risk to private reinsurance or retrocession markets. Some programmes operate as the main or sole provider of flood insurance coverage, as insurers in Iceland and Spain,⁸² and as a reinsurer in Australia for cyclone-related flood risks. As a result, these programmes would assume a substantial amount of the country's flood risk unless a significant proportion is transferred to private reinsurance or retrocession markets. In addition, in some countries where both programmes and private (re)insurers offer insurance or reinsurance coverage, such as France and the United States, the programmes nonetheless assume a significant share of the country's flood risk due to limited take-up of private insurance or reinsurance and limited use of private reinsurance and/or retrocession markets.

Unlike many other lines of insurance business, coverage for natural hazard-related property damages exposes insurers and reinsurers to the risk of extreme losses due to the potential occurrence of a major event that affects many policyholders simultaneously. This risk usually drives property insurers to acquire reinsurance to protect against extreme losses (OECD, 2018^[114]). An insurance or reinsurance programme that assumes a significant share of a country's flood risk is similarly exposed to substantial losses in the event of a catastrophic flood or series of major floods in a given year. If the programme does not have significant reinsurance or retrocession protection for extreme losses or significant accumulated reserves, severe losses could necessitate financial support from governments, leaving governments with the role of reinsurer for excess programme losses. Some programmes have had to access government financial support in the aftermath of major events. The programme in France accessed the government guarantee

as a result of winter storms in 1999 that caused both wind and flood damage (Cazaux, Meur-Férec and Peinturier, 2019^[115]). The programme in Spain accessed a credit line from the central bank after an accumulation of severe flood damages in 1982 and 1983, although this was prior to significant changes to the legal framework of the programme (González de Frutos, 2023^[116]). The US programme has borrowed significant amounts to meet flood claims in the aftermath of major hurricanes or series of hurricanes (Congressional Research Service, 2024^[117]).⁸³ The programmes in New Zealand and Türkiye have also accessed government support in the aftermath of major earthquakes.

The risk that extreme losses trigger government financial support should be reduced if the flood risk insurance programme acquires significant protection from reinsurance or retrocession markets. However, acquiring significant private market reinsurance coverage can be costly, particularly in the context of a hard reinsurance market. The cost of reinsurance coverage would need to be incorporated into the premium collected, which could have potential implications for affordability. In addition, reinsurance coverage may not be triggered over a number of years, resulting in a net cost for the programmes that ceded risk to reinsurance markets. While only reflecting a limited period of time that is insufficient to infer conclusions about the relative benefits and costs of reinsurance, most programmes have paid, sometimes significantly, more in reinsurance premiums than they have received in reinsurance recoveries in recent years (Figure 5.7). However, this would be expected if the reinsurance or retrocession coverage acquired is meant to cover extreme (i.e. very low frequency) losses. In some cases, governments that offer financial support for extreme losses may wish to evaluate the relative costs and benefits of encouraging programmes to acquire significant reinsurance protection, while taking into account the potential impact of government financial support on moral hazard.⁸⁴

Figure 5.7. Programme reinsurance results (2017-2024)



Note: The reinsurance result is calculated as the difference between reinsurance recoveries received by the programme and reinsurance premiums paid by the programme (shown here as a share of reinsurance premiums paid). In Iceland, Romania and Switzerland, the overall reinsurance result includes all hazards covered by the programme (i.e. not just reinsurance for flood risk).

Source: NTI (2019^[75]; 2021^[76]; 2023^[77]), *Ársskýrsla*; NTI (2025^[78]), *Ársreikningur*; PAID Romania (2019^[79]; 2020^[80]; 2021^[81]; 2022^[82]; 2023^[83]; PAID Romania, 2024^[84]), *Raport privind Solvabilitatea și Situația Financiară*; AECA (2023^[85]), *Rapport Annuel 2022: La solidarité crée la sécurité*; UIR (2025^[86]), *Rapport financier 2024*; Flood Re (2018^[87]; 2019^[88]; 2020^[89]; 2021^[90]; 2022^[91]; Flood Re, 2023^[92]), *Annual Report and Financial Statements*; Flood Re (2024^[93]), *Annual report and accounts 2023-2024*; FEMA (2018^[94]; 2019^[95]; 2020^[96]; 2021^[97]; 2022^[98]), *The Watermark*; NFIP (2021^[99]), *National Flood Insurance Program's Reinsurance Program*.

A reduced scope of eligible hazards and/or eligible insureds could also reduce the risk, or at least the magnitude, of extreme losses that could necessitate government financial support. Programmes could limit their overall financial exposure by, for example: (i) limiting eligibility to households and small businesses which may have more limited access to private insurance; (ii) reducing the amount of coverage provided and enabling the private sector to provide supplemental coverage; and/or (iii) limiting the scope of hazards covered by the programme to those that are uninsurable in the private market⁸⁵ or those that can only be cost-efficiently addressed by investing in risk reduction.⁸⁶

Box 5.2. Public compensation and financial assistance

Governments in most countries provide financial assistance or compensation to those affected by disasters, including floods. This can be in the form of small grants to support basic needs or more substantial grants or loans to help those impacted rebuild damaged homes or businesses, or even rebuild in a more resilient way.¹ Households and businesses that have comprehensive insurance coverage for damages and losses due to floods are less likely to need compensation or financial assistance to repair building damage or recuperate lost revenues, and therefore demands for public compensation and financial assistance should be lower in countries with higher levels of insurance coverage. There is some evidence that higher insurance coverage is correlated with reductions in post-event government spending. For example, an examination of government spending in the aftermath of a set of past large events estimated that an increase in insurance penetration of 1% is linked to a reduction in post-disaster government expenditure equivalent to 22% of the damages incurred (Lloyd's, 2012^[118]).

The flood insurance programmes that responded to the OECD survey provided some information on the public compensation and financial assistance that is made available in the aftermath of floods in their countries, as well as an assessment of the relative contribution of this support in responding to flood-related damages and losses. In most of the countries with flood risk insurance programmes, the contribution of public compensation and financial assistance is limited, including in countries where programme coverage is broadly available and comprehensive, such as Spain and Switzerland,² as well as in countries where programme coverage or take-up is more limited, such as Romania and the United States, or where the programme plays a more limited role in the market, such as the United Kingdom. Only the programmes in Morocco, where a compensation programme for uninsured households has been established, and New Zealand indicated that public compensation and financial assistance played a more significant (“moderate”) role in responding to flood damages and losses.³

Providing substantial public compensation and financial assistance to households or businesses to respond to flood damages and losses could undermine efforts to encourage take-up of programme (or private sector) flood insurance coverage. Many of the countries with flood risk insurance programmes have taken steps to mitigate the risk that government compensation might discourage insurance take-up.

- As noted above, the government compensation programmes in Belgium, Denmark, Morocco and Norway are specifically designed to complement the financial protection available through the flood risk insurance programme by limiting coverage to damages and losses that are uninsured in Morocco, uninsurable in Denmark and Norway, or that exceed private insurance market capacity in Belgium. Providing clear boundaries between the role of insurance, including programme coverage, and compensation programmes could help limit demands for public compensation in the aftermath of major flood events.

- In Romania and the United States, the availability of public compensation and financial assistance is limited to those that have purchased or commit to purchase insurance coverage. In Romania, financial assistance from national and local governments to respond to flood damages is not available to households that do not comply with the requirement to acquire programme coverage (PAID Romania, 2021^[34]). In the United States, households that receive financial assistance through the Federal Emergency Management Agency's Individuals and Households Program are expected to maintain flood insurance to be eligible for any future payouts. In addition, households that are located in a Special Flood Hazard Area are not eligible to receive financial assistance if they have not acquired flood insurance (Bhattacharyya, Wang and Hastak, 2024^[119]). In Italy, businesses that do not comply with the requirement to purchase flood and other natural hazard insurance will be ineligible for government financial assistance for recovery or reconstruction (Tayel, 2025^[25]).

Notes:

¹ For example, in the United Kingdom, government grants of up to GBP 5 000 have been provided to fund measures that improve a property's flood resilience (Government of the United Kingdom, 2023^[120]).

² In its response to the OECD survey, the Swiss programme for Public Insurance Companies for Real Estate indicated that the government does not provide any public compensation or financial assistance for flood damages and losses.

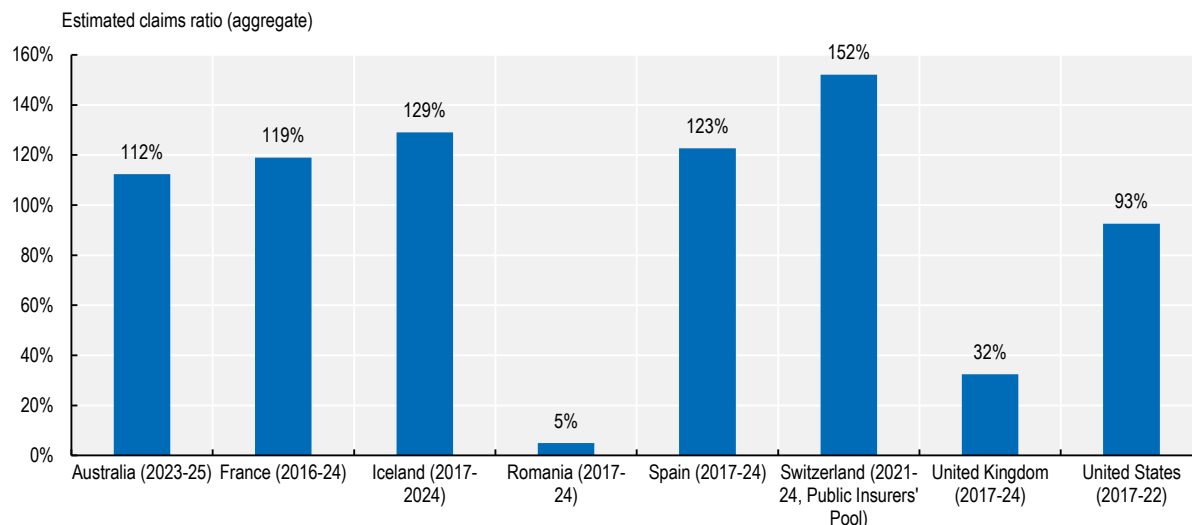
³ This may reflect experience from the significant flooding that occurred as a result of Tropical Cyclone Gabrielle in 2023 where a buy-out process was offered for certain homes that were likely to be repeatedly impacted by flooding. The buy-out was funded by the central government and local council, with insurance recoveries paid to local councils, and was complemented by other relief funds made available by the central government.

However, limiting the scope of hazards covered, eligible insureds or the amount of coverage offered could ultimately reduce the overall level of coverage achieved. The risk that financial support could be triggered, or that greater amounts of support would be needed, due to a broader programme scope should be considered in the context of whether more limited coverage would lead to greater uninsured losses and public demands for more substantial public compensation or financial assistance (Box 5.2). In addition, limiting programme coverage to risks that are uninsurable could lead to more frequent or significant needs for government financial support as the programme's portfolio of risk would be populated by higher-risk properties⁸⁷ (OECD, 2021^[7]).

Programme financial soundness

Fiscal risks might also arise if a programme faces more frequent underwriting losses which could occur if premiums collected are regularly insufficient to meet claims demands. A number of programmes have faced claims ratios (i.e. claims as a share of premiums) above 100%, indicating that premiums have been insufficient to cover the cost of claims (Figure 5.8).⁸⁸

Figure 5.8. Estimated claims ratio: selected programmes (2016-2024)



Note: The claims ratio for some multi-peril programmes (France, Iceland, Romania, Spain, Switzerland) is for all covered perils. The estimate for Switzerland is for the reinsurance pool established by Public Insurance Companies for Real Estate (not for the insurers). The estimate for France includes insurers and the state-owned reinsurer. The estimate for the United Kingdom includes the industry levy as premium income.

Source: The estimates for Australia, Iceland, Romania, Switzerland, the United Kingdom and United States are OECD calculations based on: ARPC (2024^[121]; 2025^[122]), *ARPC Annual Report*; NTI (2019^[75]; 2021^[76]; 2023^[77]), *Ársskýrsla*; NTI (2025^[78]), *Ársreikningur*; PAID Romania (2019^[79]; 2020^[80]; 2021^[81]; 2022^[82]; 2023^[83]; PAID Romania, 2024^[84]), *Raport privind Solvabilitatea și Situația Financiară*; AECA (2023^[85]), *Rapport Annuel 2022: La solidarité crée la sécurité*; UIR (2025^[86]), *Rapport financier 2024*; Flood Re (2018^[87]; 2019^[88]; 2020^[89]; 2021^[90]; 2022^[91]; Flood Re, 2023^[92]), *Annual Report and Financial Statements*; Flood Re (2024^[93]), *Annual report and accounts 2023-2024*; FEMA (2018^[94]; 2019^[95]; 2020^[96]; 2021^[97]; 2022^[98]), *The Watermark*. The estimates for France are from CCR (2025^[104]), *Les catastrophes naturelles en France: Bilan 1982-2024*. The estimates for Spain are from CCS (2025^[123]), *Statistics - Extraordinary Risks: Data Series for 1971-2024*.

The multi-peril direct insurance programme in Romania and the flood reinsurance programmes in the United Kingdom have achieved low claims ratios in recent years. The programme in Romania has not faced significant losses in any of the years considered. In the United Kingdom, claims were low relative to the amount of premiums and levy charges collected, although the claims ratio increased significantly in more recent years.

The programmes in Australia, France, Iceland Spain and the Public Insurance Companies for Real Estate programme in Switzerland have faced overall underwriting losses in recent years. In Iceland, the overall underwriting loss is driven by exceptional losses and compensation paid for damages and relocation of residents from the town of Grindavík, which was impacted by earthquakes and volcanic eruptions beginning in late 2023 (NTI, 2025^[78]).⁸⁹ In Spain, the overall loss is driven by the major flooding near Valencia in 2024 which led to EUR 4.9 billion in losses, nearly 5 times more losses than the programme has ever faced from a single event (CCS, 2025^[123]).⁹⁰ Significant reserve accumulation prior to the event protected the programme from requiring additional funds.⁹¹ In Australia, Tropical Cyclone Alfred in March 2025 had a significant impact on underwriting performance, which is projected to lead to losses that will account for more than 80% of the losses in the programme's first years (ARPC, 2025^[124]). In Switzerland, the programme is protected by the pooling of excess losses among participating Public Insurance Companies for Real Estate, which was not accounted for in calculating the estimated claims ratio. In France, the average claims ratio for the "CatNat" system⁹² as a whole has increased to 119% for the period 2016-2024 relative to (a still high) 93% during the period 2010-2024 (CCR, 2025^[104]).

The programme in the United States has faced a lower, although still relatively high, claims ratio, mostly driven by significant claims in 2018.⁹³ The programme has faced fairly frequent losses and has borrowed

funds from the US Treasury in 22 years since 1980, although only three times since 2010 (Congressional Research Service, 2024^[117]). The US Government Accountability Office estimates that the programme could continue to face an annual funding shortfall of USD 1 billion or more until 2032 (during the transition to full-risk based premiums) (GAO, 2023^[40]). The programme also likely faced a high claims ratio in 2024 given significant claims from Hurricanes Helene and Milton.

Premium inadequacy could be unexpected, for example, if loss experience has been higher than expected due to changes in hazard frequency or severity or risk assessment weaknesses. Premium inadequacy could also be intentional, if premium rates have been established with the aim of ensuring affordability rather than financial soundness. Given their public policy purpose, and access to government support, flood risk insurance programmes may be able to accept more frequent underwriting losses than a private insurer or reinsurer (OECD, 2021^[7]). As above, the fiscal costs that could materialise as a result of premium inadequacy should be considered in the context of whether greater programme financial resilience, through higher premiums, might reduce overall coverage levels, due to reduced affordability, and lead to more substantial needs for public compensation and financial assistance.

In the context of increasing flood losses, a number of programmes have increased premiums. In France, the government announced an increase to the premium rates applied for programme coverage for property insurance, both household and commercial and industrial risks (from 12% to 20%), and for first party motor vehicle coverage (from 6% to 9%) (Ministère de l'Économie, 2023^[125]). In the United Kingdom, Flood Re announced a mid-year premium increase that will take effect from October 2025 (Flood Re, 2025^[126]) with rates increasing by as much as 20% for the highest council tax band (Harris, 2025^[127]). The programme and the UK government also agreed to an increase to the industry levy, from GBP 135 million to GBP 160 million (Flood Re, 2025^[126]). As noted above, the US National Flood Insurance Program is also increasing premium rates through the implementation of Risk Rating 2.0.

Form of financial support

The government support provided to flood risk insurance programmes is often limited by a ceiling on payments, compensated in terms of a fee or premium payment from the programme or repayable. Some of the programmes that benefit from a government backstop compensate the government for the support provided by paying a fee or premium. The reinsurance programme in France pays a share of the premiums that it collects (10.8%) to the government as a fee for the provided guarantee while the programme in Türkiye pays a premium for the excess-of-loss reinsurance coverage provided, which is also limited in the amount of coverage provided. In other cases, the government financial support is repayable. Any loans extended by the government to the programmes in Iceland, Romania and the United States are repayable. In Iceland, the obligations of the programme are also limited for any given event to 10% of the programme's aggregate sum insured (Government of Iceland, 1992^[110]). In Italy, a ceiling on the amount of risk that can be assumed by the state-owned reinsurer is established annually (Tayel, 2025^[25]). In Spain, while the obligations of the programme benefit from a government guarantee, past funding needs to meet financial obligations were addressed through repayable loans.

Other things equal, fiscal risks would be greatest for programmes that have access to unlimited, non-repayable and uncompensated backstops. However, applying fiscal risk mitigation measures to the government financial support provided to a programme is likely to have other implications.

- Establishing a limit on government financial support can help ensure that fiscal risks are identified, managed and mitigated, although any losses that exceed the programme's capacity, inclusive of the pre-determined financial support, would ultimately be uninsured and could therefore create a need for public compensation and financial assistance.
- Establishing a repayment requirement can help ensure that fiscal risks are contained. It could also provide an incentive for the programme to ensure financial soundness and reduce moral hazard. However, repayment obligations could pose a burden on the programme that could ultimately lead

to future losses, or a need to raise premiums which could impact affordability. For example, the US National Flood Insurance Program carries a significant outstanding debt burden of USD 20.5 billion and made annual interest payments of USD 619 million in 2023 (FEMA, 2023^[128]), equivalent to approximately 19% of premiums collected in fiscal year 2022 or 1.6 times the amount the programme paid for reinsurance coverage (FEMA, 2022^[129]). In addition, repayments due shortly after a significant event could coincide with rising reinsurance costs, as reinsurance pricing tends to increase after large events, which could place further pressure on the financial soundness of the programme.

The magnitude of potential fiscal risks that may arise differs across countries, based on: (i) the scope of flood risk assumed and retained by the flood risk insurance programmes with access to explicit government financial support; (ii) programme financial soundness; and (iii) the form of government financial support (Table 5.12).

Table 5.12. Potential fiscal risks related to government support for flood risk insurance programmes

	Programme retains significant flood risk	Programme may not collect sufficient premiums	Programme has faced past losses beyond financial capacity	Substantial government support is provided
Australia				Substantial but repayable
France				Substantial but compensated
Iceland				Programme ceiling and repayable
New Zealand	Limited coverage provided			
Romania	Limited coverage provided and significant use of reinsurance			Repayable
Spain				Substantial but likely repayable
United States				Substantial but repayable

Note: Dark blue indicates a more significant potential for fiscal risk related to the given risk factor. Medium blue indicates a moderate potential for fiscal risk related to the given risk factor. Light blue indicates a limited potential for fiscal risk related to the given risk factor. White indicates no potential for fiscal risk related to the given risk factor. The fiscal risk factors are: (i) the programme assumes and retains a substantial share of the country's flood risk (first column); (ii) the programme may not collect sufficient premiums to meet claims (and could therefore require government support) (second column); (iii) the programme has faced past losses beyond its financial capacity (and has called on government support) (third column); or (iv) substantial unlimited, non-repayable or uncompensated (through a fee or premium) government support is available.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*.

5.6. Encouraging and supporting flood risk reduction

The establishment of a flood risk insurance programme could also aim to support flood risk reduction and adaptation. Flood risk insurance programmes can support flood risk reduction by: (i) leveraging and sharing any insights on flood risk gathered by the programme with policyholders, communities and governments responsible for investments in flood prevention; (ii) incentivising flood risk reduction measures by policyholders through premium pricing that reflects risks and premium discounts that reward investments in risk reduction, or by applying risk-related conditions on access to coverage; and (iii) providing direct funding to policyholders for investments in risk reduction, either before or after a loss has been incurred (Table 5.13). Various design characteristics could have an impact on the role of

flood risk insurance programmes in risk reduction, including the importance of the programme in assuming flood risk, the type of coverage provided, the relationship of the programme with government, and the programme's approach to premium pricing. The flood risk insurance programmes that have been established have also placed different levels of emphasis on investing in flood risk reduction and adaptation.

Table 5.13. Programme contributions to risk reduction

	Sharing of risk data and/or insights to identify high-risk areas and/or risk reduction options	Providing incentives for risk reduction through risk-based pricing and/or premium discounts	Providing funding for investments in risk reduction
Australia			
France		Higher deductibles in response to risk management gaps	
Italy			
Morocco			
New Zealand		Private sector may apply risk-based pricing for building coverage	
Romania			
Spain			
Switzerland (Public)			
Türkiye			
United Kingdom		Private sector may apply risk-based pricing	
United States			

Note: Dark blue indicates a more significant contribution to risk reduction through the given type of contribution. Light blue indicates a limited contribution to risk reduction through the given type of contribution. White indicates contribution to risk reduction through the given type of contribution.

Source: OECD survey on the design and operation of flood risk insurance programmes; OECD (2021^[7]), *Enhancing Financial Protection Against Catastrophe Risks: The Role of Catastrophe Risk Insurance Programmes*; World Forum of Catastrophe Programmes (n.d.^[14]), *Comparative Table*.

5.6.1. Sharing flood risk insights in support of risk reduction

As noted above, the insurance sector has developed sophisticated risk analytical tools to quantify the exposure to flood and other natural hazard risks that is assumed through the coverage provided. These analytical tools make use of meteorology, hydrology and engineering to identify potential flood hazards and the potential damage that could result from these hazards based on the location and structural characteristics of the built environment. The claims data that (re)insurers collect through their activities makes a critical contribution to calibrating these risk analytical tools. The data and insights from risk analytical tools developed by the insurance sector could make a broader contribution to flood risk management and flood risk reduction, including by informing decisions on land-use and building codes and identifying communities or individuals at high risk and possible risk mitigation approaches (OECD, 2023^[130]).

The availability of insurance sector analytical tools in different countries is linked, to some extent, to the amount of risk that private (re)insurers have assumed. In general, there tends to be a wider selection of flood risk models in countries where the private insurance sector assumes significant flood risk (Table 5.11).

However, in countries where flood risk insurance programmes assume the vast majority of flood risk, similar risk analytical tools could be, and have been, developed by the programmes directly, leveraging

claims data for the entire country and potentially the meteorological, hydrological and engineering expertise available within other government departments and agencies. Programmes that provide direct insurance coverage for most flood hazards and for a broad range of insureds, including households and businesses facing different levels of risk, would likely have broader and more granular access to data that can be used in developing risk analytics and insights.

The programmes that are operated by state-owned or government-linked entities, including in Australia, France, Morocco, New Zealand, Spain and in the Swiss cantons with Public Insurance Companies for Real Estate, share data and insights derived from their (re)insurance and compensation activities with national and sometimes local governments to support investment in risk reduction, although subject to any restrictions related to data and privacy protection.⁹⁴ In many cases, they also work proactively with governments to identify high-risk areas.

- In Australia, the Australian Reinsurance Pool Corporation is working with the National Emergency Management Agency on the development of a national disaster risk profile and is sharing data to identify high-risk communities and prioritise risk mitigation projects and funding for disaster readiness.
- In France, the state-owned reinsurer has developed a strategy to promote risk reduction and adaptation which will include efforts to advise relevant governments agencies on effective risk reduction approaches and encourage insurance companies to implement risk awareness and reduction measures with their insureds (CCR, 2025^[131]). As part of its 2025 strategic plan, the state-owned reinsurer is developing a new advisory and services offering to reinforce prevention. So far, the services offered include exposure mapping, climate risk diagnostics, consulting services, and customised training programmes.
- In Morocco, the *Fonds de solidarité contre les événements catastrophiques* works with all water and flood management agencies to identify high-risk areas and approaches to risk reduction.
- In New Zealand, the Natural Hazards Commission has a Resilience and Research team that leverages science and research on the natural hazards covered by the programme to raise risk awareness at central and local government levels, as well as among businesses and households, and with regulators responsible for critical areas such as building codes. The programme reviews land-use plans developed by local councils and, where relevant, makes submissions to oppose development in high-risk areas. The programme has also released 25 years of claims data for all residential properties in New Zealand in order to provide home buyers and existing residents with key information on risk and the need for risk reduction.⁹⁵
- In Spain, the *Consorcio de Compensación de Seguros* is involved in the national implementation of the European Union's Flood Directive, which is aimed at reducing the risk of flood damages in Member States, and provides loss data and loss ratios to support the identification of "Areas of Potential Significant Flood Risk"⁹⁶ where development should be limited. The programme is also collaborating with the General Directorate for Water on identifying high-risk properties that could benefit from public funding for adaptation and with individual municipalities on adaptation options.
- In Switzerland, the Public Insurance Companies for Real Estate contributed to the development of hazards maps that are integrated into all land-use planning and development decisions, and provide feedback on land-use planning in the cantons where they operate.
- In the United States, the National Flood Insurance Program, which is part of the Federal Emergency Management Agency, works proactively within government to identify high risk areas and potential risk reduction options. The programme also develops flood hazard maps for the entire country, the Flood Insurance Rate Maps that are used for the pricing of its coverage, and receives a budget appropriation for the development of those maps.

The programmes that are operated by private sector entities also leverage their data and insights to support risk awareness, risk management and risk reduction, although the level of data sharing and advice appears to be more limited, potentially linked to their more limited attachment to government.

- In Romania, *Pool-ul de Asigurare Împotriva Dezastrelor Naturale* has various areas of collaboration with the Romanian General Inspectorate for Emergency Situations although the programme's claims data is not shared with government agencies or with local communities.
- In Switzerland, private insurers and the co-insurance/pooling arrangement among private insurers have contributed to the development of hazard maps in the cantons where they operate.
- In the United Kingdom, Flood Re invests significantly in risk awareness initiatives and provides expertise on flood risk to the national government, including by convening experts in property flood resilience and developing information for households on how to improve their property flood resilience (Flood Re, 2025^[102]). However, the programme does not share data with the government or engage directly with local governments or high-risk communities to advocate or advise on specific risk reduction measures for individual properties or communities.

While driven by various factors, there is evidence that some of the countries with flood risk insurance programmes have been successful in minimising development in areas that are highly exposed to flood risk (Table 5.14).

Table 5.14. Development in areas exposed to flood risk (1985-2015 and 2020)¹

	Moderately higher growth in high-hazard flood zones (share of territory)	Significantly higher growth in high-hazard flood zones (share of territory)
Australia		
Belgium		
Denmark		
France		
Iceland		
Morocco		
New Zealand		
Norway		
Romania		
Spain		
Switzerland		
Türkiye		
United Kingdom		
United States		

Note: The shades of blue signify that a larger portion of the country's territory is seeing either moderately (10%-50%) or significantly (50%) more rapid growth in areas that are at high-risk of flooding, relative to areas that are at low-risk of flooding. ¹ More recent data (up to 2020) was included for some countries in Europe. The darker the shade of blue, the larger the share of the country's territory that faces moderately or significantly higher growth in high-hazard flood zones. White indicates that no share of the country's territory faces moderately or significantly higher growth in high-hazard flood zones.

Source: Rentschler et al. (2023^[2]), *Global evidence of rapid urban growth in flood zones since 1985*; Rentschler, Lemke and Avner (2025^[132]) *Settling in the Zone: Urbanization and Flood Exposure Trends Since 1985 (Europe and Central Asia)*.

5.6.2. Incentivising risk reduction through premiums and access conditions

Flood risk insurance programmes that make affordable coverage broadly available risk encouraging development in high-areas, unless closely controlled through land-use planning, and could also reduce incentives for risk management and risk reduction where coverage is subsidised for all or some

policyholders. The implementation of limits on access to programme coverage and/or risk-based pricing can deliver effective risk signals, provide incentives for risk reduction and reduce moral hazard.

As noted above, some programmes impose conditions on access to programme coverage as a means to mitigate the risk that the programme encourages development in high-risk areas by making affordable coverage available (i.e. to mitigate the risk of moral hazard).

- In Belgium, buildings constructed more than 18 months after a zone has been identified as a high-risk flood zone are not eligible to benefit from the premium rates defined by the *Bureau de Tarification* and can therefore only access coverage in the private market, which is likely to be expensive if the building is at high-risk.
- Similarly, in France, insurers are not obligated to extend coverage for natural hazards for: (i) new buildings constructed in zones where construction is not allowed based on the local *Plan de Prévention des Risques Naturels* (natural hazard prevention plan); or (ii) buildings that were constructed in a zone that was later identified as a zone where construction is not allowed and where identified prevention measures have not been implemented within five years (CCR, 2024^[133]).
- In Italy, illegal structures or structures without required legal authorisations are excluded (ANIA, 2025^[10]).
- In Switzerland, the Public Insurance Companies for Real Estate in some cantons can require households or business that have faced damages to undertake improvement measures in order to access coverage.
- In the United Kingdom, homes built after 2009 are not eligible for programme coverage. This restriction is aimed at ensuring that the programme does not incentivise new developments in high-risk areas by offering affordable reinsurance coverage, as homeowners will need to depend on private market coverage which would be expensive if flood exposure is high and cannot be transferred to Flood Re.
- In the United States, coverage is only available to households and businesses that are located in participating communities. To become a participating community, the local authorities must apply and submit a flood management ordinance that meets or exceeds minimum floodplain management requirements established by the programme. The measure provides the federal government, which has financial exposure to programme losses, with some assurance that flood risk management standards are applied in communities where coverage is being provided as well as a means to influence local flood risk management.

The programmes in Denmark and Norway apply some coverage exclusions for more frequent losses. In the case of Denmark, compensation is only provided for storm surge and inland flood damage with a return period that is assessed to be less frequent than 1-in-20 years. In Norway, the insurance coverage provided through the co-insurance/pooling arrangement will only cover coastal flooding losses if water levels exceed a 1-in-5-year return period. These measures help protect the programmes from repetitive losses incurred by homes or businesses at risk of regular flooding. It also should encourage those households and businesses to implement risk reduction measures, which would likely be a more cost-effective way to address high-frequency losses.

Risk-based pricing could serve to communicate a price signal to policyholders on the level of flood risk that they face and provide an incentive to implement risk reduction measures in order to reduce the amount they need to pay for flood insurance coverage. As noted above, the programmes in Australia, Türkiye and the United States implement, or will implement, risk-based pricing for the flood coverage that they provide and therefore should provide a risk signal to policyholders and some incentives for implementing risk reduction measures. In Italy, insurance companies are required to set premiums that are proportional to

the risk and take into account risk reduction measures implemented by policyholders (Persano Adorno, 2025^[59]).

Some programmes have identified specific measures that policyholders can implement in order to receive a defined reduction in their premium. In Australia, discounts have mostly been aimed at wind mitigation, such as roof tie-down and window and garage door bracing, although a specific discount for flood mitigation will be introduced for SMEs from April 2026 (ARPC, 2025^[134]). In the United States, the National Flood Insurance Program offers discounts based on the elevation of the first floor above the ground, taking into account the foundation type and with additional discounts for the inclusion of flood openings that allow floodwaters to pass through, as well as the placement of machinery, equipment and appliances at elevations above the first floor (FEMA, 2022^[135]). In the United Kingdom, Flood Re is developing a scoring methodology to measure the effectiveness of property flood resilience investments that will be used to create flood performance certificates⁹⁷ aimed at facilitating the provision of lower pricing and premium discounts for effective property-level flood risk reduction measures (Flood Re, 2023^[136]).

Programmes that provide direct insurance should have a greater capacity to ensure that policyholders receive risk signals and related incentives as the programme is responsible for setting and applying pricing decisions and offering premium discounts. It may be more difficult for a reinsurance programme to ensure that the price signals incorporated into reinsurance pricing is consistently passed on by the reinsured direct insurers.⁹⁸ However, reinsurance programmes that assume all of the risk, as in Australia and the United Kingdom, may be better able to ensure that risk signals and premium discounts are transmitted to policyholders as insurers are not retaining much risk and should be able to pass on the programme pricing. As noted above, the Australian Competition and Consumer Commission is monitoring the premium-setting practices of direct insurers to ensure that the benefits of the Cyclone Reinsurance Pool are passed on to policyholders.

The price signals and premium discounts will also be more effective where policyholders have the capacity to make effective investments in risk reduction and where effective risk reduction measures can be implemented at the level of individual properties, rather than at the community-level. The OECD's examination of the insurance sector contribution to climate adaptation identified a number of challenges to the implementation of risk reduction measures by policyholders, including a lack of awareness of possible risk reduction or adaptation investments and insufficient access to funding for investing in risk reduction or adaptation (OECD, 2023^[130]). As discussed in the following section, some programmes are providing financial support for policyholder risk reduction.

In addition, for some risks, property-level risk mitigation may be significantly less cost-effective than investments made at the community level. This challenge may be particularly relevant in the case of flood risk given the potential for community-level risk mitigation investments, including both structural flood control measures such as flood barriers as well as nature-based flood risk reduction measures, to significantly reduce exposure to flood risk for all properties within the community. Some programmes have responded by providing incentives and/or premium discounts for community-level risk reduction measures. In France, the standard deductible applied to insured natural hazard losses can be increased in communities where more than two covered events have occurred within five years and where a *Plan de Prévention des Risques Naturels* has not been developed. The deductible can be doubled for three events within five years, tripled for four events and quadrupled for five events (CCR, 2024^[133]). In the United States, the National Flood Insurance Program provides policyholders in participating communities with discounts based on community-based risk reduction measures, such as additional flood mapping, risk mitigation in new developments, measures to reduce losses in existing developments, improved emergency preparedness and public awareness initiatives (FEMA, 2017^[137]). The discounts can also be withdrawn if the community is found to have not implemented the risk management measures for which the discounts were provided.⁹⁹ The National Flood Insurance Program's Community Rating System has been found to be effective in reducing flood losses in participating communities¹⁰⁰ although there is some

evidence that communities with larger populations and higher levels of educational attainment are better placed to participate in, and incur benefits from, the system (Cano Pecharroman and Hahn, 2024^[138]).

5.6.3. Funding risk reduction activities

As noted, a key impediment to the effectiveness of policyholder risk reduction incentives is the cost of implementing risk reduction measures. For example, recent OECD work (OECD, 2023^[130]) estimated that it could take close to 30 years for those at lower risk, i.e. those facing a less frequent than 1-in-100 year flood return period, to recoup the cost of dry floodproofing a home through premiums discounts.

Some programmes are providing direct funding for community and policyholder risk reduction.¹⁰¹ For example, in Switzerland, the Public Insurance Companies for Real Estate provide funding for up to 50% of the cost of loss prevention measures and invest approximately CHF 80 million annually on risk reduction. In the United Kingdom, insurers and the programme have established a Build Back Better programme to make GBP 10 000 in funding available to integrate resilience measures into the post-event repair of insured properties. The programme is available to those whose property is reinsured by Flood Re as well as those covered solely by participating insurers (i.e. insurers that participate in the programme make the funding available to all policyholders, not just those reinsured through Flood Re). In the United States, the National Flood Insurance Program offers an additional “Increased Cost of Compliance” coverage that provides up to USD 30 000 to insured policyholders to allow them to elevate or relocate their homes or floodproof their business premises in order to be compliant with updated floodplain management requirements in their community (FEMA, 2023^[139]). As noted above, flood risk insurance programmes, particularly where the programme has a strong relationship with government, can also play a role in facilitating access to, or supporting the targeting of, public sector funding for property-level risk reduction. The programme in Spain has provided advice on where to focus government support.

The existence of a programme might also make it easier to implement important, although often controversial, risk reduction measures such as managed retreat (i.e. relocation away from high-risk zones). Some of the programmes have recent experience in supporting managed retreat for other natural hazards. For example, in Iceland, the programme worked with the government to arrange a buy-out of the properties in the town of Grindavik impacted by volcanic eruptions. Under the arrangement, the programme agreed to provide an insurance payment of 95% of the sum insured to allow residents to relocate elsewhere, with a special purpose real estate company established to take-over the homes and the responsibility for demolition (Sigurdardottir, 2024^[140]), (NTI, 2024^[141]). In New Zealand, approximately 8 000 homes were designated part of a 'Residential Red Zone' following the 2010–2011 Canterbury earthquakes, due to the land being associated with a risk of severe damage due to liquefaction if future earthquakes occurred. The government offered to purchase insured residential properties from homeowners on an 'opt-in' basis, along with vacant residential land, and assumed the rights to related insurance claims. This type of managed retreat could also make a significant contribution to reducing the risk for communities prone to flood.

5.7. Conclusions

Increasing flood hazard and continued development in areas exposed to flooding has led to an increase in losses from floods. An increasing number of countries have, or are establishing or expanding, public-private insurance programmes to support the availability of affordable insurance coverage for flood risks. Public-private insurance programmes that provide coverage for flood risk have been established, or will soon be established, in 14 of 38 OECD Members. These programmes have supported the availability, affordability and take-up of flood insurance coverage. The share of economic losses that are insured in countries with programmes that cover flood risk is higher than the average for OECD Members, with only a few exceptions. These programmes also contribute to reducing overall public sector exposure to flood risk and supporting risk reduction and adaptation.

Countries have taken different approaches to the design of flood risk insurance programmes, reflecting different objectives and country and market characteristics. The design of flood risk insurance programmes differs in terms of covered hazards, eligible insureds, type of compensation or (re)insurance provided, role of the programme in the market, approach to premium pricing, and the role of government in providing financial support and oversight. While these different approaches can all be effective in addressing protection gaps in flood insurance, the different approaches to programme design can lead to different outcomes. This chapter has aimed to outline the potential implications of different programme design choices on four possible programme objectives: (i) achieving broad flood insurance coverage; (ii) leveraging private insurance sector expertise and capacity; (iii) minimising impacts on public finances; and (iv) encouraging and supporting flood risk reduction – consistent with the *G7 High-Level Framework for Public Private Insurance Programmes against Natural Hazards*.

Programmes that play a larger and more direct role in assuming flood risk, for example by providing direct insurance for a broad scope of flood hazards and insureds, are generally able to ensure the availability of affordable coverage. However, broad coverage may not be achieved without the implementation of measures to support take-up, such as automatic inclusion of flood coverage or broadly applicable mortgage-related flood insurance requirements. Countries with lower levels of property insurance penetration are also likely to face coverage gaps, even where programmes make affordable flood insurance coverage broadly available. Programmes with a larger role in covering flood risk could, however, miss opportunities to leverage private market expertise and capacity to assume risks. They could also increase fiscal risks if premiums are inadequate and the government provides a generous backstop for programme losses.

Programmes that are more focused on addressing specific market gaps in coverage are generally better able to leverage private market expertise and risk-bearing capacity. However, the establishment of programmes targeted at markets gaps will likely lead to a risk pool containing more high-risk properties which could lead to greater loss volatility. More narrowly targeted programmes are also likely to face more challenges in achieving broad coverage if the private insurance market is unable or unwilling to provide coverage for hazards or insureds that are not eligible for programme coverage, which could lead to demands for public compensation or financial assistance to respond to uninsured losses.

Requirements for insurers to offer flood coverage or for households or businesses to acquire flood insurance coverage are usually effective in supporting take-up of coverage. However, such requirements could have implications for policyholders if the required coverage is unaffordable or for insurers if they are required to assume risk that they do not have capacity to assume. Ensuring that coverage is affordable for all policyholders required to acquire such coverage will be critical although this is challenging to achieve without some form of subsidisation for high-risk policyholders, which can have potential implications on fiscal risk and exacerbate moral hazard.

The application of risk-based pricing in programme coverage can provide important risk signals and incentives for risk reduction. However, the effectiveness of pricing incentives in encouraging risk reduction will depend on the capacity of policyholders to invest in risk reduction. Risk-based pricing can also lead to affordability challenges for those at high-risk, and political challenges if those at high-risk are obligated to acquire flood insurance coverage. Cross-subsidies, or greater risk mutualisation, among low and high-risk policyholders is commonly applied in flood risk insurance programmes, particularly those that cover multiple natural hazard risks, although this approach can blunt incentives for risk reduction and potentially incentivise development in high-risk areas. This risk can be mitigated through the implementation of effective land-use controls and resilient building standards, and a number of programmes have incorporated risk management requirements, conditions or incentives to reduce the impact of limited risk signals in premium pricing.

Supporting risk reduction and adaptation will be critical for addressing rising flood losses, whether flood insurance coverage is provided through private insurers, a flood risk insurance programme or both. Flood

risk insurance programmes that have direct links to governments have sometimes demonstrated a greater potential to leverage that relationship to influence broader risk reduction, although a number of private sector programmes are also contributing to flood risk management.

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Notes

¹ Flooding can also be caused by a tsunami, landslide or dam burst although flood insurance is usually focused on pluvial, riverine and coastal flooding. Water damage from a tsunami would normally be covered by earthquake insurance while flooding from a dam burst might be covered by the liability insurance of the owner or operator of the dam.

² Average annual economic losses in OECD Members in 2020-2024 reached USD 31.9 billion, and USD 34.3 billion when including accession candidate countries, relative to USD 17.8 billion and USD 23.3 billion, respectively, in 2000-2019 (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)). OECD Members and accession candidate countries are: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Thailand, Türkiye, the United Kingdom and the United States.

³ The average annual number of very heavy precipitation days are projected to increase in Czechia (100% increase), Greece (100%), France (104%), Finland (104%), Colombia (107%), Ireland (109%), Denmark (113%), the United Kingdom (119%), Germany (120%), Korea (120%), Lithuania (121%), Sweden (124%), Norway (128%), Türkiye (131%), Latvia (137%), Estonia (144%), Switzerland (146%), Luxembourg (150%), Canada (152%), Japan (153%), Peru (157%), Thailand (158%), Brazil (161%), the United States (166%), Chile (172%), Indonesia (193%), New Zealand (197%) and Argentina (580%) in 2080-2099, relative to 2020-2039, under an intermediate emissions scenario (Shared Socio-economic Pathway 2-4.5) (OECD, 2025^[5]).

⁴ The lower figure is calculated including all loss years, the higher figure excludes loss years for which only an estimate of economic losses (not insured losses) was available. OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)).

⁵ Pluvial or flash flooding can occur anywhere although those at lower relative elevation may still face higher risk than households or businesses at higher relative elevation. As noted above, a changing climate is expected to lead to more episodes of extreme rainfall in many countries (OECD, 2025^[5]).

⁶ In the United Kingdom, the second largest mortgage provider has reportedly stopped extending mortgage credit to households that the lender deems may become uninsurable in the future (Shankleman, 2024^[145]). Similarly, a major lender in the Canadian province of Québec announced that it would no longer offer new mortgages to households located in high-risk flood zones (those located in floodplains expected to face flooding more frequently than 1-in-20 years (Shingler, 2024^[146]). In France, some mortgage brokers have reported increasing challenges in accessing mortgage financing for homes in high-risk zones, particularly

coastal areas (Clerima, 2024^[153]). In the United States, an analysis by the Federal Reserve Bank of New York found some evidence that banks were more reluctant to extend some types of loans (i.e., loans that they are normally more likely to retain on their balance sheet) to borrowers in communities where flood risk exposure is likely higher than accounted for in the flood hazard maps developed by the Federal Emergency Management Agency for use by the National Flood Insurance Program (Blickle et al., 2023^[147]).

⁷ The report is based on responses to a questionnaire circulated to public-private insurance programmes, directly and through the World Forum of Catastrophe Programmes, complemented by desk research undertaken by the Secretariat. This report incorporates comments received from delegates to the Working Party on Insurance and Pensions, members of the OECD High-Level Advisory Board on the financial management of catastrophe risk and the public-private insurance programmes included in the report.

⁸ The objectives are consistent with those found in the *High-Level Framework for Public Private Insurance Programmes against Natural Hazards*, welcomed by G7 Finance Ministers and Central Bank Governors in May 2024, and which provides a set of considerations for the establishment of public-private insurance programmes to address protection gaps for natural hazard risks (G7 Finance Track, 2024^[163]). The Framework was developed by the G7 Climate Change Mitigation Working Group, based on input from the OECD and IAIS secretariats.

⁹ For the purposes of this report (and consistent with (OECD, 2021^[7]) and (OECD, 2023^[176])), public-private insurance programmes include any type of arrangement established by the insurance sector and/or government to provide insurance, co-insurance, reinsurance and/or a government guarantee for losses resulting from catastrophe perils to all or specific types of potential policyholders, including purely private sector arrangements such as insurance sector co-insurance/pooling arrangements and purely public arrangements such as the establishment of one or more public insurers to provide insurance coverage for catastrophe perils. It does not include government-owned insurance companies that operate in many lines of business and that have not been specifically established to cover catastrophe perils or other property-related risks nor government-owned insurers targeting other specific lines of business.

¹⁰ The Canadian Federal Budget in 2024 included funding for the establishment of a low-cost flood insurance program by the Canada Mortgage and Housing Corporation (Department of Finance Canada, 2024^[20]) although further funding to establish the programme was not included in the government's Economic and Fiscal Update in December 2024 (Insurance Bureau of Canada, 2024^[162]).

¹¹ In Türkiye, Doğal Afet Sigortaları Kurumu (Turkish Catastrophe Insurance Pool), in collaboration with the Insurance and Private Pension Regulation and Supervision Agency (SEDĐK), is introducing a compulsory multi-hazard disaster insurance programme that will expand existing coverage for earthquake risks to include coverage for floods, landslides, hurricanes, hailstorms, wildfires and avalanches (Bahar, 2024^[22]).

¹² The 2025 statutory review of the *Terrorism and Cyclone Insurance Act* will consider whether the coverage period should be extended to 168 hours after the beginning of a *Declared Cyclone Event*, from the current 48 hours (The Treasury, 2025^[174]).

¹³ Damages from overflow of existing waterways or due to “villbekker” (a fast-moving stream of water down a slope) as a result of heavy precipitation are covered.

¹⁴ In Türkiye, offices, commercial or (light) industrial companies that are located in an apartment or residential building are also eligible for programme coverage.

¹⁵ In the United Kingdom, programme coverage is not available for rental properties.

¹⁶ In Australia, the programme would also provide coverage for strata properties, as long as the strata is at least 50% dedicated to residential purposes.

¹⁷ The amount of coverage that the insurer must provide, and that the insured must acquire, varies based on the value of the businesses' property, land and equipment. Companies with a value of up to EUR 1 million must acquire an insured limit equal to that value. Companies with a value of EUR 1 million to EUR 30 million, must acquire an insurance limit equivalent to at least 70% of that value. Companies with a value above EUR 30 million have flexibility in determining the insurance limit acquired (ANIA, 2025^[10]).

¹⁸ In Belgium, a classification of high-risk zones is periodically published. Any building that is constructed in a high-risk zone more than 18 months after that zone was identified as high-risk is not eligible to access a premium rate for flood risk defined by the Bureau de Tarification nor for compensation through the co-insurance/pooling arrangement established for properties that have accessed coverage with the assistance of the Bureau de Tarification (Kingdom of Belgium, 2014^[8]).

¹⁹ In Switzerland, the Interkantonaler Rückversicherungsverband arrangement among the Public Insurance Companies for Real Estate operates a co-insurance/pool arrangement that collectively acquires reinsurance and another co-insurance/pooling arrangement that has been established to share excess losses above the coverage provided by through the acquired reinsurance.

²⁰ Twelve insurers (accounting for 90% of the market) participate in the Swiss co-insurance/pooling arrangement among private sector insurers (Swiss Insurance Association, 2021^[143]). All insurance companies that offer property insurance in Norway are obligated to participate in the co-insurance/pooling arrangement.

²¹ At the time of writing, the pooling arrangement in Italy included the participation of approximately 75% of insurance companies.

²² When establishing the programme in the United Kingdom, households at lower risk of flooding were generally able to acquire coverage from private insurers at a lower price than Flood Re would charge the insurer to assume the risk, meaning that only higher risk households would normally access coverage that is reinsured by the programme (DEFRA, 2014^[148]).

²³ In Australia, insurance companies that exceed a Gross Written Premium threshold are required to cede all cyclone-related wind, storm surge and cyclone-related flood risk to the programme although insurance companies may exclude coverage provided to households and businesses in an established list of postal codes deemed to be at low-risk of cyclone-related flood (and wind) damage in their calculation of Gross Written Premium (ARPC, 2022^[101]). As a result, insurers that do not provide sufficient coverage in higher risk areas may choose not to cede their cyclone and cyclone-related flood risk to the programme.

²⁴ There is a EUR 5 billion overall ceiling on risk that can be assumed by the public reinsurer in 2025 (Hallo, 2025^[157]), with the possibility that the ceiling may be increased in future years, based on amounts paid by the public reinsurer in the previous year (Tayel, 2025^[25]).

²⁵ In Switzerland, the premium charged for natural hazard insurance coverage by private insurers is a fixed rate based on the sum insured although some Public Insurance Companies for Real Estate charge differentiated premiums based on construction characteristics and other relevant factors (e.g. the Public Insurance Companies for Real Estate in Basel canton (Basellandschaftliche Gebäudeversicherung, n.d._[164])).

²⁶ In 2023, the premium rate for more resilient homes (“Type A”) was increased although the rate for less resilient homes (“Type B”) remained the same as Type B homes account for only a small share of the programme’s portfolio (approximately 5%) and are generally lower-income households.

²⁷ As a reinsurance provider, Flood Re is mainly overseen by the prudential supervisor.

²⁸ The *Consortio de Compensación de Seguros* has decided to adhere to the requirements included in Solvency II, despite a specific exclusion from those requirements.

²⁹ Any co-insurance/pooling arrangement or consortium established by the insurance sector to assume natural hazard risks is required to register with, and may require approval from, the insurance supervisor (IVASS) (Iannitti and Bonato, 2025_[158]).

³⁰ The compensation programme for uninsured households in Morocco is overseen by a board with representation from various government departments, the insurance supervisor and the private insurance sector.

³¹ In the United Kingdom, the government needs to agree to any changes to risk retention, reinsurance and the levy collected to fund the operations of Flood Re.

³² The *EIOPA Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for both residential and commercial properties in Spain (EIOPA, 2025_[26]). In Switzerland, market penetration of insurance coverage for all types of flood hazards is estimated to be 99% by Insurance Europe (Insurance Europe, n.d._[27]).

³³ For example, flooding in early 2022 in southern Queensland and northern New South Wales that was unrelated to a cyclone led to over AUD 6 billion in claims payments (Chow et al., 2023_[28]; Insurance Council of Australia, 2024_[149]). A recent Parliamentary Committee inquiry into insurers’ responses to major flooding in 2022 recommended that the Australian Government examine ways to improve the affordability of flood insurance, including the appropriateness of a government supported reinsurance arrangement (House of Representatives Standing Committee on Economics, 2024_[154]).

³⁴ The *EIOPA Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for both residential and commercial properties in Iceland and Norway, “high” for commercial properties in Italy although “medium” in the case of coverage for coastal flooding in Italy (EIOPA, 2025_[26]). In Australia, flood insurance is “generally available” in all parts of Australia for households and businesses (Chow et al., 2023_[28]) and is included in an estimated 93% of residential property insurance policies (as of 2020) (Lilly, 2024_[29]).

³⁵ The *EIOPA Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for both residential and commercial properties in Denmark (EIOPA, 2025_[26]), which likely refers to the availability of coverage for pluvial flooding.

³⁶ In Australia, the programme provides coverage for strata properties that are at least 50% dedicated to residential purposes. As a result, a large business that is located within an eligible strata property would be covered by the programme.

³⁷ The EIOPA *Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for commercial properties in Belgium (EIOPA, 2025^[26]). In Australia, flood insurance is “generally available” in all parts of Australia for households and businesses (Chow et al., 2023^[28]). In the United Kingdom, various studies have found only a limited share of small businesses in high-risk areas have had difficulties accessing flood insurance (Browning, 2023^[31]; BMG, 2022^[30]). However, in their response to the OECD survey on flood risk insurance programmes, Flood Re indicated that there is some anecdotal evidence of challenges in accessing commercial flood insurance coverage.

³⁸ The EIOPA *Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “medium” for commercial properties in Romania, although “high” for residential properties (EIOPA, 2025^[26]).

³⁹ The New Zealand Treasury receives quarterly reports on residential insurance availability and pricing. The report from August 2023 found that online quotes for insurance coverage were available from two or more insurance companies for almost all of the examined regions, which included communities at higher risk of flooding (Finity Consulting, 2023^[32]). The EIOPA *Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “medium” for residential properties in Italy (EIOPA, 2025^[26]).

⁴⁰ The EIOPA *Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for residential properties in Belgium (EIOPA, 2025^[26]).

⁴¹ The programme coverage for flood risk will be an expansion of the existing first loss or limited coverage for earthquake risk provided by the programme (Bahar, 2024^[22]) so the applied limits are likely to be equivalent. However, the new coverage will introduce a new “immediate needs coverage” for additional expenses that will be capped at 10% of the sum insured (Bahar, 2024^[22]).

⁴² In their responses to the OECD survey on flood risk insurance programmes, Romania and Türkiye identified the limit on coverage provided by the programme as a potential gap in coverage as insured households would need to purchase additional “facultative” coverage from private insurers. In Romania, close to 25% of households with programme coverage do not have additional coverage (beyond the programme coverage (although it is unclear whether this is due to a lack of availability, affordability or take-up).

⁴³ While direct insurers in France are similarly responsible for making decisions on whether to offer coverage, the *Bureau Central de Tarification* has the authority to require an insurer to provide coverage for the natural hazard risks within the scope of the programme. A prospective insured can notify the *Bureau Central de Tarification* if an insurance company refuses to provide coverage for natural hazard risks covered by the programme. The *Bureau Central de Tarification* can then require the insurer chosen by the prospective insured to provide the coverage and determine the premium (Bureau Central de Tarification, n.d.^[165]). The stop-loss reinsurance coverage provided by the state-owned reinsurer offers protection for insurance companies against high losses.

⁴⁴ In Italy, insurance companies are obligated to provide a minimum level of coverage based on the value of the companies’ property, land and equipment. For companies with up to EUR 1 million in insurable

value, the insured limit must be equivalent to the insurable value. For companies with between EUR 1 million and EUR 30 million, the insured limit must be at least 70% of the insurable value. For larger companies, there are no requirements on the level of coverage that insurers must provide. In addition, insurers are required to calculate their risk tolerance limit for natural hazard risks on an annual basis and may refuse to provide further coverage once this tolerance limit has been reached (d'Elia and Fumarola, 2025^[62]).

⁴⁵ In Australia, policyholders may be subject to a deductible on the insurance they acquire but insurers are not subject to a deductible on the reinsurance coverage provided by the programme. In the United Kingdom, the programme imposes a deductible on the reinsurance coverage that they provide while insurers are responsible for determining the deductible applicable to policyholders.

⁴⁶ As noted above, flood insurance is “generally available” in all parts of Australia for households and businesses (Chow et al., 2023^[28]). The EIOPA *Dashboard on insurance protection gap for natural catastrophes* indicates that the availability of flood insurance is “high” for residential and commercial properties in France, “high” for commercial properties in Italy although “medium” in the case of coastal flooding (EIOPA, 2025^[26]). In the United Kingdom, flood insurance coverage for residential properties appears to be widely available as only 0.19% of household insurance policies sold or renewed in 2021-2022 applied an exclusion for flood risk (BMG, 2022^[36]).

⁴⁷ The monitoring report found that there have been no new insurer entrants providing coverage in high-risk areas and limited appetite among existing insurers to expand or increase their overall exposure although that some insurers have made changes to underwriting controls and exposure limits (ACCC, 2025^[38]).

⁴⁸ The cost of reinsurance tends to decline as the level of diversification increases so the cost to reinsure a single (diversified) pool of risks should be lower than the aggregate cost of reinsuring multiple (less diversified) pools of risks.

⁴⁹ As noted above, the programmes in Iceland, Romania, Spain, Türkiye, United Kingdom, and the private insurers in Morocco, Norway and Switzerland that participate in co-insurance/pooling arrangements, are subject to the same regulatory and supervisory requirements applied to private insurance or reinsurance companies.

⁵⁰ If low-risk and high-risk policyholders are paying the same amount of premium, relative to the sum insured, and the overall amount of premiums collected is in line with expected claims, then low-risk policyholders are likely paying more than their share of claims. However, this relationship is more complex when programmes provide coverage for multiple natural hazards as cross-subsidies may also be applied between the different hazards.

⁵¹ As outlined in the section below on the Scope of risks assumed and retained, all of these programmes assume a significant share of the flood risk in the countries that they operate.

⁵² According to Flood Re, households at high-risk of flooding may face premium quotes that are 50-60% higher than other households.

⁵³ The report found that premiums for households in areas facing medium and high levels of cyclone risk were 11% lower relative premium rates prevalent before the pool was operational and that small businesses premium rates in these areas declined by 24% (ACCC, 2025^[38]).

⁵⁴ IVASS is collecting data on premium rates, deductibles, the sum insured and other characteristics for all property insurance policies issued to businesses within the scope of the mandatory insurance requirement (IVASS, 2025^[175]).

⁵⁵ According to an analysis by the US Government Accountability Office (GAO), approximately 66% of NFIP policyholders face premium increases under “Risk Rating 2.0.” of which almost half face premium increases of 100% or more. Premium increases are limited by statute to 18% per year, which means, according to GAO calculations, that more than 30% of all NFIP policyholders will continue to benefit from subsidised premiums until 2026 and it could take until 2037 before 95% of NFIP policyholders pay full risk-based premium rates (GAO, 2023^[40]).

⁵⁶ In New Zealand, for example, it was found that approximately 20% of the premium quotes from insurers for homes at high-risk of flooding included an additional flood premium charge of NZD 250 (on average), with substantial variation across insurers in terms of when this surcharge is applied (Lilly, 2024^[29]).

⁵⁷ Some countries that have not established flood risk insurance programme have implemented, or are considering the implementation of, mandatory flood insurance purchase requirements. In Greece, businesses with annual gross revenues above EUR 500 000 are required to acquire insurance against flood, earthquake and forest fire risks although there is an exemption for companies unable to secure the required coverage (Kitsou and Brouma, 2025^[159]). In Indonesia, recent legislation authorises the government to establish mandatory insurance for household against disaster risks (Government of Indonesia, 2023^[160]) although no requirement had been implemented at the time of writing.

⁵⁸ In Italy, the requirement is being phased in over time with large companies subject to the requirement from 31 March 2025; medium-sized companies from 31 October 2025; and small and micro-enterprises from 31 December 2025 (ANIA, 2025^[21]).

⁵⁹ Fire insurance is mandatory in all cantons where Public Insurance Companies for Real Estate operate and in some cantons where private insurers operate.

⁶⁰ There are also property insurance requirements for households with mortgages in a number of countries where flood insurance is automatically included in standard property insurance, such as France, Spain and in Swiss cantons without a mandatory insurance requirement, which means that, in practice, flood insurance is also a requirement for those with mortgages.

⁶¹ Special Flood Hazard Areas are zones defined by the National Flood Insurance Program as having a 1% or greater probability of being flooded in a given year (FEMA, 2020^[45]).

⁶² Households that do not comply with the requirements are not eligible for any government financial assistance or compensation for damages to their home resulting from the covered natural hazards from either national or local governments and can face a fine of RON 100 to RON 500 (i.e., up to almost 4x the cost of an insurance policy for more resilient homes) (PAID Romania, 2021^[34]).

⁶³ Property insurance data was not available for New Zealand and Morocco in the OECD Insurance Statistics database for 2024.

⁶⁴ According to UNESPA, 79.5% of households in Spain are protected against climate risks, which includes the coverage provided by private insurers and the programme (UNESPA, 2025^[51]).

⁶⁵ According to Swiss Re, New Zealand has a higher level of non-life insurance penetration and density than Morocco (Casanova Aizpun et al., 2023^[106]).

⁶⁶ Data on share of homeowners with an outstanding mortgage was not available for Türkiye.

⁶⁷ For example, in the US state of California, limits on premium increases and increasing losses from wildfires, which are automatically covered in most property insurance policies, have been cited as factors in the decisions of a number of insurers to stop or severely restrict new property insurance policy applications or renewals (Rivera, 2024^[144]).

⁶⁸ One study estimated that, between 1972 and 2014, at least 27% of flood claims and 14% of claims payments were related to properties outside of Special Flood Hazard Areas (Wing et al., 2020^[166]). According to one estimate, the actual number of properties in the United States that face a 1% annual probability of flooding, and should therefore be included within the NFIP's Special Flood Hazard Areas, is approximately 2.2 times higher due to outdated flood maps and the exclusion of heavy rainfall from those maps (First Street, 2025^[167]).

⁶⁹ In addition, for some events, the claims paid reported by the programme seem to be higher than the insured losses reported in the Swiss Re sigma database. For example, the programme estimates claims of approximately EUR 4.8 billion related to the flooding in Valencia in 2024 (CCS, 2025^[168]), which is approximately 20% more than insured flood losses reported in the Swiss Re sigma database, although this may be partly due to the difference between estimated claims and claims paid. The Valencia floods accounted for more than 60% of reported flood losses in Spain since 2000 (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)).

⁷⁰ The programmes in France, Norway, Spain and Switzerland do not offer direct financial subsidies to policyholders purchasing property insurance, whether for households or businesses. However, the elevated penetration rate of property insurance coverage effectively functions as an implicit cross-subsidisation mechanism.

⁷¹ For example, between 2010 and 2014, the programme paid out approximately USD 150 million for flood and storm surge compensation (Danish Natural Hazards Council, 2017^[169]) relative to approximately USD 1.9 billion in insured flood losses during that period (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)).

⁷² In Spain, there is no legal impediment to transferring risk to reinsurance markets should the need arise.

⁷³ In determining whether they meet the AUD 10 million threshold for mandatory participation in the programmes, insurers can exclude premiums written in areas where cyclone risk is negligible (ARPC, 2025^[170]).

⁷⁴ A stop-loss protection provides additional coverage for an accumulation of losses in a given period. Under a stop-loss arrangement, some or all of the losses incurred by the cedant above a specific threshold are assumed by the reinsurer.

⁷⁵ In 2016, the commercial operations of CCR were transferred to a wholly-owned subsidiary, which was then acquired by a private sector consortium (Arundo Re, 2025^[171]).

⁷⁶ In its first years of operation, the amount that insurers could transfer to CCR was not limited to 50%. Higher cessions in the first years, and high claims payments through the stop-loss facility in large loss years, explain the average risk transfer level above 50%. Since approximately 1995, the share of claims paid by CCR has been near or just below 50%, with the exception of large loss years in 2003, 2017, 2022 and 2024 (CCR, 2025^[104]).

⁷⁷ For most (lower risk) households in the United Kingdom, the cost of flood insurance should be below the amount that Flood Re charges for its reinsurance coverage. As a result, direct insurers are likely to retain the risk for most of the coverage that they provide to lower-risk households (ABI, 2024^[152]). Over 2023 and 2024, Flood Re claims payments (Flood Re, 2025^[102]) were equivalent to approximately 30% of reported insured flood losses in the United Kingdom (OECD calculations based on data provided by Swiss Re (Swiss Re, sigma database. All rights reserved.)).

⁷⁸ A requirement to transfer all risk to the programme, which is sometimes implemented by terrorism risk insurance programmes, could reduce the risk of adverse selection for the programme (i.e. if insurers only transfer the risks that they do not wish to retain to the programme).

⁷⁹ Insurers with better quality and more granular data on the risks that they have underwritten can generally obtain more favourable terms (and pricing) for reinsurance coverage (Lilly, 2024^[29]).

⁸⁰ Flood Re's retrocession costs increased by approximately GBP 100 billion in 2025/2026 (Flood Re, 2025^[102]).

⁸¹ Some programmes have developed their own catastrophe models and analytical tools. For example, the state-owned reinsurer in France has developed an in-house deterministic modelling tool as well as its own flood-hazard map at address level.

⁸² For example, in Spain, it's been estimated that the programme will absorb 90%-95% of the insured losses from catastrophic flooding in Eastern and Southern Spain in October 2024 (Bray, Nieto and Wilson, 2024^[156]).

⁸³ The programme borrowed USD 16.6 billion to respond to flood claims after Hurricanes Katrina, Rita, and Wilma in 2005, USD 6.25 billion after Hurricane Sandy in 2012 and USD 7.425 billion after Hurricanes Harvey, Irma, and Maria in 2017, although USD 16 billion in outstanding debt was cancelled (Congressional Research Service, 2024^[117]). In 2025, the programme borrowed USD 2 billion to respond to more than USD 10 billion in projected claims related to Hurricanes Helene and Milton (FEMA, 2025^[161]).

⁸⁴ Governments in some countries may be prepared to provide more generous access to the government financial support and therefore take on a greater exposure to programme losses. Government that have sufficient fiscal space and/or inexpensive access to debt markets are likely better placed to offer more generous financial support and may be willing to take on more risk if the purchase of additional reinsurance protection by programme would have a significant impact on the affordability of programme coverage.

However, the cost of accessing funding to provide financial support to a programme is not stationary and will likely vary over time. Furthermore, a generous government backstop could lead to moral hazard as the programme and the private sector participants in the programme may face more limited incentives to limit the exposure taken on through the programme given the ability to shift substantial programme costs to the government.

⁸⁵ For example, in France and Spain, the programmes only provide coverage for wind damages if the wind speed was measured to be above a specific threshold and private insurers are required to provide coverage for losses if the measured wind speed was below the threshold) (OECD, 2021^[7]).

⁸⁶ For example, the exclusion of programme coverage for high-frequency hazards as in Denmark and Norway

⁸⁷ Programmes that provide coverage for a broader range of hazards or insureds, including different types of insureds and insureds facing different levels of risk, will have larger risk pools with a greater level of diversification. Programmes that only assume risks that private insurers or reinsurers are unwilling to cover will have smaller risk pools comprising high-risk properties that will likely be subject to more frequent losses and greater volatility (OECD, 2021^[7]).

⁸⁸ The programme in Australia is too recent to be included. The Cyclone Reinsurance Pool aims to set premiums for reinsurance coverage at a rate that will be cost neutral to government over the long-term. The programme in New Zealand was not included given the limited coverage provided for flood damage (and the significant coverage provided for other natural hazards, notably earthquakes).

⁸⁹ The aggregate claims ratio for the programme in Iceland was only 10% between 2017 and 2022.

⁹⁰ The aggregate claims ratio for the programme in Spain was only 55% between 2017 and 2023.

⁹¹ The Consorcio de Compensación de Seguros had reportedly accumulated an equalisation reserve of EUR 10.3 billion as of the end of 2023 (De Cicco and Alvarez, 2024^[172]).

⁹² Given its role in providing reinsurance for the entire market, the state-owned reinsurer reports claims ratios for the system as a whole including the premiums collected and losses incurred by private direct insurers for natural hazards included in the scope of the programme.

⁹³ The estimated claims ratio was 280% in 2018, 61% in 2019, 45% in 2020, 44% in 2021 and 56% in 2022.

⁹⁴ The programme in Türkiye also plans to share loss data with relevant government authorities.

⁹⁵ The claims data is available at: <https://www.naturalhazardsportal.govt.nz/s/>.

⁹⁶ The Floods Directive requires national authorities to identify “Areas of Potential Significant Flood Risk” based on preliminary flood risk assessments for all river basins, develop flood hazard and risk maps for the identified areas and then prepare Flood Risk Management Plans to manage the risk of flooding in those areas (Neuhold, 2017^[150])

⁹⁷ Flood Re has published a “roadmap” for the implementation of flood performance certificates (Flood Re, n.d.^[173]).

⁹⁸ For example, one examination of the premium discounts provided by the Florida Hurricane Catastrophe Fund (which operates as a reinsurance fund for hurricane risk in the US state of Florida) found that direct insurers have not always passed on discounts to policyholders as some insurers simply divided the cost of the premium that they paid for the reinsurance equally across all policyholders (Medders and Nicholson, 2018^[142]).

⁹⁹ For example, policyholders in a county and group of municipalities in the state of Florida had premium discounts of 25% withdrawn because the local authorities had not implemented a requirement to ensure that homes that were more than 50% damaged were elevated during reconstruction (Insurance Journal, 2024^[151]).

¹⁰⁰ One recent study found that USD 11.4 billion in flood damage reductions between 1998 and 2020 could be attributed to actions taken under the Community Rating System, compared to approximately USD 12.1 billion in premium reductions granted (Gourevitch and Pinter, 2023^[155]).

¹⁰¹ In France, 12% of the premium surcharge applied to property and motor vehicle damage policies were previously allocated directly to a national prevention fund (*fonds de prévention des risques naturels majeurs*) that supported property- and community-level risk reduction investments. This arrangement was modified in 2021 and the prevention fund is now funded by an annual budget allocation.

Financial Protection Against Catastrophic Risks

Floods, Fires and Other Major Risks

Increasing damages and losses from large-scale catastrophe risks such as natural hazards and cyber attacks are impacting the availability of affordable insurance coverage. This is forcing governments to increase their focus on addressing the resulting protection gaps. This report aims to support policymakers and regulators in building financial resilience to catastrophe risks. It introduces a framework for evaluating the need and best approach to offering government-supported financial protection for large-scale catastrophe risks. It then applies the framework to a set of large-scale risks, including natural hazards, cyber and infectious disease risks. It also examines the particular challenges in the availability of affordable insurance coverage for two types of natural hazards, wildfires and floods, and the different approaches to addressing those challenges.



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