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Could insurance provide an alternative to fiscal support in crisis response?

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Abstract

Could insurance provide an alternative to fiscal support in crisis response?

The COVID-19 pandemic led to significant economic disruptions and revenue losses for business impacted by workplace closure measures aimed at restraining the spread of the virus. Governments provided extensive monetary and fiscal support to address liquidity risks and mitigate the potential for mass insolvencies as few businesses had applicable insurance coverage for these types of losses. This paper examines the fiscal and insurance sector responses to the economic disruptions resulting from COVID-19 workplace closures, the challenges to the availability of insurance coverage for this risk and some of the challenges and risks related to large-scale fiscal support for businesses. It also includes a discussion of the potential contribution of a loss-sharing arrangement between governments and insurance markets for pandemic-related business interruption losses as a means of enhancing the contribution of insurance markets to providing financial protection in the context of future pandemics.

Keywords: fiscal federalism, insurance, crisis management

JEL classification: H12, H51, G22

Résumé

Face aux crises, l'assurance peut-elle se substituer à la relance budgétaire ?

Du fait de la pandémie de COVID-19, les entreprises concernées par les mesures de fermeture destinées à endiguer la propagation du virus ont subi des perturbations économiques et un manque à gagner considérables. Étant donné que peu d'entre elles étaient assurées contre ce type de pertes, les pouvoirs publics ont mis en place des mesures de soutien monétaire et budgétaire à grande échelle pour faire face au risque de liquidité et d'insolvabilité massive. Cet article analyse les réponses budgétaires et assurantielles aux perturbations économiques provoquées par les fermetures d'entreprises dues au COVID-19, les difficultés liées à la possibilité de s'assurer contre ces risques, et certains des enjeux et des risques associés aux vastes mesures budgétaires adoptées pour venir en aide aux entreprises. Il se penche également sur l'apport potentiel de la conclusion, entre les autorités et les marchés de l'assurance, d'accords de répartition des pertes d'exploitation liées à une pandémie comme moyen d'accroître, à l'avenir, la contribution des marchés de l'assurance à la protection financière face à d'autres pandémies.

Mots-clés : fédéralisme budgétaire, assurance, gestion de crises

Classification JEL : H12, H51, G22

Could insurance provide an alternative to fiscal support in crisis response?

By Leigh Wolfrom¹

1. Introduction

The COVID-19 pandemic led to significant economic disruption and losses of revenue for business facing workplace closures and other mobility restrictions imposed to contain the spread of the virus. Governments (principally central governments) provided significant monetary and fiscal support to businesses to address liquidity risks and avoid large-scale insolvencies, as there was limited insurance coverage for the resulting business interruption losses.

This paper provides an overview of the economic impacts of COVID-19 and fiscal and insurance sector responses. It includes rough estimates of the magnitude of losses that businesses faced across sectors and countries, as well as an overview of the (principally central) government and insurance sector contributions to absorbing the losses incurred by businesses (Section 2). This is followed by a discussion of the challenges to broader private insurance market coverage for economic disruptions on the scale of COVID-19 and some of the challenges and risks associated with large-scale government fiscal support (Section 3). The final section discusses the potential for a loss-sharing arrangement across levels of government and the insurance sector (a catastrophe risk insurance programme for pandemics) to address some of the challenges to providing large-scale fiscal support and impeding broader insurance market participation in covering these types of losses in the future.

All levels of government make important contributions to the management of crises and catastrophic events (see Box 1) and made significant contributions to responding to the economic disruptions caused by COVID-19 through investment in health care and vaccine distribution as well as support for affected businesses and households. However, given the scale of the COVID-19 economic disruption and the primarily centralised responsibility for social and business protection programmes in most OECD countries (OECD, 2021^[1]), much of the discussion in this paper is focused on central government programmes and funding support.

¹ This working paper was presented at the 18th Annual Meeting of the OECD Network on Fiscal Relations across Levels of Government (21-22 April 2022) and served as a reference document at the OECD Roundtable on the role of insurance markets in responding to large-scale and systemic risks (22 June 2022), organised by the Insurance and Private Pensions Committee. It was prepared by Leigh Wolfrom, Policy Analyst, under the supervision of Timothy Bishop, both of the OECD Directorate for Financial and Enterprise Affairs. Boxes 1 and 4 were prepared by Andoni Montes, and document revisions were made under the supervision of Sean Dougherty, both of the Fiscal Network. The paper was reviewed by Boris Cournède of the Economics Department and Stéphane Jacobzone of the Public Governance Directorate. The paper also benefited from comments by Junghun Kim, Sean Dougherty, Bert Brys, Rüdiger Ahrend as well as delegates to the Fiscal Network and Insurance and Private Pensions Committee.

Box 1. Decentralised fiscal support for crisis response

Centralised response to the COVID-19 pandemic is an outlier

Central governments have played a leading public sector financial role in the COVID-19 pandemic response – by absorbing the bulk of the fiscal shock and cushioning its impact on subnational governments through *ad hoc* vertical grant schemes, the waiving of fiscal rules, financial guarantees and/or loans (OECD, 2021^[1]). However, this has not always been the case.

In fact, several OECD countries have explicit cost-sharing arrangements, or co-financing agreements, across levels of government that are applied to natural disaster damages, such as those caused by floods, fires or earthquakes. More precisely, setting explicit and *ex ante* rules and instruments to share expenditure responsibilities and revenue losses across levels of governments, together with drawing well-defined boundaries for central aid, emerge as key policy recommendations in a recent study (OECD/The World Bank, 2019^[2]). Such policies can dispel moral hazard issues, setting incentives for them to engage in risk reduction and achieve efficient fiscal support for crisis insurance in multilevel governance frameworks.

These kinds of cost-sharing agreements between central and subnational governments to finance disaster response and recovery can be found both in federal countries, such as in Australia, Canada and Mexico, as well as some unitary countries, such as Japan, New Zealand and Peru. These arrangements may also include provisions to provide insurance coverage for local public infrastructure. However, they can also include direct income transfers for households, as with the Japanese post-disaster subsidy for housing and the Canadian AgriRecovery Framework for farmers' assistance.

Despite having clear responsibility allocation arrangements, previous experience has shown that when disasters are of extreme gravity or have systemic consequences, central governments often take extraordinary measures. This has been the case during the COVID-19 pandemic, and it was also in the major earthquakes experienced in New Zealand in 2010, 2011 and 2016, and the Great East Japan Earthquake in 2011, which triggered Fukushima's nuclear disaster.

Source: OECD/The World Bank (2019^[2]).

A fiscal response to large-scale (systemic) events has many potential benefits, including the ability to deliver support through existing financing channels, target support to those in need and tap the government's unparalleled borrowing capacity. Nonetheless, a number of governments and insurance companies have been examining whether a loss-sharing arrangement between governments and the insurance sector through a pandemic risk insurance programme could contribute to managing the financial impacts of future infectious disease outbreaks and increase public and private sector resilience. Whether such a programme provides the best option for managing this risk will depend on whether the potential benefits² of a well-designed, government-backed insurance programme outweigh the costs³ of such an approach.

² Including the potential for rapid payment, increased fiscal transparency related to the management of government contingent liabilities, risk management and insurance sector loss absorption.

³ Notably the fiscal cost in terms of maintaining employment, providing a public financial backstop or guarantee for the programme as well as the economic cost of using insurance relative to leveraging government balance sheets. The fiscal risk could be significant, particularly if a triggering event were to occur before significant premiums are accumulated by the programme and take up of the insurance is widespread.

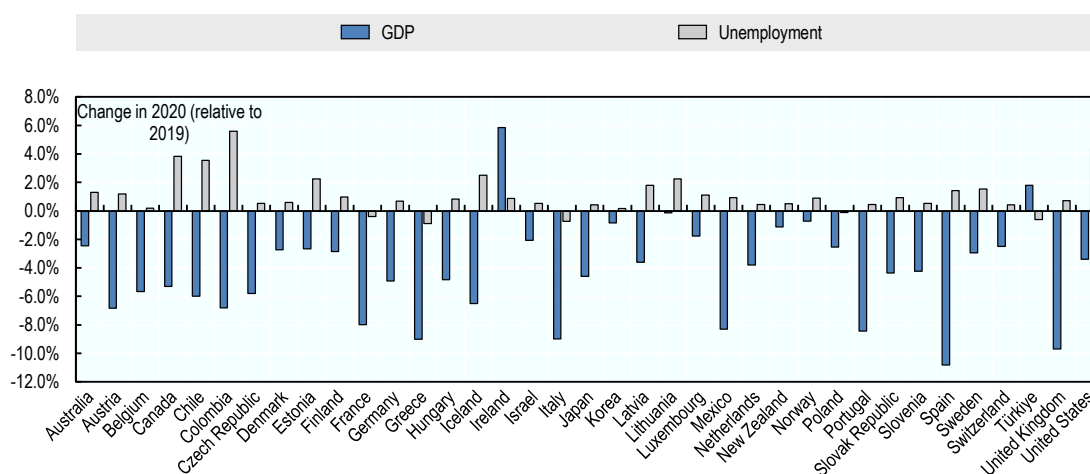
A well-designed pandemic risk insurance programme (key features set out in this paper) that provides clarity in coverage could address some of the *ex ante* and *ex post* challenges related to providing to large-scale fiscal support and may help to moderate the need for such support. It could also support the quantification and management of pandemic risks. While such programmes entail important up-front costs, they may also help to smooth the financial shock for public finances – depending on the capacity that the insurance sector is able and willing to provide, given the challenges outlined below. Without a loss-sharing arrangement between governments and the insurance sector, there is likely to be little available business interruption insurance coverage for even localised outbreaks of infectious diseases.

Global pandemics are just one source of large-scale and global macroeconomic shocks. The discussion in this paper may also be relevant for other large-scale risks such as climate change or systemic cyber-attacks – and will hopefully make a contribution to efforts to improve the management and sharing of macroeconomic risk more broadly.⁴ As experience with other perils such as terrorism suggests, cooperation between the government and the insurance sector can potentially transform a risk that seems initially uninsurable into a risk that is increasingly well-covered in private insurance and reinsurance markets (even if the need for government backing is not eliminated) – although, as outlined below, global pandemics create a number of novel challenges to significant insurance sector involvement in providing coverage.

1.1. Insurance and government responses to COVID-19 economic disruptions

The COVID-19 pandemic had significant economic and financial implications, not to mention tragic social consequences and loss of life (**Figure 1**). Gross domestic product (GDP) declined in 36 of the 37 OECD member countries in 2020 (by 4.3% on average) (OECD, 2021^[3]). The unemployment rate increased in 32 of 37 member countries (by 1.1% on average) to reach 7.2% across the OECD (OECD, 2021^[3]) while underemployment (i.e. full-time workers working less than a full-week and part-time workers who want but cannot find full-time work) increased to 7.7% of the labour force – the highest levels since at least before the global financial crisis (OECD, 2021^[4]).

Figure 1. GDP and Unemployment in 2020



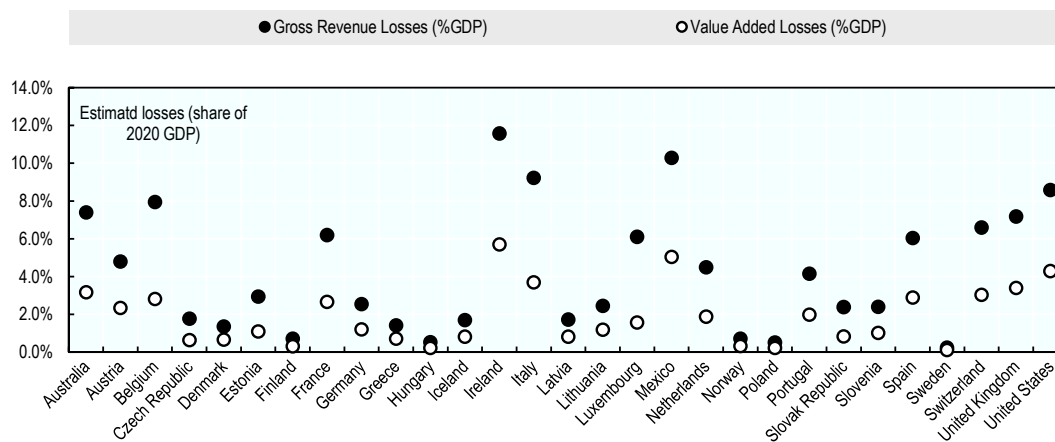
Note: Unemployment rates presented are harmonised unemployment rates

Source: Author's calculations based on OECD (2021^[3]).

⁴ For example, Ahrend et al. (2011^[72]) provides an early analysis of the potential for risk sharing within and across countries in response to large-scale macroeconomic shocks.

Businesses faced significant reductions in revenues as a result of workplace closures, mobility restrictions and other changes in consumer behaviour. Businesses across the 29 OECD countries⁵ for which necessary data was available faced gross revenue losses in the estimated range of USD 2.7 trillion to USD 3.3 trillion – equivalent to approximately 5.6% to 6.9% of GDP. On a value-added basis (which removes the double-counting related to input suppliers), estimated losses range from USD 1.2 trillion to USD 1.6 trillion or 2.6% to 3.3% of GDP (see **Figure 2**). Annex A provides further details on how these estimates were derived.⁶

Figure 2. Business revenue loss estimates for 2020 as a share of GDP



Note: Gross revenue and value added losses derived as described in Annex A (high estimates are shown)

Source: See Annex A. GDP figures are from <https://data.oecd.org/gdp/gross-domestic-product-gdp.htm>

1.2. Limited insurance coverage for business revenue losses

Many of the revenue losses faced by businesses were not covered by insurance, even in countries with high levels of insurance market development and insurance penetration. Insurance coverage for business revenue losses (i.e. business interruption insurance – see Box 2) is usually offered (and acquired – although not all businesses acquire this coverage) as an endorsement (add-on) to insurance coverage for property coverage (or commercial insurance package policies) in exchange for an additional premium.

⁵ Includes Australia, Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

⁶ As described in Annex A, revenue loss estimates are presented on a total production and value-added basis. The production basis provides a sense of the gross revenue losses that a business would face as the price of the products would account for the full cost of production, including intermediate inputs. A value-added basis aims to eliminate double-counting by presenting production net of the cost of intermediate goods.

Box 2. Business interruption insurance

Businesses can acquire financial protection against revenue (or business interruption) losses from commercial insurance markets. Such coverage is designed to address loss of income or earnings that occur as a result of property damage to the business that is covered under the policy (for example, the inability to operate while a business premises is restored after fire or water damage) – for a limited amount of time as specified in the policy. As a result, the coverage is often only triggered if the policyholder has incurred physical damage to its property. Many policies also provide business interruption coverage for circumstances that restrict access to the policyholder’s premises, such as an order by a civil authority or a physical impediment that restricts access to the policyholder’s place of business (ingress/egress coverage). Some policies also include contingent business interruption, which covers disruptions to the policyholder’s business as a result of a disruption faced by a critical supplier and/or customer. However, in many cases, this additional coverage is also limited to situations involving some form of physical damage to a property (i.e. to a neighbouring property in the case of ingress/egress coverage or to the supplier/customer in the case of contingent business interruption) – and often with the requirement that that damage resulted from a peril that would have been covered if the damage had occurred at the policyholder’s premises. Some insurance policies providing business interruption coverage also apply specific exclusions for any damages or losses resulting from a pollutant, contaminant, virus and/or bacteria (OECD, 2020^[5]).

The coverage provided varies based on the terms and conditions of individual policies but generally reimburses policyholders for lost income as a result of a covered peril. The coverage may reimburse policyholders on the basis of gross profit or gross revenues lost¹ or on the basis of net profit or net revenue lost with additional coverage for fixed costs such as mortgage/rent, payroll and loan and tax payments. Most policies also provide coverage for additional expenses incurred during the period of interruption (for example, if the business needs to temporarily relocate its operations).

Note: 1. Coverage for gross profits is reportedly a more common basis for business interruption coverage than gross revenue although the latter is often acquired by professional service firms for whom intermediate goods or services likely account for a lower share revenue. Source: Charlesworth (2022^[6]).

However, the limitations applied to business interruption coverage in respect of pandemic (non-physical) risks have led insurers to deny the vast majority of claims submitted by businesses for losses associated with COVID-19 workplace closures. For example, in the United States, only 3 648 of the 183 562 business interruption claims submitted (and closed)⁷ resulted in a payment to the policyholder (i.e. less than 2%) as of November 2020 (NAIC, 2020^[7]). The denial of claims has led to disputes and litigation in many countries – and some victories for policyholders that have led to higher pay-outs – although the vast majority of revenue losses faced by businesses in 2020 were not covered by insurance.⁸ In the United States, as of November 2020, approximately USD 420 million had been paid by insurers for business interruption claims related to COVID-19 (compared to the above estimate of USD 810 billion in value added losses). In the United Kingdom, where a test case⁹ initiated by the Financial Conduct Authority resulted in a finding of

⁷ As of November 2020 (the last report for this exercise), 26 892 submitted claims remained open (NAIC, 2020^[7]).

⁸ A more comprehensive overview of the outcome of disputes and litigations related to COVID-19 business interruption claims is provided in (OECD, 2021^[36]).

⁹ In the United Kingdom, the Financial Conduct Authority (FCA) took the unprecedented step of seeking clarity from the courts on some specific areas of potential coverage disputes related to non-damage business interruption coverage as a test case with the aim of expediting a resolution and reducing the need for lengthy litigation between insurers and their policyholders (FCA, 2020^[70]).

valid coverage for many policyholders, approximately GBP 1.3 billion in claims have been paid within the scope of the test case as of January 2022 (FCA, 2022^[8]) (approximately 1.75% of the estimated valued added loss). Overall, one recent estimate suggests that insurers have faced approximately USD 35 billion in COVID-19 related losses (up to Q3 2021) across the property and casualty lines of business (Howden, 2022^[9]), which includes business interruption, event cancellation as well as liability insurance¹⁰ – although most of the losses resulted from business interruption and event cancellation (relative to the USD 1.2 trillion to USD 1.6 trillion in estimated value added losses in covered OECD countries and sectors, or approximately 2.1% to 2.9%).

1.3. Public financial support for business

The disruption to economic activity – and the lack of insurance coverage for business revenue losses – created significant liquidity challenges for businesses with the potential for solvency risks to emerge due to uncertainties related to the eventual length of disruption. Governments (principally central governments) and central banks across OECD member and candidate countries responded with a range of monetary and fiscal policies to support financial market liquidity and credit availability and provide financial support to impacted businesses (see Annex B for detailed information on the types of support provided across OECD member and candidate countries).

Central banks employed a variety of measures to support liquidity and the availability of credit in the economy, including: (i) policy interest rate cuts; (ii) lending to various parts of the financial sector to support stability and credit extension to the real economy; and (iii) expanded asset purchases (including of non-financial sector debt) (Cantú et al., 2021^[10]). Prudential supervisors (including central banks, where applicable) also took steps to support credit availability, such as the release of capital or liquidity buffers and/or adaptations to regulatory requirements to support lending to the real economy (BIS, 2020^[11]).

Government fiscal policies were targeted at supporting the survival of otherwise viable companies through the disruption, and maintaining employment. This included a range of tax measures (reductions, deferrals), job retention programmes (short-time work schemes and wage subsidies) as well direct grants, loans, guarantees and equity investments provided to impacted businesses by different levels of government.

Tax measures included both deferrals and reductions. Tax deferral measures were enacted in most OECD member and candidate countries, mostly by central governments (OECD, 2021^[11]), and were generally made available for higher frequency tax payments (i.e. those paid on monthly or quarterly basis), such as advance corporate or personal income tax payments, value-added taxes or social security contributions (OECD, 2020^[12]). A number of countries also deferred other types of tax payments, such as property tax payments. A few countries also increases loss-offset provisions, allowing companies to either carry-back or carry-forward losses incurred in 2020 to offset past or future taxes due (OECD, 2020^[12]). A smaller number of countries introduced measures to reduce the tax burden in 2020, such as waivers applicable to certain types of taxes or contributions (e.g. social security contributions, property taxes and others).

Job retention schemes, including short-time work and wage subsidies¹¹ were enacted (or utilised and often expanded where such schemes already existed) in almost all OECD member and candidate countries, generally by central governments. These schemes aim to limit increases in unemployment (and

¹⁰ Liability insurance protects businesses against claims against the business resulting from injury or damage to third parties (employees, customers, shareholders and other stakeholders). Businesses around the world have faced a number of liability claims in the context of COVID-19 (for example, from employees or customers that claim to have been affected at the business' premises), although the outcome of many of these claims have yet to be determined.

¹¹ Short-time work schemes provide government subsidies for hours not worked. Wage subsidy schemes provide a government subsidy for hours worked or may be used to top up the earnings of workers on reduced hours (OECD, 2021^[4]).

subsequent labour displacement) and support businesses by providing financial support to cover a share of wage costs related to employees that are retained on employment contracts with recipient businesses (allowing businesses to retain employees). In the majority of countries, these programmes covered the full cost of hours not worked although some countries required employers to bear some of the cost (approximately 25%-30% in Denmark, Korea, Japan and Lithuania) (OECD, 2021^[4]).

Direct grants, loans, equity injections and particularly loan guarantees were provided by governments (or government development banks or financing institutions) in many OECD countries (OECD, 2020^[12]) to ensure access to liquidity in the context of declining economic activity and to prevent insolvencies. Most of this support was provided by central governments (OECD, 2021^[1]). Based on an analysis of these types of fiscal measures in 9 OECD countries (Moretti, Braendle and Leroy, 2021^[13]), loan guarantees were the main form of support provided and generally covered of 70% to 100% of the loan value (although with variation across countries and by type of beneficiaries). Some governments provided loans and a small number provided equity injections into state-owned enterprises or large companies deemed strategic. Most countries established overall programme ceiling and limits on exposure to individual enterprises (for example, a 25% of revenue or 2x wages ceiling is applied in EU countries under state aid rules). Most provided risk-based guarantee fees and borrowing rates although some loan programmes were interest-free (particularly for SMEs) (e.g. Switzerland, United Kingdom). Programmes were generally time-bound (usually 5-8 years with possibility of extension in the case of continued financial hardship). Some imposed conditions related to pre-COVID financial health and post-COVID viability.

The availability of fiscal support for different types of businesses varied. In some countries, some or all programmes were available to all business while, in others, support was limited to specific sectors, smaller companies and/or businesses that could demonstrate a significant drop in revenues (OECD, 2020^[12]). Some of the tax waivers were only available to SMEs, for example, or to companies operating in specific sectors (OECD, 2020^[12]). Job retention schemes were widely available, particularly in the early months of the crisis. Broad targeting with limited eligibility criteria supported speed in access to funds (OECD, 2021^[14]) and was consistent with the widespread impacts of the initial workplace closure requirements and mobility restrictions.

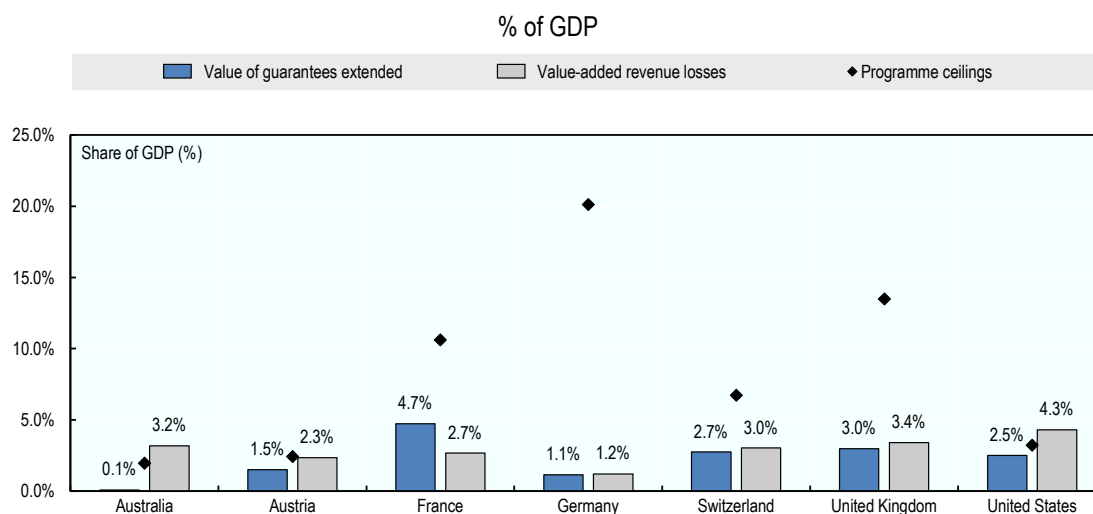
Broad availability and simple access also supported relatively broad take-up of support. In the United States, for example, approximately 70% of small businesses received support through public emergency relief measures in the first half of 2020 (Foroohar, 2020^[15]) while in Ireland, 6 out of 10 firms accessed some form of government support (not including the temporary wage subsidy scheme) (CBI, 2020^[16]).

In addition to supporting businesses, many central and subnational governments also provided support to displaced workers and other vulnerable segments of the population, through tax deferrals, other payment deferrals (e.g. mortgage interest, utility payments) early access to retirement savings and direct cash grants – usually targeted towards individuals that were displaced or otherwise vulnerable households (OECD, 2020^[12]). The expansion of unemployment insurance benefits and sick leave benefits (with, in some cases, increased assumption of costs by governments (OECD, 2020^[12])) made a particular contribution to supporting displaced employees and likely provided businesses with additional flexibility in terms of reducing wage costs. In some countries (particularly Canada and the United States), governments expanded unemployment insurance benefits (either amount or duration of benefits) as the primary means to support displaced workers. For example, in the United States, the insured unemployed who approached or surpassed the 26-week maximum for benefits could apply for support under Pandemic Emergency Unemployment Compensation (PEUC) and Pandemic Unemployment Assistance (PUA) programmes which provided up to 50 weeks of unemployment insurance coverage (Jackson et al., 2021^[17]). In Australia, Ireland and the United States, unemployment benefits in May/June 2020 as a share of average wages increased by 80%, 100% and 170% (respectively) relative to the share of average wages covered in 2019 (author's calculations based on data included in (OECD, 2021^[4])).

The fiscal support provided likely played a significant role in offsetting the revenue losses (or reducing the operating (wage) costs) and maintaining the solvency of businesses disrupted by the workplace closure requirements. For example, according to OECD estimates, job retention schemes supported approximately 20% of employment on average across OECD countries at their peak, equivalent to 60 million jobs (OECD, 2021^[4]). Take-up of job retention schemes was highest in the most impacted sectors, supporting 56% of dependent employment in the accommodation and food services sectors in the second quarter of 2020 and 36% in the arts, entertainment and recreation sectors across OECD countries (author's calculations based on data included in (OECD, 2021^[4])).

The central government guarantee schemes in most of the countries examined by the OECD (see Moretti et al. (2021^[13])) appear to have provided significant support for the funding needs that businesses faced as result of losses in revenue. **Figure 3** provides estimates of the guarantees extended in selected countries (up to March 2021), guarantee programme ceilings and the value-added revenue losses as estimated in this paper (high-end loss scenario). In most of the countries examined, the programmes extended guarantees that were similar in magnitude to the value-added loss estimates (and sometimes larger than these estimates) – and many of programme ceilings were significantly larger (i.e. more guaranteed financing could have been provided). Likely as a result of the large-scale fiscal support provided, the financial conditions for SMEs did not deteriorate significantly in 2020 (or 2021) for SMEs and lending to SMEs surged in many countries (OECD, 2022^[18]).

Figure 3. Guarantees extended, programme ceilings and estimated value-added losses in selected countries



Note: Calculations are based on estimated revenue losses during strict workplace closures (Statistics Canada, 2020^[19]), data on value added for OECD countries (OECD, 2022^[20]), (iii) data on the imposition of workplace closure requirements collected by the Blavatnik School of Government (Hale et al., 2021^[21]) and (iv) data on guarantee programme ceilings (as of March 2021) from Moretti et al. (2021^[13]). Further information on the data and methodology is provided in Annex A.

2. Building financial resilience against future large-scale economic disruptions

2.1. Challenges to a private market insurance solution for pandemic-related business revenue losses

Catastrophe perils (i.e. perils that occur with lower frequency but have the potential to cause large losses), such as natural catastrophes and extreme weather events, various forms of cyber-attacks, infectious disease outbreaks, infrastructure disruptions as well as social unrest, terrorist attacks and inter-state conflict, are generally challenging to insure in private insurance markets:

- there is more limited historical experience on which to base underwriting assessments leading to more pricing uncertainty.
- the higher severity of catastrophe events requires insurance companies to hold large reserves and/or capital to cover these losses.
- the potential for catastrophes to impact many policyholders simultaneously (particularly where catastrophes can affect policyholders across different regions and sectors) reduces the benefits of diversification on which the insurance business model is based.
- the lower frequency of catastrophe events may also limit the willingness of policyholders to pay for insurance coverage for catastrophe perils as the likelihood of facing losses may seem remote and/or there may be an expectation of government compensation for losses in the event of a low-likelihood catastrophic event.

The ability of private insurance and reinsurance markets to provide broad coverage for a global pandemic on the scale of COVID-19 would clearly be impeded by many of these challenges:

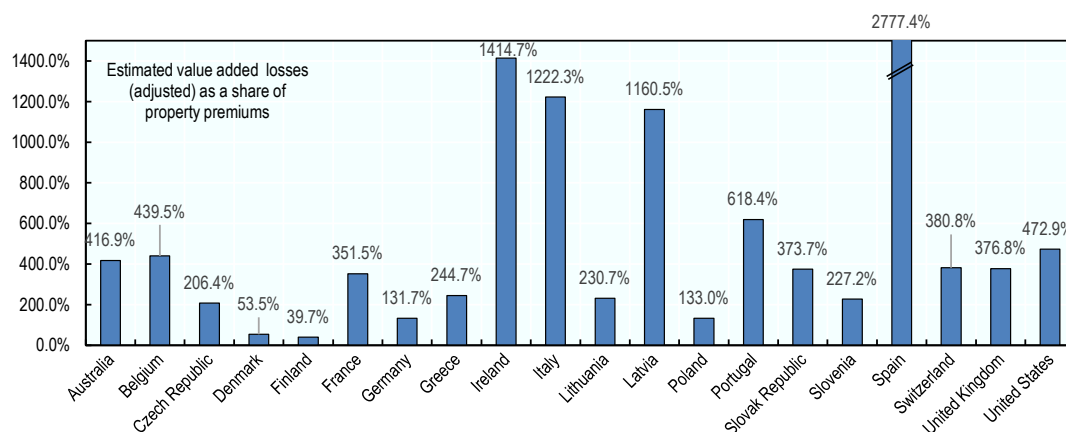
- in most countries, the estimated gross value added losses are multiples (approximately 4.3x across countries where data was available) of the gross written property insurance premiums (residential and business) collected by insurance companies in 2020 (of which only a portion would have been collected specifically to provide business interruption coverage) (see **Figure 4**);
- the high level of correlation in the timing of losses around the world (a fast-spreading communicable disease like COVID-19 has the potential to lead to near-simultaneous losses in countries around the world that would be impossible to diversify) – which would impede the ability of the reinsurance sector to provide coverage, given the reduced ability to diversify risks geographically;
- difficulties in quantifying potential exposures given the dynamic, fast-evolving, and country-specific nature of the risks, for instance the impact of government decisions, the emergence of new variants, and other factors on loss levels,¹² including the potential for more frequent outbreaks in the future;¹³

¹² In order to extend coverage, insurance and reinsurance companies need to have confidence in their ability to quantify the potential exposures that they are assuming – which is necessary for pricing premiums and making decisions on the amount of capital and provisions to set aside and the level of reinsurance protection required. Exposures to infrequent large-scale catastrophes are, by nature, more challenging to quantify than frequent events such as motor vehicle accidents. Communicable disease outbreaks such as COVID-19 add additional challenges given the difficulties in assessing public health policy responses as well as factors such as the speed of development of effective treatment options for the disease.

¹³ While large-scale global pandemics have been rare (especially highly-transmissible diseases such as COVID-19), increasing population (and habitat encroachment), changing climate, increasing urbanisation and continued globalisation could lead to more frequent infectious disease outbreaks (and potentially global pandemics) in the future (The Vaccine Alliance (Gavi), 2020^[65]), (Whiting, 2020^[66]). Among insurance sector experts, a return period of approximately 1-in-30 to 1-in-40 years is expected in the future (Schanz, 2020^[71]).

- challenges linked to moral hazard given the experiences with COVID-19 and related public support measures, which may make individuals and businesses less inclined to purchase pandemic coverage in the future, even if offered; as well as
- challenges related to adverse selection as businesses facing lower levels of exposure to a given risk are less likely to acquire insurance coverage relative to those most exposed – which means insurance companies are most likely to assume a portfolio that is heavily weighted towards high-risk policyholders (which would require higher premiums).

Figure 4. Value-added losses as a share of annual gross written property premiums (2020)



Note: Value added losses derived as described in Annex A (high estimates are shown, adjusted for reduced wage costs in some sectors)
Source: See Annex A. Property insurance premiums are from OECD (2022^[22]).

Given these challenges – and without a government backstop for catastrophic losses – insurance and reinsurance companies have started to apply (or re-apply revised) exclusions to ensure that business interruption losses resulting from future pandemics will not be covered. For example, the Lloyd’s Market Association, which develops policy wording for use on the Lloyd’s market (and beyond), published a communicable disease exclusion clause for use in property treaty reinsurance (which has a significant impact on the scope of coverage in direct insurance policies) in March 2020 that would exclude: “...any loss, damage, liability, claim, cost, or expense of whatsoever nature, directly or indirectly caused by, contributed to by, resulting from, arising out of, or in connection with a Communicable Disease or the fear or threat (whether actual or perceived) of a Communicable Disease (LMA, 2020^[23]).” According to one assessment by an insurance/reinsurance broker, it has become “increasingly difficult to avoid a communicable disease exclusion in its entirety on property damage and business interruption policies” (Marsh, 2021^[24]) which suggests that these types of exclusions are being widely applied and that little insurance coverage will be available in the future for business interruption losses related to any type of communicable disease outbreak.

2.2. Challenges and implications related to large-scale fiscal support for business

Large-scale fiscal support for business to mitigate the impacts of economic disruptions can involve both implementation challenges and longer-term implications for both recipients of the fiscal support and for the long-term health of public finances.

Fiscal support should ideally target businesses that are both: (i) in need (i.e. facing disruptions in revenue with limited access to private market financing to address liquidity risk – see Box 3 on the challenges faced by SMEs); and (ii) likely to be viable once the crisis is over. The first criteria would require an assessment

of which types of activities are most disrupted and which companies have the most limited access to private finance, creating a risk that some businesses in need will not be eligible for support while some businesses without a real need for fiscal support will receive that support. For example, in the United States, some large, publicly-traded businesses reportedly received significant government-backed loans from the Paycheck Protection Program, including a number of companies with market capitalisations of more than USD 100 million (which ultimately led to a change in eligibility criteria) (Franck, 2020^[25]). The second criteria would require an assessment of the future viability of individual companies, which would be particularly challenging in the midst of a major disruption (OECD, 2021^[26]) (of unknown duration). Poor targeting can have important implications for the overall cost of fiscal support measures if more support is accessed than needed and/or if default rates are high because of funds allocated to non-viable firms. An IMF analysis estimated that the fiscal cost of a support measure that narrowly targets businesses at risk can be less than a third of the cost of a non-targeted measure with similar levels of effectiveness in terms of reducing failures and maintaining employment (Kalemi-Ozcan et al., 2020^[27]). Initial government evaluations of COVID-19 responses found evidence that the fiscal support provided might have been accessed by some businesses with limited need for support and might also sustained some non-viable businesses (OECD, 2022^[28]) – although other studies have found evidence that programmes in some countries (EU countries) were well-targeted towards viable firms in need (OECD, 2022^[18]).

Box 3. Targeting SMEs

Most of the fiscal support measures established specifically targeted the needs of SMEs. SMEs have generally been perceived to be more vulnerable to the disruptions caused by COVID-19 due to:

- *Higher levels of financial fragility:* there is some evidence that many SMEs have lower cash reserves (JPMorgan Chase Institute, 2016^[29]) (and higher liquidity risk) and are more dependent on bank financing with limited ability to access other sources of market financing (OECD, 2021^[14]).
- *More limited capacity to adapt to changing consumer and/or regulatory requirements:* given fewer employees with broader responsibilities, SMEs may not have access to the expertise needed to implement new health and safety measures to protect customers and employees from infection or to quickly shift to new distribution models for their products or services in response to restrictions on in-person sales (OECD, 2021^[14]).
- *Greater presence in sectors facing more severe restrictions:* In many countries, SMEs make up a significant share of businesses in sectors that have been more heavily targeted with workplace closure requirements, such as the accommodation and food services sectors (OECD, 2020^[12]), (OECD, 2021^[14]).

The provision of rapid financing is critical in the context of a major disruption to ensure that liquidity constraints do not lead to insolvencies. In responding to the COVID-19 disruption, most (if not all) governments that provided fiscal support to business (rightly) designed support programmes with the aim of ensuring rapid payments and monitored turnaround times as a key performance metric for the established programmes (OECD, 2022^[28]). Programmes in many countries were implemented within days of receiving necessary legislative authorities. However, the efficiency of delivering some measures was hampered (in some cases) by data challenges in some countries. For example, some government evaluations identified administrative difficulties in administering tax deferrals or waivers due to challenges in identifying eligible recipients due to poor quality or incomplete records (OECD, 2022^[28]). In addition, efforts to simplify application processes by limiting eligibility criteria and required documentation limited the ability of some programmes to effectively target viable firms in need (OECD, 2022^[28]). In some countries, central government funding was delivered by subnational governments which led to some challenges in ensuring consistent treatment (see Box 4).

Box 4. Linea COVID: Spanish firm-support programme's multilevel governance

In March 2021, the Spanish central government created a EUR 7 billion unconditional non-refundable transfer programme for firms and the self-employed affected by the pandemic. The requirement to become a recipient was to have an income loss of at least 30% in 2020 when compared with the previous year, with the condition that the financial assistance should be primarily deployed in paying existing debts. In exchange, beneficiaries committed to maintain their activity at least until July 2022, and neither distribute dividends nor raise executives' salaries during two years, to ensure benefits were devoted to improve accounting results. Subsidies could range between EUR 3 000 and 200 000.

Although the programme was designed by the central government, funding was allocated across regions according to income levels, unemployment and youth unemployment indicators, with the aim of favouring regions in need. In addition, the Balearic and Canary Islands, whose tourism-dependent economies were severely hit by the pandemic, received EUR 2 billion out of the total amount of the programme. As observed, the programme was designed to provide asymmetric support across regions, depending on their specific sectoral needs.

During the two months after the programme was announced and enacted, each region signed a management agreement with the central government to assume the responsibility to open the calls for applications, examine and resolve the applications, and pay and monitor the transfers. Every month, regions would provide information about applications and resolutions to the Central Treasury. This model of shared governance was in response to calls from regions to take a larger role in the fiscal response to the pandemic.

Among the positive take-aways from this shared governance experience, it is possible to identify the adaptation of management and documentation requirements to the region-specific context, since regions were provided with a margin to set more or less administratively strict management procedures and criteria for decisions. In addition, regions had room to increase subsidies by complementing funding provided by the central government, according to the needs and choices of their citizens, making available an efficiency-improving varied policy menu, in line to Tiebout's "voting with one's feet" hypothesis (Tiebout, 1956^[30]). In addition, this experience set a precedent to create new channels for co-operation across levels of government, and to improve the quality of vertical fiscal relations.

On the other hand, previous asymmetries led to horizontal inequalities among potential beneficiaries across regions. First, while some territories arranged the first payments already in June 2021, others took longer to provide firms and self-employees with support. But the main gap was related to take-up. Although almost 75% of the funds were dispensed on average, the percentage differed across territories. Business associations argued this was caused by an initial design issue, due to strict eligibility requirements and the large amount of documentation required to prove income losses. As a response, successive calls of "Linea COVID" increased the scope of eligible sectors and the time span to apply. However, both Balearic and Canary Islands used all the funding allocated by the central government, serving as a yardstick to evaluate performance of the rest of the regions.

According to Fiscal Federalism theory (Oates, 1972^[31]), these performance differences would allow citizens to hold regional governments accountable. Nevertheless, even if most regions maintained the "Linea COVID" naming of the policy, some rebranded it, making regional implementations of the programme more difficult to relate to the central government's funding and weakening the accountability argument for decentralisation.

Source: Spanish Ministry of the Treasury and Regional Governments.

Non-budgetary fiscal support (sometimes referred to as balance sheet based support) provided as loans, equity injections and guarantees can also create challenges in terms of fiscal transparency and reporting. In some countries, depending on the accounting approach implemented, these measures will not generate an immediate expense to be incorporated into government spending statistics.¹⁴ There is significant uncertainty about the ultimate fiscal cost of such measures which depends on the ability of businesses to repay loans extended by governments or banks (and guaranteed by governments). Despite significant progress in improving disclosure related to balance-sheet measures since the global financial crisis, only 4 of the 9 countries examined by the OECD included detailed cost estimates in their (initial or revised) budget documentation and only 3 of 9 included information on estimated default rates by programme beneficiaries (Moretti, Braendle and Leroy, 2021^[13]).

Non-budgetary fiscal support can also create risks for beneficiaries that take additional debt supported by these measures. Loan guarantees could result in moral hazard as bank lenders might relax criteria for loans. Higher leverage ratios would likely reduce credit ratings and increase the cost of future borrowing - limiting capacity for productive investment and potentially leading to higher future defaults and insolvencies (with implications for the fiscal cost of government-backed debt) (OECD, 2021^[14]; OECD, 2020^[32]). A number of studies have projected (sometimes significant) increases in SME debt levels as a result of the current crisis.¹⁵ Across countries examined by the OECD (in OECD, 2022^[18]), the median growth rate of SME outstanding loan stock in 2020 was 4.9% (up from an average annual increase of 1.2% in the previous five years).

The significant monetary and fiscal support has also had significant implications for public finances – although the ultimate fiscal impact of these measures is difficult to assess. Some of the fiscal support, such as job retention schemes, tax waivers and grants to businesses, involved net current expenditure or an increase in debt while others, such as tax deferrals can be expected to be paid back in the future. The main point for such fiscal support, is whether it maximised welfare gains, by reducing economic harm and hardship, and favoured a rapid economic rebound, for example through facilitating quick return of workers to the labour market, and helping firms to resume activity quickly.

Loans, guarantees and equity do not involve a fiscal cost unless loans are not repaid or an equity investment loses significant value which could entail expenditures reported at a future date (OECD, 2020^[12]). Efforts by governments to support broad and quick access could increase the risk of future losses on loans and guarantees extended. For example, in the United Kingdom, the National Audit Office estimated a default probability range of 35% to 60% on UK Bounce Back Loans (NAO, 2020^[33]).

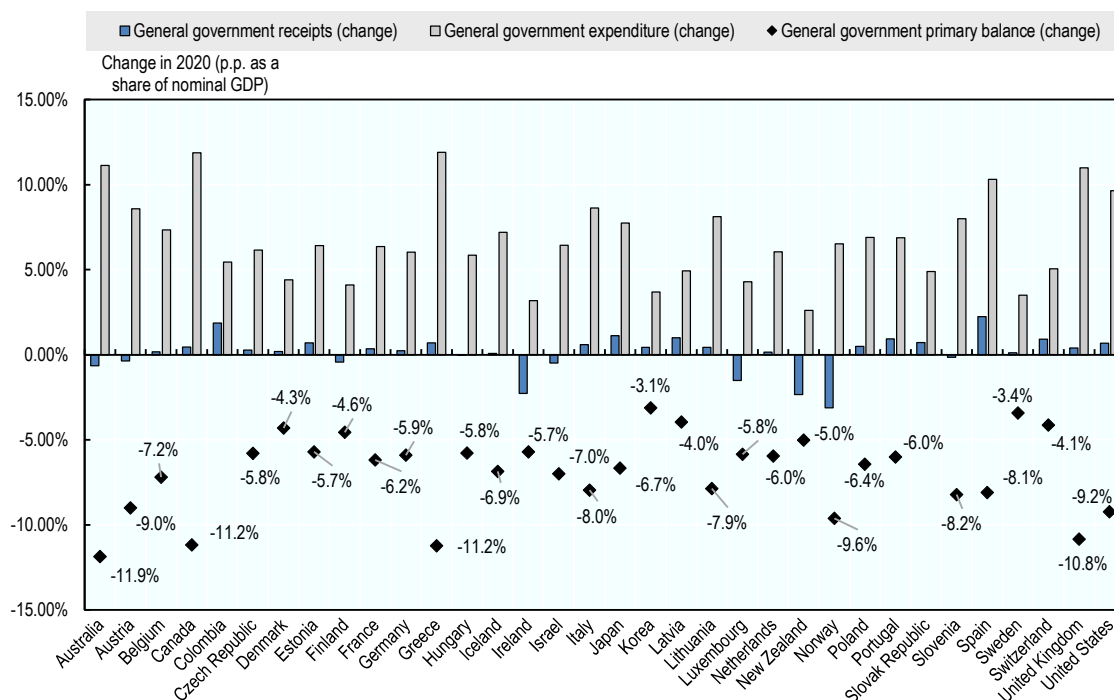
Across OECD member countries, general government expenditures as a share of nominal GDP increased by 6.8%¹⁶ (which would have included fiscal support to both business and individuals as well as other government spending needs, such as health care) while revenues were generally stable (as a share of GDP which was significantly reduced). This generally results in a “scissors effect” on public finances. As a result, general government primary balances deteriorated by 6.9% of nominal GDP on average across OECD countries in 2020 (see **Figure 5**).

¹⁴ Some countries do account for loans and loan guarantees in government spending. In the United States, for example, since the enactment of the Federal Reform Credit Act, the long-term cost of direct loan and loan guarantee programmes must be included in budgetary reporting with Congressional authorisation required for the “subsidy cost” of the credit provided (Anderson and Burke, 2021^[74]).

¹⁵ For example, the Canadian Federation of Independent Businesses estimated that the average small business in Canada has accumulated approximately CAD 170 000 in debt related to COVID-19 (CFIB, 2021^[67]). In the United Kingdom, SMEs had taken on GBP 68.2 billion in debt since the start of the pandemic through the Coronavirus Business Interruption Loan Scheme (CBILS) and the Bounce Back Loan Scheme (BBLs) (Dolan, 2021^[68]).

¹⁶ General government expenditures as a share of nominal GDP in 2020 were 6.8% higher than in 2019.

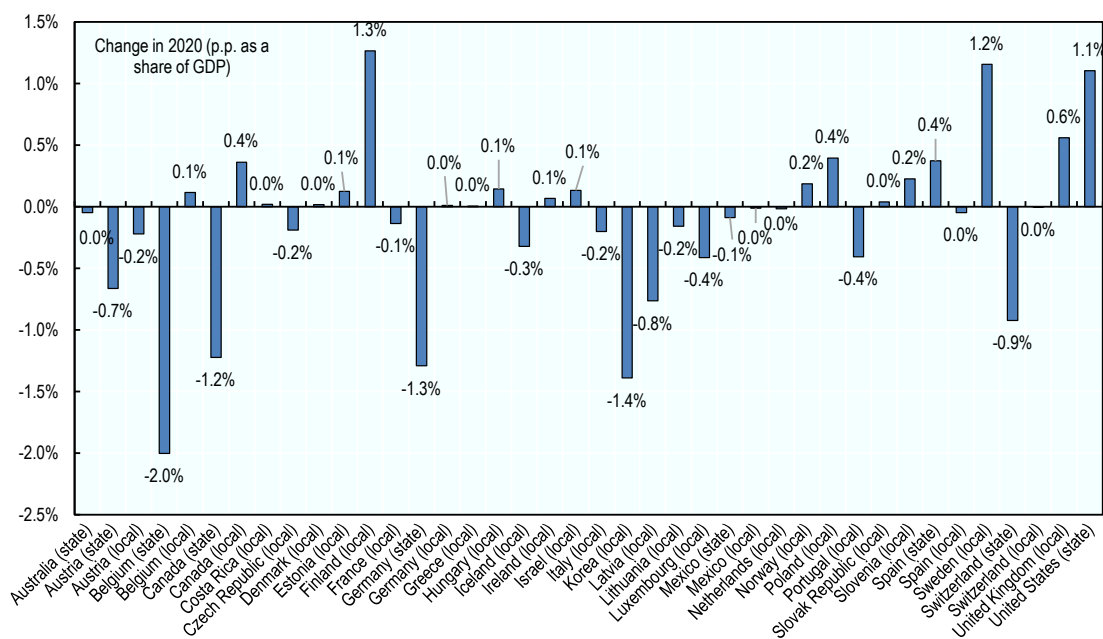
Figure 5. Change in general government revenues, expenditures and primary balances



Source: Author's calculations based on OECD (2021_[3]).

Government balances did not deteriorate as much at the subnational as at the central government level (see **Figure 6**), which in general amounted to only 1-2% of GDP. As outlined in OECD (2021_[1]), the asymmetric impacts are due to central governments' taking an expansionary fiscal policy in times of crises (acting as a lender of last resort and with increased borrowing capacity relative to subnational governments), the larger role of central governments in social protection and the more diversified tax base that can be mobilised to support households and businesses.

Figure 6. Change in subnational government balances in 2020 (net lending/net borrowing)



Source: Author's calculations based on OECD (2022^[34]).

3. Potential contribution of a catastrophe risk insurance programme for pandemics

Lessons from the experience of COVID-19 offer an opportunity to better prepare for the financial impacts of future pandemics, including by considering the potential contribution of insurance markets to absorbing some of the losses resulting from pandemic-related disruptions to economic activity.

For many other perils that are “uninsurable” by private insurance markets alone, catastrophe risk insurance programmes have been established to support the availability of affordable insurance coverage. These programmes provide insurance, co-insurance, reinsurance and/or a government guarantee for losses resulting from catastrophe perils to all of specific types of potential policyholders and have been established by the insurance sector, government (at national or subnational level) or (most commonly) as a collaboration between the insurance sector and a given level of government. Among OECD and candidate countries, 18 countries have established a catastrophe risk insurance programme (or programmes) for terrorism and/or natural catastrophe risks. These programmes differ in terms of the scope of perils and types of policyholders covered, the role of the programme in the broader insurance market and the level of involvement of the government (including as a provider of a financial backing) (see Table 1).

Table 1. Catastrophe risk insurance programmes

	Programme	Type of insurance offered	Type of perils covered	Types of policyholders covered	Importance as coverage provider	Premium pricing	Public sector involvement
Australia	Australian Reinsurance Pool Corporation (ARPC)	Reinsurance	Terrorism	Commercial	Main provider of coverage (reinsurance)	Simplified premium structure (hazard zone)	ARPC is a government enterprise that benefits from a government guarantee for excess losses up to a pre-determined amount
Austria	Österreichischer Versicherungspool zur Deckung von Terrorrisiken (OVDT)	Co-insurance/ Reinsurance (pool)	Terrorism	Commercial Residential (household)	Main provider of coverage (co-insurance)	Various approaches, including fixed cost (sum insured)	None
Belgium	Terrorism Reinsurance and Insurance Pool (TRIP)	Co-insurance/ Reinsurance (pool)	Terrorism	Commercial Residential (household)	Main provider of coverage (co-insurance)	Fixed cost (market share)	TRIP benefits from a government guarantee for excess losses up to a pre-determined amount
Denmark	Danish Storm Council	Direct insurance (compensation)	Storm surge and inland flood	Residential (household) Commercial	Sole provider of coverage (compensation)	Fixed cost (per policy)	The Storm Council is a public entity that provides compensation for damages funded by a fee on fire insurance policies.
	Terrorism Insurance Council	Direct insurance (compensation)	Terrorism (NBCR)	Residential (household) Commercial	Sole provider of coverage (compensation)	No up-front premium. Losses are recouped through a fixed charge applied to specific types of policies.	The Terrorism Insurance Council is a special entity that provides compensation for damages.
Finland	Finnish Terrorism Pool	Reinsurance	Terrorism	Residential (household) Commercial	Residual provider of coverage (reinsurance when all other recovery sources exhausted)		None
France	Caisse centrale de réassurance (CCR)	Reinsurance	Flood, earthquake, tsunami, landslide, mudslide, avalanche, subsidence and high winds; terrorism	Residential (household) Commercial	Significant provider of coverage (reinsurance)	Fixed cost (sum insured) (uniform additional premium rate)	CCR is a government entity backed by an unlimited government guarantee
	Gestion de l'Assurance et de la Réassurance des risques Attentats et actes de	Co-insurance/ Reinsurance (pool)	Terrorism	Commercial	Sole provider of coverage for large risks (co-insurance)	Fixed cost (sum insured)	GAREAT's reinsurance coverage is provided by private reinsurers and CCR (government entity)

	Programme	Type of insurance offered	Type of perils covered	Types of policyholders covered	Importance as coverage provider	Premium pricing	Public sector involvement
	Terrorisme (GAREAT)						
Germany	Extremus	Direct insurance	Terrorism	Commercial (large)	Main provider of coverage for large risks (direct insurance)	Risk-based pricing	Extremus is backed by a limited government guarantee
Iceland	Natural Catastrophe Insurance of Iceland (NTI)	Direct insurance	Volcanic eruptions, earthquakes, landslides, avalanches, river, coastal and glacial flood	Residential (household) Commercial	Sole provider of coverage (direct insurance)	Fixed cost (sum insured)	NTI is a government entity backed by an unlimited government guarantee (although overall indemnity limits apply per event)
Japan	Japan Earthquake Reinsurance (JER)	Reinsurance	Earthquake, volcanic eruptions, tsunami	Residential (household)	Significant provider of basic coverage (reinsurance)	Simplified premium structure (hazard zone and type of construction)	Losses above certain thresholds are shared by the government and industry up to a pre-determined amount
Netherlands	Nederlandse Herverzekeringsmaatschappij voor Terrorisemeschaden (NHT)	Reinsurance	Terrorism	Residential (household) Commercial	Main provider of coverage (reinsurance)	Fixed cost (market share)	NHT benefits from a government guarantee for excess losses up to a pre-determined amount
New Zealand	Earthquake Commission (EQC)	Direct insurance	Earthquake, volcanic eruptions, tsunami, landslides, storm/flood (for land only)	Residential (household)	Significant provider of basic coverage (direct insurance)	Fixed cost (sum insured)	EQC is a government entity backed by an unlimited government guarantee
Norway	Norsk Naturskadepool	Co-insurance/ Reinsurance	Flood, storm, landslide, avalanche, volcanic eruption, earthquake	Residential (household) Commercial	Sole provider of coverage (co-insurance)	Fixed cost (sum insured)	Established by legislation although no government financial support is provided.
Romania	Pool-ul de Asigurare împotriva Dezastrelor Naturale (PAID)	Direct insurance	Flood, earthquake, landslide	Residential (household)	Main provider of coverage (direct insurance)	Fixed amount (based on construction type)	Established by legislation although no government financial support is provided.
Spain	Consortio de Compensación de Seguros (CCS)	Direct insurance	Flood, earthquake, tsunami, volcanic eruption, windstorm, terrorism, social unrest	Residential (household) Commercial	Sole provider of coverage (direct insurance)	Fixed cost (sum insured)	CCS is a government entity backed by an unlimited government guarantee (although self-financed with its own capital and reserves)

	Programme	Type of insurance offered	Type of perils covered	Types of policyholders covered	Importance as coverage provider	Premium pricing	Public sector involvement
Switzerland	Kantonale Gebäudeversicherungen (19 cantons) (e.g. Grisons) ¹	Direct insurance	Flood, storm, hail, avalanche, landslide, snowpressure (as well as fire)	Residential (household) Commercial	Sole provider of coverage (direct insurance) (some cantons)	Simplified premium structure (type of construction)	Established by legislation as independent self-financed entities with their own capital and reserves
	Interkantonale Rückversicherungsverband (IRV)	Reinsurance for public insurers for real estate	Flood, storm, hail, avalanche, landslide, snowpressure (as well as fire)	Residential (household) Commercial	Sole provider of coverage (reinsurance) (some cantons)	Risk-based pricing	Established by legislation as independent self-financed entity with its own capital and reserves
	Schweizerische Pool für Erdbebendeckung (SPE)	Direct insurance (compensation)	Earthquake	Residential (household) Commercial	Sole provider of coverage (compensation)	Fixed cost (sum insured)	None
	Schweizerischer Elementarschadenpool (SVV) of the private insurance sector	Co-insurance	Flood, storm, hail, avalanche, landslide	Residential (household) Commercial	Main provider of coverage (co-insurance) (some cantons)	Fixed cost (sum insured)	None
	Terrorism Reinsurance Facility	Reinsurance	Terrorism	Commercial (large)	Main provider of coverage (reinsurance)		None
Türkiye	Turkish Catastrophe Insurance Pool (TCIP)	Direct insurance	Earthquake, tsunami, landslide (and other perils triggered by earthquake)	Residential (household) (within municipal boundaries)	Significant provider of basic coverage (direct insurance)	Simplified premium structure (hazard zone and type of construction)	Limited government reinsurance for losses above TCIP's capacity
United Kingdom	Flood Re	Reinsurance	Flood	Residential (household)	Residual provider of coverage (reinsurance)	Fixed cost (based on council tax band)	Established by legislation
	Pool Re	Reinsurance	Terrorism	Commercial	Main provider of coverage (reinsurance)	Simplified premium structure (hazard zone)	Unlimited government backstop for losses above Pool Re capacity
United States	National Flood Insurance Program (NFIP)	Direct insurance and risk management programme	Flood	Residential (household) Commercial	Significant provider of basic coverage (direct insurance)	Simplified premium structure (hazard zone and elevation with exceptions, although a new rating model is set to be implemented from October 2021)	NFIP is administered by the Federal Emergency Management Agency (a government agency) The NFIP collects premiums and has the authority to borrow from the US Treasury. NFIP has transferred part of its risk to private reinsurance companies and capital market investors
	Terrorism Risk Insurance Program (TRIP)	Co-insurance	Terrorism	Commercial	Main provider of coverage (co-insurance)	No up-front premium. Post-event assessments	Limited federal government backstop through co-insurance for

	Programme	Type of insurance offered	Type of perils covered	Types of policyholders covered	Importance as coverage provider	Premium pricing	Public sector involvement
						are applied through surcharges imposed upon commercial policyholders	losses above a defined threshold
	California Earthquake Authority	Direct insurance	Earthquake	Residential (household)	Significant provider of coverage (direct insurance)	Risk-based pricing	Established by state legislation
	Fair Access to Insurance Requirements (FAIR) Plans and Beach and Windstorm Plans (e.g. Citizens Property Insurance Corporation (Florida)) ²	Direct insurance	Wind (as well as other property insurance perils such as fire and theft in some cases)	Residential (household) Commercial	Residual provider of coverage (direct insurance)	Risk-based pricing	Some residual plans are operated as public insurers (e.g. Citizens (Florida) is a state government entity)
	Florida Hurricane Catastrophe Fund (FHCF)	Reinsurance	Wind	Residential (household) Commercial	Significant provider of basic coverage (reinsurance)	Risk-based pricing	Established by state legislation and administered by a government agency

Note: 1. There are public insurers for real estate in 19 Swiss cantons. The information provided in the table is for Gebäudeversicherung Graubünden in the canton of Grisons (as an illustrative example).

2. There are residual insurance arrangements that offer coverage for all or some property risks in many US states. Similar to Citizens in Florida, these programmes are aimed at making insurance coverage available to households that are unable to secure coverage in the private market.

Source: Adapted from OECD (2021^[35]).

These programmes provide a means for insurance markets to provide coverage for risks that might otherwise be deemed uninsurable and therefore excluded from coverage. A recent OECD analysis found that these programmes have generally led to higher levels of insurance coverage for the types of perils and/or policyholders included within the scope of the programme and that they may reduce fiscal exposure to catastrophe losses (OECD, 2021^[35]).¹⁷ Some of these programmes have been established directly by sub-national governments while a few national programmes involve specific elements related to intergovernmental responsibilities (see Box 5).

Box 5. Inter-governmental elements in the management of catastrophe risk insurance programmes

While most catastrophe risk insurance programmes have been established by national governments or by insurance associations at the national level, there are a few examples of programmes that have been established at the subnational level. In the United States, an earthquake risk insurer has been established at state-level in California while a number of public insurers, residual programmes (beach and wind plans) and a reinsurance fund covering hurricane (wind) risks have been established at state-level (Florida, Louisiana, Texas, North Carolina, South Carolina). In addition, general residual insurance arrangements that provide access to property insurance for those unable to secure private insurance coverage have been established by most US states. This approach reflects both the different levels of exposure to natural catastrophe risks in different parts of the United States as well as state responsibility for the regulation and supervision of insurance companies (although the federal government also has some responsibilities related to the oversight of insurance markets). In Switzerland, a number of cantons have established public insurers for real estate that acts as the sole provider of property insurance coverage for both standard perils such as fire as well as for natural catastrophe perils.

Some programmes that have been established at the national-level incorporate specific conditions related to subnational responsibilities. The US National Flood Insurance Program only makes (federally-provided) coverage available in communities that meet specific requirements related to floodplain management. In France, policyholders may have to pay a higher deductible in the event of a claim if they have suffered repetitive losses and if the municipality has not implemented a risk reduction plan. These types of approaches respond to some the misaligned incentives that may result when local governments are responsible for risk management while national government are responsible for a significant share of the disaster losses that potentially could have been avoided by greater local government investment in risk reduction.

Source: OECD (2021^[35]).

In the early months of COVID-19, a number of insurance companies, insurance associations and other stakeholders developed proposals for establishing a catastrophe risk insurance programme for business interruption (and sometimes other losses) resulting from pandemics, in all cases involving loss-sharing with government. However, at the time of writing, none of these proposals have led to the establishment of such a programme. These proposals differed in terms of the amount of coverage that would be provided, the types of policyholders covered and the distribution of losses between insurers and the private sector (see **Table 2**).

¹⁷ Governments usually face demands for compensation and financial support in the aftermath of large-scale catastrophes that involve significant uninsured losses – which leads to higher fiscal costs. For example, one study that examined specific past large events estimated that an increase in insurance penetration of 1% was linked to a reduction in post-disaster government expenditure equivalent to 22% of the damages incurred (Lloyd's, 2012^[73]). In addition, a recent OECD analysis of catastrophe risk insurance programmes found that most of these programmes involved limited public sector exposure related to the government's financial backing as most programmes operate at a high-level of financial resilience.

Table 2. Pandemic risk insurance programme proposals

Proposal	Distribution	Type of coverage	Perils	Eligible policyholders	Coverage trigger	Government involvement
EIOPA (Europe)	Insurance sector (bundled with other coverage)	Non-damage business interruption (potentially parametric)	Pandemic	SMEs (potentially)	Not specified	National government (third risk layer) Europe (fourth risk layer)
CATEX (Federation française des assureurs)	Insurance sector (attached to commercial property or business interruption policies)	Business interruption (resilience capital)	Extraordinary events (cyber, terrorism, pandemic, etc.)	SMEs	Health emergency declaration and closure order	Reinsurance provided by public reinsurer (CCR)
GDV (Germany)	Insurance sector (levy or policy extension)	Business interruption	Pandemic (or epidemic)	No restriction	WHO/German authority declaration	Government retrocession/guarantee (highest layer)
ReStart (Lloyd's)	Insurance sector	Business interruption	COVID-19	Small companies (potentially all SMEs)	Evidence of health emergency and revenue decline	No requirement for government backstop
Recover (Lloyd's)	Insurance sector (stand-alone, multi-year policy)	Non-damage business interruption	Pandemic and other perils	No restriction	Evidence of health emergency and revenue decline	Government guarantee against default on future premium payments
Black Swan (Lloyd's)	Insurance sector	Non-damage business interruption (systemic event)	Systemic risk perils	No restriction	Not specified	Government backstop for reinsurance pool
Pandemic Risk Insurance Act (United States)	Insurance sector	Business interruption and event cancellation	Pandemic and infectious disease outbreaks	No restriction	Certification by Secretary of Health and Human Services	5% industry retention and 5% industry co-insurance above retention
Business Continuity Protection Program (APCIA, NAMIC, Big I – United States)	Insurance sector (stand-alone policy)	Business interruption	Pandemic	No restriction (although coverage amounts are smaller for larger companies)	Health emergency declaration and closure order	Government would pay all claims
Pandemic Business Interruption Program (Chubb – United States)	Insurance sector	Business interruption	Pandemic	SME programme and larger company programme	Pandemic declaration and closure order	6% retention up to USD 15 billion (SME programme) 5% retention up to USD 15 billion (larger companies) Industry share to increase over time

Draft concept for facilitating pandemic protection (Zurich North America – United States)	Insurance sector	Business interruption	Pandemic	No restriction	Health emergency declaration and closure order	Government reinsurance pools that would assume 90%, 95% or 100% of risk (cedant chooses cession level)
Business Continuity Coalition (United States)	Insurance sector	Business interruption and event cancellation	Pandemic	No restriction	Health emergency declaration and closure order	Government reinsurance for 95% of losses (first event) and 90% of losses (second event)

Source: Adapted from OECD (2021^[36]).

Many of these proposals include interesting design elements that could potentially address some of the challenges in implementing large-scale fiscal support as well as the implications of such support for recipients and for public finances:

- *Defining eligibility:* By definition, an insurance coverage would only be available to businesses that have paid a premium in advance for such coverage which would eliminate the need to define eligibility criteria for fiscal support and any need for governments to make assessments on need and future viability of programme beneficiaries. That said, a programme could be designed *ex ante* to only provide support to the companies most likely to face significant losses and/or with the most limited capacity to access alternative financing (for example, by size of company or by sector). Some of the pandemic risk insurance programme proposals limit eligibility to small companies or SMEs and/or provide different levels of coverage amounts or terms for SMEs. For example, the proposal developed by one US insurance company (Chubb) recommends completely different programmes for small and large companies (see Box 6).

Box 6. Establishing differential support for SMEs

One large US property and casualty insurer (Chubb) has proposed the establishment of a Pandemic Business Interruption Program that would involve different approaches for small companies and for medium and large companies. For small businesses, the programme would provide a fixed payment based on a multiple of payroll costs in the event of a government-declared pandemic and lockdown with losses shared between insurers and government. Small business policyholders would only be required to pay premiums at a rate calibrated to cover the potential industry share of losses which would reduce the cost of this insurance. For medium and large companies, business interruption coverage could be acquired from private insurers who would cede a proportion of the risk (and premium) to a government reinsurer.

Source: Chubb (2020^[37]).

- *Speed of support:* The insurance underwriting process would provide information for the calculation of business interruption losses in advance which should allow for faster payments¹⁸ to businesses with eligible coverage without a need for additional documentation. A parametric¹⁹ trigger could be used as the basis for payments which would simplify the designation of a triggering event and further increase speed of payment. Many of the proposals put forward by insurance companies and associations incorporate a parametric trigger that would provide fixed payments based on the declaration of a health emergency and/or a workplace closure measure (see Box 7).
- *Fiscal transparency:* An insurance-based approach could support fiscal transparency by potentially clarifying implicit contingent liabilities. Insurance involvement would drive demand for risk analytics and modelling to assess capital and provisioning requirements, set premiums and manage exposure and risk transfer to reinsurance markets²⁰ which could also provide governments with tools for measuring their own exposure to a catastrophe risk insurance programme for pandemic business interruption.²¹

Box 7. Parametric coverage for revenue losses

The majority of the proposals for the establishment of a pandemic risk insurance programme incorporate some form of parametric trigger as a basis for claims payments (including CATEX (France), GDV (Germany) and many of the US proposals). A parametric trigger would provide a simplified means for determining whether a pay-out should be made to the policyholders, allowing for a quicker release of funds and avoiding the operational challenges that would certainly materialise if insurers needed to individually assess claims submitted by significant numbers of policyholders simultaneously. In all cases, payments would be made based on some form of government order or declaration. Under the CATEX (France) and PRIA (United States) proposals, payments would be made based on a specific administrative order or certification that a triggering event has occurred. Under some of the other US proposals, coverage would be triggered based on both a disaster or health emergency declaration and a workplace closure order affecting the given policyholder (BCC and Zurich NA proposals). In Germany, the GDV proposals suggests a reliance on a WHO pandemic declaration or regional health emergency declaration from a competent German authority.

Source: OECD (2021^[36]).

¹⁸ Some of the programme proposals, where specified, would establish the pay-out amount in advance (i.e. a payment amount based on pre-event revenues would be defined in advance and paid based on the duration of the interruption to business activities. This would eliminate the need for claims adjustment to determine the actual level of losses which would unquestionably lead to much faster payments.

¹⁹ Most insurance is offered on an indemnity-basis, which means payments are made based on the actual level of losses incurred. Parametric insurance provides a payment of a pre-defined amount based on the occurrence of a specific event (for example, an earthquake of a given magnitude or a declaration of a health emergency). Payments are usually made much more quickly under parametric insurance as there is no need to verify the amount of losses that the policyholder incurred.

²⁰ For example, for natural catastrophe, terrorism and (increasingly) cyber risks, a sophisticated catastrophe modelling industry has developed to provide insurance and reinsurance companies with the analytical tools necessary to support premium pricing, exposure management and risk transfer to reinsurance and capital markets – and ultimately provide greater comfort in insurance company's willingness to assume these risks.

²¹ Catastrophe models developed by the insurance sector (including specialised modelling firms) are broadly used by the insurance sector for pricing coverage, transferring risk to reinsurance and capital markets and managing retained exposure. Catastrophe models for infectious diseases were developed following the SARS epidemic in 2003/2004 (with a focus on life and health risks) and some reinsurance companies and specialty modelling firms have more recently developed catastrophe models to measure business interruption risks linked to pandemics.

- *Recipient financial health:* Insurance payments are not loans and would not impact the level of indebtedness or leverage among those that receive payments, therefore eliminating some of the potential constraints to economic recovery that arise if the crisis leads to higher indebtedness and financial fragility.

In addition, any losses absorbed by the insurance sector should help to mitigate the amount of funding needed through fiscal support measures and therefore the implications for public finances (at least in the longer-term).²² For some sectors, insurance coverage for pandemic-related business interruption could potentially be affordable without significant government funding, although it is unclear whether the limited ability of insurance and reinsurance companies to diversify risk across countries and sectors would ultimately impede their willingness to offer such coverage at all (see Box 8).

However, many of the proposals (where specified) involve a relatively limited commitment by the insurance sector in terms of financial capacity. For example, the Pandemic Risk Insurance Act proposal in the United States would involve a 95% co-insurance share for the government (above an insurer-specific deductible and as long as industry-wide losses are more than USD 250 million). The Zurich North America proposal would allow insurers to cede 90%, 95% or 100% of the exposures they assume to a government reinsurer. Under the Business Continuity Protection Program proposal in the United States, insurers would not assume any risk.

The high-share of losses attributed to the public sector likely reflects the high-level of uncertainty about the frequency and severity of future infectious disease outbreaks (as well as the other challenges to insurability, notably the scope for diversification). As noted above, insurance – and particularly reinsurance – markets rely on the ability to diversify risks across sectors and countries which would not be possible in the context of a global pandemic. In the case of other risks where diversification is difficult, such as cyber risks, reinsurance companies have tended to provide only limited amounts of “catastrophe” (i.e. excess-of-loss) reinsurance to protect against the possibility of correlated losses across their portfolio. This challenge could limit the ability of a loss-sharing programme to transfer risk to private retrocession markets (which is a common method to reduce public financial exposure in catastrophe risk reinsurance programmes).

It also provides a means for the insurance sector to protect itself against the possibility of facing large losses from an (insured) infectious disease outbreak in the near-term – and before the industry is able to build up significant reserves with collected premiums. Some of the proposals specifically link future payouts to the amount of reserves accumulated (GDV - Germany) or foresee a larger role for the private insurance sector in absorbing losses in the future (Chubb – United States). Formulas for loss distribution between governments and the insurance sector that adjust to changes in insurance industry financial capacity have been implemented under catastrophe risk insurance programmes for other catastrophe perils.²³ One of the proposals put forward by Lloyd’s (United Kingdom) incorporates a credit guarantee from government that would ensure premiums are paid by policyholders over the long-term for any coverage provided, including in the event of policyholder insolvency.

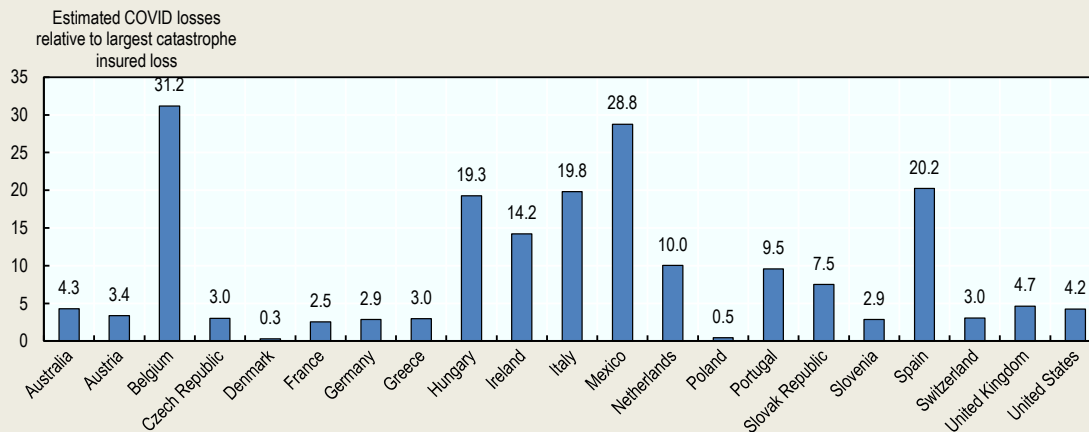
²² However, if an infectious disease outbreak covered by a pandemic insurance programme occurred in the near future, before the government or insurance sector was able to accumulate sufficient reserves through premium collection, the government would likely face a significant unfunded loss that could have a larger public financial impact than other types of fiscal measures.

²³ For example, the Japanese earthquake risk insurance programme allocates co-insurance liability based on the level of earthquake reserves accumulated by private insurers, JER and the Government of Japan (in a dedicated Special Account for Earthquake Reinsurance). If the level of reserves accumulated by insurers and JER increases as the result of a period with few losses, their share of the programme’s liability increases accordingly. In Australia and the United States, insurer deductibles under terrorism risk insurance programmes are established (and adjusted) based on the level of premiums collected by insurers in covered lines of business.

Box 8. The viability of private insurance for pandemic business interruption

The overall estimated value added losses incurred by businesses as a result of COVID-19 would clearly be beyond the capacity of the private insurance market to absorb. However, when compared to past large catastrophe events, the loss estimate (while still much higher in most countries) is not of a completely different order of magnitude than past events covered by the insurance sector. For example, relative to the largest insured loss for a catastrophe event in each country (for which data is available), providing a similar level of insurance protection for COVID-19 as for those catastrophes (45% of economic losses) would be equivalent to a loss event that is on average 4.6x the largest insured loss in each country (and in some countries, the potential COVID-19 loss would be lower than the largest insured loss from a catastrophe event – see Figure 7). However, natural catastrophe losses are almost always (partially) assumed by international reinsurance markets that provide reinsurance coverage based on their ability to diversify the risks they assume across countries (which would not be possible in the context of a global pandemic).

Figure 7. Estimated COVID losses relative to past large catastrophe insurance losses

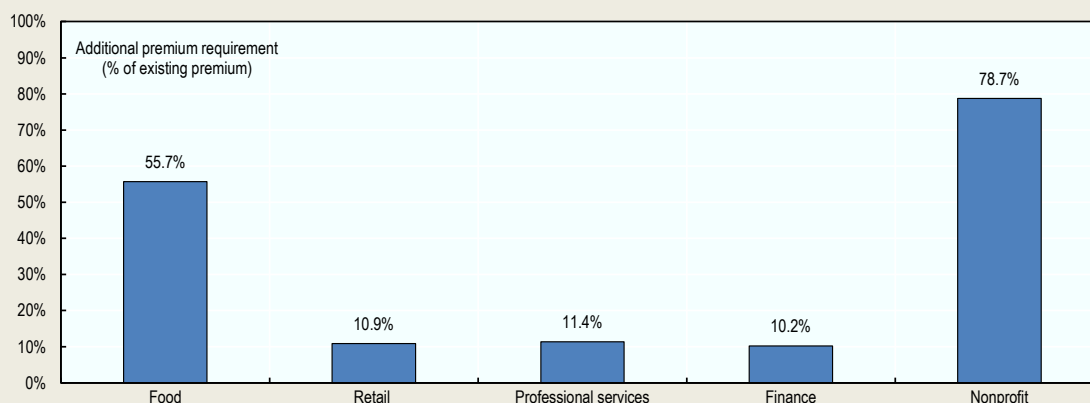


Note: This chart provides the ratio of 45% of estimated COVID-19 value added losses to the largest insured natural catastrophe loss in each country since 1990. The largest losses were: 2010-11 Queensland floods (both related events – Australia); 2009 hailstorm Wolfgang (Austria); 2010 tornado and thunderstorms near Liège (Belgium), 2009 rainfall floods (Czech Republic); 1999 winter storm Anatol (Denmark); 1999 winter storms Lothar and Martin (both events – France); 2007 winter storm Kyrill (Germany); 1999 earthquake in Athens (Greece); 1999 river flooding (Hungary); 2009 rainfall flooding (Ireland); 2012 Finale Emilia earthquakes (Italy); 2014 Hurricane Odile (Mexico); 2016 thunderstorms and hail (Netherlands); 1997 rainfall flooding (Poland); 2017 wildfires (Portugal); 2010 floods (Slovak Republic); 2010 hail storm near Podravje (Slovenia); 2011 Lorca earthquake (Spain); 2005 floods and landslides (Switzerland); 1990 winter storm Daria (United Kingdom); and 2005 hurricane Katrina (United States). Value added losses derived as described in Annex A (high estimates are shown, adjusted for reduced wage costs in some sectors).

Source: See Annex A. Natural catastrophe insured and economic loss data is from Swiss Re (2020_[38]).

The premium cost to insure the estimated amount of value added losses in some sectors might even be affordable, under the assumption that a pandemic on the scale of COVID-19 does not occur more often than 1-in-35 years. Figure 8 provides some rough estimates of how much additional premium would be required (as a share of existing premium costs) to provide coverage for 80% of value added revenue losses for an average SME (annual revenues of USD 380 000) in different sectors. For a retail, professional services or finance company, the additional premium required would be approximately 10% (which is similar in magnitude to the broadly imposed recent increases in insurance pricing due to the “hard” insurance market).¹ For a food or non-profit (in the arts/recreation sector, for example), the additional premium required would be substantial and likely unaffordable unless subsidised by the government in some way.

Figure 8. Additional premium requirement for pandemic-business interruption coverage



Note: 1. For example, small business property and casualty insurance premium rates in the United States have increased by approximately 12% between mid-2017 and mid-2021 (CIAB, 2021^[39]). 2. Based on estimates of median premium costs for a business owner policy and business interruption insurance provided by a comparison website in the United States (Insureon, 2022^[40]). The estimate of the amount of revenue earned by an average SME is from Godlewski (Godlewski, 2020^[41]) and the estimated loss in revenue by sector as a share of annual revenues calculated as the average for all included countries. The calculation assumes that insurance providers achieve a loss ratio of 65% (i.e. eventual claims payments as a % of premiums collected, the appx. loss ratio achieved across most lines of business).

One of the most significant challenges to the viability of a pandemic risk insurance programme will be ensuring that a sufficient number of businesses decide to acquire such coverage (i.e. addressing costs and potential moral hazard).²⁴ To achieve broad coverage, premiums would need to be affordable and businesses would need to be both aware of the risk of losses that they face and convinced of the need for coverage.²⁵ If a large proportion of businesses do not expect to face pandemic-related business interruption losses (potentially due to lack of risk awareness or a miscalculation about the frequency of future outbreaks) or expect significant fiscal support in the context of any future pandemic – the share of losses insured will be low and the pressure on governments to provide fiscal support will be substantial. Some of the pandemic risk insurance programme proposals incorporate elements aimed at ensuring broad take-up. The CATEX (France) proposals would provide coverage as an automatic extension to property insurance coverage (similar to natural catastrophe and terrorism insurance coverage in France). The Pandemic Business Interruption Program (Chubb-United States) would require businesses to opt-out of coverage and confirm that they will not have access to business interruption coverage or federal assistance programmes in the event of a pandemic.

²⁴ In this context, moral hazard occurs when businesses decide not to acquire insurance coverage (or otherwise prepare financially) to protect against future losses based on the expectation that government will provide support.

²⁵ The purchase of business interruption insurance for pandemics could also be deemed compulsory, which by limiting moral hazard would help to ensure broad coverage and reduce premium costs, although this would force businesses to manage this risk through insurance (rather than other risk management strategies, such as self-insurance) and would ultimately be similar to a tax, which could prove to be problematic in the immediate aftermath of the COVID crisis.

Relying on insurance as a tool for providing financial support to business could, however, reduce the ability of governments to achieve other important objectives. For example, funding support provided through job retention schemes was only available where businesses maintained contractual relationships with the employees whose working hours (or reduced working hours) were being subsidised – and some programmes imposed requirements for employers to invest in employee skills and training (OECD, 2021^[26]). Some governments also imposed conditions on businesses that benefitted from deferred social security contributions or guaranteed loans to limit dividend distribution and share buybacks (OECD, 2020^[42]). An unconditional insurance payment to a business owner would not necessarily provide assurances that the business would maintain existing employment levels. As a result, governments could still face costs related to supporting displaced workers through unemployment insurance benefits or other social protection programmes. Some of the pandemic risk insurance programme proposals aim to address this risk. For example, the industry proposal for Business Continuity Protection Program (United States) would incorporate a condition that would require that policyholders that receive a pay-out certify that the funds would be used to retain employees. However, further consideration would need to be given as to whether this would be the optimal approach to stabilising employment – particularly if such a condition impeded necessary adjustments by struggling businesses.

In light of the above, some of the key design features²⁶ that could support the viability of a pandemic-related business interruption insurance programme while also contributing to broader societal objectives, such as the maintenance of employment, include:

- **Ensuring broad take-up:** Governments may wish to consider approaches that involve an automatic extension of coverage for pandemic risk business interruption in order to ensure broad coverage. An automatic extension to include coverage for pandemic risk business interruption as part of commercial property insurance policies or an approach that involves the voiding of relevant exclusions (on an *ex ante*, not *ex post* or retroactive basis) under specific circumstances (e.g. a pandemic that has been formally declared as such by a government authority) would likely be more effective in ensuring broad coverage than simply making coverage available. Catastrophe risk insurance programmes that make coverage available on an optional basis have generally had more limited success in reducing the financial protection gap for targeted perils. Voiding applicable exclusions might help address the challenges of integrating coverage for pandemic-related business interruption into the existing scope of commercial property policies.
- **Ensuring rapid payments for covered events:** As noted, rapid payments to impacted policyholders is critical for managing liquidity risks in the early-stages of an economic disruption. An insurance programme should be based on a simple payment trigger (potentially a parametric trigger) that eliminates the need for lengthy loss adjustment processes.
- **Limiting public exposure through appropriate design that leverages available private sector capacity and targets companies in need:** The design of a pandemic risk business interruption insurance programme should involve a careful assessment of the likely financial protection needs and vulnerabilities of businesses in different sectors (and of different sizes) and the appetite and capacity of private (re)insurance markets to provide coverage. As it may take some time before private (re)insurance markets will be willing to make available significant capacity, thresholds for government involvement may need to be set at fairly low levels initially. It is unlikely that private (re)insurance markets would ever have the capacity to manage the losses resulting from a pandemic on the scale of COVID-19 across all sectors – although different types of companies are likely to be more insurable in private markets than others. However, any risk-absorption by private markets would nonetheless reduce public sector exposure.

²⁶ Adapted from OECD (2021^[36]).

- **Providing incentives (or requirements) for risk reduction and employment stability:** One of the challenges that has exacerbated business interruption losses (in some sectors) has been difficulties in transitioning to a work from home approach. Insurers could be required to ensure that policyholders have business continuity plans or other risk mitigation measures in place (or could offer premium discounts) that support the continuity of operations (where possible) and reduce the amount of business interruption losses incurred in the event of widespread business closures. Insurers could also require that businesses take steps to maintain existing employment levels and apply payment reductions for policyholders that reduce costs through employee layoffs – although this would have to be considered against other options for stabilising employment or protecting workers in case of unemployment.

Ultimately, a well-designed pandemic risk insurance programme could address some of the *ex ante* and *ex post* challenges related to large-scale fiscal support, support the quantification and management of pandemic risks and potentially reduce the public financial burden. Whether such a programme provides the best option for managing this risk will depend on whether the potential benefits of a well-designed insurance programme (incorporating the features highlighted above) outweigh the costs of such an approach (in terms of maintaining employment as well as the economic cost of using insurance relative to leveraging government balance sheets – which could be significant, particularly if a triggering event occurs before significant premiums are accumulated by the programme).

Annex A. Estimates of the financial losses faced by businesses

The business revenue losses used in this paper were estimated based on available data on (i) production in current prices by activity (ISIC Rev 4.) as a proxy for business revenue by sector (OECD, 2022^[43]); (ii) gross value added by activity (ISIC Rev 4.) (OECD, 2022^[20]); (iii) business revenues in April 2020 relative to April 2019 in Canada by activity, as a means to estimate the magnitude of losses in different sectors during workplace closures (Statistics Canada, 2020^[19]); and (iv) government restrictions on workplace closures in 2020 (Hale et al., 2021^[21]).

Data on production was only available for 2017 and 2018 and was therefore adjusted to provide an estimate of production in 2019. The adjustments were derived using the average of two approaches (i) applying the growth in gross value added between 2018 and 2019 (or 2017 and 2019 for some countries, where 2018 data was not available) to production; and (ii) applying the ratio of gross value added to production for each sector and country (in 2017, 2018 or both where available) to data on 2019 gross value added. For all countries, the estimates using either of the adjustment approaches were almost equivalent (i.e. 0.2% variation, on average, in the derived estimate of 2019 production). Table A.1 and Table A.2 provide the USD estimates of production and gross value added (respectively) used for calculating losses across selected sectors (as well as the share of overall production and gross value added covered by the included sectors). Exchange rates used for these calculations are period averages from (OECD, 2022^[44]).

Table A A.1. Estimates of production by activity (2019, USD billion)

	Agriculture, forestry, fishing and hunting	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation	Accommodation and food services	Other covered sectors ¹	Share of production covered in estimates
Australia	64.04	328.33	279.76	200.77	149.82	27.73	57.65	666.87	68%
Austria	10.75	67.42	227.10	81.66	43.20	7.73	33.87	105.17	70%
Belgium	12.32	90.46	282.17	108.88	101.23	8.66	21.98	179.62	73%
Czech Republic	11.72	40.57	216.74	51.92	27.34	5.57	10.38	63.43	75%
Denmark	13.84	49.56	123.22	70.35	35.21	8.42	11.67	112.46	70%
Estonia	2.53	5.41	15.23	6.00	2.78	1.01	1.33	10.28	72%
Finland	12.56	44.26	132.79	38.44	22.04	6.72	10.33	60.74	66%
France	102.92	359.85	888.25	498.59	425.11	63.82	136.64	763.53	68%
Germany	70.77	407.28	2 236.65	606.84	412.69	76.57	117.24	1 031.06	69%
Greece	15.25	8.78	61.39	40.75	11.19	5.31	28.02	54.48	67%
Hungary	11.91	21.00	113.68	28.65	13.52	4.40	6.85	36.73	75%
Iceland	2.06	4.38	7.54	3.37	1.59	0.55	1.81	8.45	65%
Ireland	11.03	32.34	249.48	52.85	28.58	5.15	10.45	117.28	66%
Italy	67.27	221.73	1 116.18	421.51	190.84	52.82	135.41	520.96	72%
Latvia	3.71	6.98	11.20	7.57	2.24	1.05	1.20	11.35	72%
Lithuania	4.41	6.91	26.54	11.79	3.41	0.98	1.53	17.24	76%
Luxembourg	0.50	10.65	16.18	15.21	10.98	0.86	2.14	128.55	78%
Mexico	67.04	149.72	778.64	295.52	40.34	8.15	44.61	355.53	81%
Netherlands	36.50	133.19	394.08	207.36	133.31	18.53	34.79	293.64	71%
Norway	17.78	71.08	97.10	54.18	32.11	7.47	11.39	165.49	68%
Poland	35.07	109.02	382.67	153.36	55.52	8.96	16.46	174.41	77%
Portugal	10.90	24.87	107.88	47.06	18.38	4.11	22.47	58.71	69%
Slovak Republic	4.23	15.04	99.07	23.38	11.24	3.70	2.41	28.24	76%
Slovenia	2.23	8.48	34.92	10.63	6.21	1.33	2.57	13.39	77%

Spain	65.68	180.90	600.42	275.85	113.95	41.18	144.89	332.80	70%
Sweden	21.02	73.18	220.35	89.40	68.50	13.27	19.08	128.87	65%
Switzerland	12.30	79.83	372.66	174.51	113.96	10.66	24.36	242.35	73%
United Kingdom	48.05	405.57	743.43	465.22	331.03	89.37	139.31	898.61	63%
United States	486.91	1 741.26	6 273.87	3 678.18	2 611.73	360.33	1 115.42	6 448.71	61%

Note: ¹ Other covered sectors includes: mining and quarrying; transportation and warehousing; administrative and support; and finance and insurance industries.

Source: Author's calculations based on (OECD, 2022^[43]) (OECD, 2022^[20]).

Table A A.2. Gross value added by activity (2019, USD billion)

	Agriculture, forestry, fishing and hunting	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation	Accommodation and food services	Other covered sectors ¹	Share of gross value added covered in estimates
Australia	27.62	98.56	77.82	108.50	98.40	10.55	26.93	355.22	62%
Austria	4.77	25.90	73.62	46.14	22.05	5.02	21.12	57.89	64%
Belgium	3.56	25.20	65.82	54.25	48.87	3.57	9.21	82.62	61%
Czech Republic	4.70	12.86	57.12	24.94	11.98	2.45	4.71	27.82	64%
Denmark	4.25	17.91	47.65	39.28	18.96	4.72	5.05	44.64	60%
Estonia	0.78	1.87	4.07	3.38	1.43	0.49	0.54	4.43	63%
Finland	6.60	17.19	38.76	20.46	12.32	3.00	4.31	27.88	56%
France	43.37	139.38	266.63	246.42	199.42	35.18	69.65	354.62	56%
Germany	30.29	179.72	755.86	348.53	219.97	47.68	56.43	478.21	60%
Greece	7.75	2.89	16.39	21.61	6.32	3.02	13.69	25.40	55%
Hungary	5.47	7.93	28.59	14.34	8.63	2.03	2.71	19.40	64%
Iceland	1.09	1.75	2.14	1.98	0.92	0.31	0.84	3.79	57%
Ireland	3.65	9.68	125.55	28.34	16.45	2.92	6.39	54.44	66%
Italy	38.35	78.10	298.84	220.93	113.28	21.11	71.69	254.52	61%
Latvia	1.37	1.94	3.64	4.37	1.36	0.63	0.56	4.47	61%
Lithuania	1.70	3.60	8.81	8.31	2.01	0.58	0.91	8.98	71%
Luxembourg	0.15	3.91	3.46	5.73	5.92	0.44	1.20	21.63	67%
Mexico	43.09	88.20	219.75	239.34	29.31	5.09	28.67	236.31	74%

Netherlands	14.89	40.30	98.07	113.95	65.28	8.97	17.12	156.38	63%
Norway	7.83	23.93	25.60	29.41	17.50	3.46	5.29	102/49	60%
Poland	13.84	39.05	98.65	92.33	30.64	3.92	7.16	82.20	70%
Portugal	5.01	9.05	28.55	27.18	8.87	1.99	12.69	29.72	59%
Slovak Republic	1.76	6.33	20.77	10.67	5.64	2.06	1.38	11.69	64%
Slovenia	1.06	2.83	11.19	5.69	3.26	0.63	1.20	6.41	68%
Spain	36.14	79.16	152.54	159.78	61.24	26.78	81.23	163.47	60%
Sweden	7.67	32.02	69.21	49.57	37.29	6.24	8.42	63.07	58%
Switzerland	4.82	34.54	133.34	105.27	54.55	5.47	13.14	122.69	67%
United Kingdom	17.62	164.83	255.62	269.13	191.57	41.63	75.68	471.81	58%
United States	196.51	890.60	2 341.85	2 028.78	1 648.78	222.00	584.18	3 484.53	55%

Note: ¹ Other covered sectors includes: mining and quarrying; transportation and warehousing; administrative and support; and finance and insurance industries.

Source: Author's calculations based on OECD (2022_[20]).

Workplace closure requirements and mobility restrictions imposed to contain the spread of COVID-19 clearly led to declines in revenue amount businesses affected by these measures. Business closures and work from home requirements clearly impacted sales (for closed retail and personal services businesses) and production (for manufacturers and other types of service providers) while stay at home requirements and recommendations reduced sales for non-essential goods and services. One early estimate suggested that, as a result of the measures as well as changes in consumer behaviour, businesses in the United States were facing USD 1 trillion in business disruption losses per month (Hartwig, Gordon and Eisenhuth, 2021^[45]).

The significance of these impacts was clearly different across sectors. Businesses that depend on the physical presence of employees or customers clearly faced larger losses in revenue than those that could maintain their activities with remote employees and customers. Businesses that sold or produced essential goods or services also likely faced less significant losses than those who offered goods or services deemed as discretionary. In the United States, clothing sales fell by 89.3% in April 2020 (relative to April 2019) while grocery store sales increased 13.2%. Similarly, in the European Union, sales of non-food products fell by 23.8% while sales of food, beverages and tobacco increased by 1.2% (OECD, 2020^[46]).

The workplace closures and stay-at-home requirements also led to changes in consumer behaviour and demand that had differing impacts on different types of business. An OECD analysis of business revenue changes in fiscal year 2020 (relative to fiscal year 2019) based on financial reporting identified a number of sectors that benefited from increased sales as a result of changing behaviour and/or demand, such as software and services, semi-conductors, food and staples and healthcare equipment - while consumer services, energy and transportation companies faced significant declines (OECD, 2021^[47]). There were also differences within sectors as businesses (such as retailers) that distributed their products or services online benefitted relative to those that depended more heavily on a physical presence (OECD, 2020^[46]).

In July 2020, Statistics Canada released the data results from a business survey that asked respondents estimate their change in revenue in April 2020 (during a period of workplace closures across Canada) relative to April 2019. Respondents provided a range of estimates of revenue changes (no change or increase or decrease by 1%-10%, 10%-20%, 20%-30% or 30% or more). This allowed for the calculation of an estimated decline across businesses in a range of sectors. At the time of writing, the authors are not aware of similar surveys in other countries that could provide the level of granularity required for these estimates. Table A.3 provides these estimates.

Table A A.3. Estimated change in revenue by sector (April 2020 relative to April 2019)

	Estimated change in revenue
Agriculture, forestry, fishing and hunting	-11.7%
Mining and quarrying	-22.8%
Construction	-35.4%
Manufacturing	-30.3%
Wholesale and retail trade	-23.1%
Transportation and warehousing	-31.2%
Professional, scientific and technical services	-20.3%
Administrative and support	-20.8%
Arts, entertainment and recreation	-39.7%
Accommodation and food services	-41.0%
Finance and insurance industries	-18.3%

Source: Author's calculations based on Statistics Canada (2020^[19]),

The duration of workplace closure requirements and mobility restrictions varied in different countries. The Blavatnik School of Government has created a government response tracker that includes a daily indicator on containment and closure policies including workplace closure requirements. This database was used to estimate the number of months in 2020: (i) where all except essential workplaces were required to close or have employees work from home; and (ii) where workplaces in some sectors were required to close or have employees work from home or where some categories of employees were required to work from home. Table A.4 provides the estimated number of months in 2020 that these types of restrictions applied in each OECD and candidate country.

Table A A.4. Workplace closure (or work from home requirements)

	Non-essential workplace restrictions (number of months, 2020)	Restrictions in some sectors (number of months, 2020)
Argentina	4.1	4.9
Australia	2.3	5.2
Austria	1.3	4.5
Belgium	2.3	6.7
Brazil	5.9	3.1
Bulgaria	0.2	1.8
Canada	4.1	4.9
Chile	7.6	1.4
Colombia	2.3	2.7
Costa Rica	1.3	7.4
Czech Republic	0.9	4.7
Denmark	0.0	7.1
Estonia	1.3	1.3
Finland	0.0	3.5
France	2.2	5.0
Germany	0.5	8.5
Greece	0.0	3.7
Hungary	0.0	4.5
Iceland	0.0	4.1
Ireland	4.6	3.0
Italy	2.1	4.7
Japan	3.1	5.1
Korea	0.5	6.2
Latvia	0.4	7.8
Lithuania	1.4	3.9
Luxembourg	1.3	1.2
Mexico	6.0	3.0
New Zealand	1.2	7.9
Netherlands	1.5	0.5
Norway	0.0	3.8
Peru	1.0	8.0
Poland	0.0	7.8
Portugal	1.1	7.9
Romania	0.0	5.3
Slovak Republic	0.8	2.9
Slovenia	0.6	6.3
Spain	1.7	6.1
Sweden	0.0	1.2

	Non-essential workplace restrictions (number of months, 2020)	Restrictions in some sectors (number of months, 2020)
Switzerland	1.5	5.7
Türkiye	0.0	6.8
United Kingdom	2.5	6.5
United States	3.0	6.0

Source: Author's calculations based on Hale et al. (2021^[21])

The data on production, gross value added, sectoral losses in Canada and workplace closures can be used to derive estimates of gross revenue (production) and value added revenue (gross value added) losses by sector for different countries (where necessary data is available), taking into account the different levels of production and gross value added by activity in different countries. Table A.5 provides estimates for production (gross revenue) losses across sectors and countries, including a low and high estimate for the arts, entertainment and recreation and accommodation and food services sectors. The high estimate assumes that businesses in these sectors were required to be closed when restrictions were only applied to specific sectors.

An approach based on production (gross revenue) likely includes some double-counting as it estimates total revenue losses for businesses producing both intermediate and final goods and services (i.e. the gross revenue for a business that produces (sells) final goods would account for the total value of the product or service, including the value of any intermediate good or service used for the production of the final product – while the producer of the intermediate product or service would also report a value for the intermediate good or service produced to create the final product). To reduce the double-counting, Table A.6 provides similarly derived estimates for gross value added (value added revenue).

Table A A.5. Estimated gross production (revenue) losses: selected sectors (USD millions)

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
Australia	-22 317.1	-16 265.7	-8 881.1	-5 837.4	-2 113.0	-6 852.2	-4 529.2	-14 687.6
Austria	-2 553.2	-7 356.4	-2 012.5	-937.8	-328.1	-1 472.4	-1 482.6	-6 652.8
Belgium	-6 060.5	-16 171.2	-4 747.7	-3 888.1	-650.5	-2 583.3	-1 702.2	-6 759.3
Czech Republic	-748.6	-3 420.4	-623.4	-289.1	-115.2	-660.9	-221.3	-1 269.5
Denmark						-1 972.1		-2 815.3
Estonia	-210.3	-505.9	-151.7	-61.9	-43.9	-88.8	-59.8	-121.0
Finland						-782.8		-1 241.1
France	-23 760.8	-50 168.2	-21 425.3	-16 090.7	-4 725.1	-15 356.6	-10 428.3	-33 892.0
Germany	-6 327.6	-29 723.8	-6 135.8	-3 675.4	-1 333.8	-22 841.3	-2 105.3	-36 053.2
Greece						-659.1		-3 584.9
Hungary						-661.4		-1 060.4
Iceland						-76.0		-256.1
Ireland	-4 365.2	-28 802.7	-4 642.7	-2 211.6	-779.7	-1 295.8	-1 629.6	-2 708.2
Italy	-20 238.7	-87 146.1	-25 038.5	-9 985.3	-5 405.8	-12 319.6	-14 286.1	-37 842.9
Latvia	-88.2	-120.9	-62.2	-16.2	-14.9	-287.2	-17.4	-336.8
Lithuania	-281.9	-926.0	-313.0	-79.8	-45.0	-171.2	-72.3	-275.6
Luxembourg	-413.6	-537.5	-384.4	-244.5	-37.3	-70.8	-96.0	-182.5
Mexico	-26 603.9	-118 352.1	-34 175.3	-4 109.0	-1 623.1	-2 430.3	-9 161.9	-13 717.8
Netherlands	-4 526.4	-11 456.1	-4 586.4	-2 597.1	-706.1	-5 527.4	-1 366.6	-10 698.8
Norway						-935.0		-1 469.8
Poland						-2 321.0		-4 397.3
Portugal	-797.0	-2 957.0	-981.4	-337.7	-147.7	-1 226.2	-832.1	-6 908.6
Slovak Republic	-350.6	-1 974.9	-354.7	-150.2	-96.7	-451.3	-64.8	-302.4
Slovenia	-156.4	-551.0	-127.7	-65.7	-27.5	-305.5	-54.7	-607.9
Spain	-8 958.4	-25 433.6	-8 890.5	-3 234.7	-2 286.4	-10 624.8	-8 293.5	-38 540.2
Sweden						-548.8		-813.9
Switzerland	-3 488.4	-13 928.5	-4 962.6	-2 854.5	-522.3	-2 541.7	-1 230.4	-5 988.0

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
United Kingdom	-29 535.8	-46 311.5	-22 049.4	-13 819.4	-7 297.5	-26 660.2	-11 726.0	-42 839.1
United States	-153 862.0	-474 201.9	-211 519.2	-132 292.9	-35 699.6	-107 491.0	-113 920.3	-343 012.7

Note: For some countries, low and high estimates are equivalent as only sectoral workplace closure requirements were imposed.

Source: Author's calculations based on estimated revenue losses during strict workplace closures (Statistics Canada, 2020^[19]), data on production for OECD countries (OECD, 2022^[43]), and (iii) data on the imposition of workplace closure requirements collected by the Blavatnik School of Government (Hale et al., 2021^[21]).

Table A A.6. Estimated gross value added (value added revenue) losses: selected sectors (USD millions)

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
Australia	-6 699.0	-4 524.4	-4 799.7	-3 833.9	-803.9	-2 606.8	-2 116.1	-6 862.2
Austria	-980.9	-2 384.8	-1 137.2	-478.6	-213.2	-956.6	-924.6	-4 148.7
Belgium	-1 688.7	-3 772.3	-2 365.6	-1 876.9	-268.1	-1 064.5	-713.0	-2 831.5
Czech Republic	-237.3	-901.4	-299.5	-126.6	-50.6	-290.4	-100.4	-576.1
Denmark						-1 105.2		-1 219.4
Estonia	-72.5	-135.2	-85.5	-31.8	-21.5	-43.5	-24.3	-49.3
Finland						-349.5		-517.9
France	-9 203.1	-15 059.5	-10 589.0	-7 548.3	-2 604.5	-8 464.5	-5 315.5	-17 275.4
Germany	-2 792.2	-10 044.9	-3 524.0	-1 959.1	-830.6	-14 223.3	-1 013.3	-17 353.1
Greece						-375.2		-1 751.0
Hungary						-305.2		-419.2
Iceland						-42.9		-118.4
Ireland	-1 306.2	-14 495.1	-2 489.4	-1 272.6	-441.5	-733.7	-997.3	-1 657.3
Italy	-7 128.8	-23 331.7	-13 123.7	-5 927.3	-2 160.3	-5 722.4	-7 563.1	-20 034.2
Latvia	-24.5	-39.3	-35.9	-9.9	-8.9	-172.3	-8.2	-159.1
Lithuania	-146.8	-307.2	-220.7	-47.1	-26.6	-101.3	-43.0	-163.9
Luxembourg	-152.1	-115.1	-144.8	-131.8	-19.2	-36.5	-53.8	-102.1
Mexico	-15 672.3	-33 402.2	-27 678.2	-2 985.3	-1013.1	-1 516.9	-5 887.9	-8 815.8
Netherlands	-1 369.7	-2 850.9	-2 520.3	-1 271.8	-341.6	-2 674.6	-672.4	-5 264.1
Norway						-432.8		-682.4

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
Poland						-1 016.4		-1 913.0
Portugal	-290.1	-782.5	-566.9	-162.9	-71.4	-592.6	-470.1	-3 903.3
Slovak Republic	-147.5	-414.1	-161.9	-75.3	-53.8	-251.1	-37.2	-173.6
Slovenia	-52.2	-176.6	-68.3	-34.5	-13.1	-145.6	-25.5	-283.7
Spain	-3 920.3	-6 461.6	-5 149.5	-1 738.4	-1 487.0	-6 910.0	-4 649.6	-21 606.9
Sweden						-258.0		-359.2
Switzerland	-1 509.3	-4 983.7	-2 993.6	-1 366.5	-268.2	-1 305.4	-663.8	-3 230.7
United Kingdom	-12 003.8	-15 923.5	-12 755.3	-7 997.5	-3 398.9	-12 417.2	-6 370.3	-23 272.9
United States	-78 695.1	-177 005.3	-116 668.0	-83 516.2	-21 994.2	-66 224.3	-59 663.3	-179 645.5

Note: For some countries, low and high estimates are equivalent as only sectoral workplace closure requirements were imposed.

Source: Author's calculations based on estimated revenue losses during strict workplace closures (Statistics Canada, 2020^[19]), data on value added for OECD countries (OECD, 2022^[20]), and (iii) data on the imposition of workplace closure requirements collected by the Blavatnik School of Government (Hale et al., 2021^[21]).

Table A A.7. Estimated gross production (revenue) losses as a share of annual revenues: selected sectors

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
Australia	-6.8%	-5.8%	-4.4%	-3.9%	-7.6%	-24.7%	-7.9%	-25.5%
Austria	-3.8%	-3.2%	-2.5%	-2.2%	-4.2%	-19.1%	-4.4%	-19.6%
Belgium	-6.7%	-5.7%	-4.4%	-3.8%	-7.5%	-29.8%	-7.7%	-30.8%
Czech Republic	-1.8%	-1.6%	-1.2%	-1.1%	-2.1%	-11.9%	-2.1%	-12.2%
Denmark						-23.4%		-24.1%
Estonia	-3.9%	-3.3%	-2.5%	-2.2%	-4.4%	-8.8%	-4.5%	-9.1%
Finland						-11.6%		-12.0%
France	-6.6%	-5.6%	-4.3%	-3.8%	-7.4%	-24.1%	-7.6%	-24.8%
Germany	-1.6%	-1.3%	-1.0%	-0.9%	-1.7%	-29.8%	-1.8%	-30.8%
Greece						-12.4%		-12.8%
Hungary						-15.0%		-15.5%
Iceland						-13.7%		-14.1%
Ireland	-13.5%	-11.5%	-8.8%	-7.7%	-15.1%	-25.1%	-15.6%	-25.9%

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation		Accommodation and food services	
					Low estimate	High estimate	Low estimate	High estimate
Italy	-9.1%	-7.8%	-5.9%	-5.2%	-10.2%	-27.1%	-10.5%	-27.9%
Latvia	-1.3%	-1.1%	-0.8%	-0.7%	-1.4%	-27.3%	-1.5%	-28.2%
Lithuania	-4.1%	-3.5%	-2.7%	-2.3%	-4.6%	-17.4%	-4.7%	-18.0%
Luxembourg	-3.9%	-3.3%	-2.5%	-2.2%	-4.4%	-8.3%	-4.5%	-8.5%
Mexico	-17.8%	-15.2%	-11.6%	-10.2%	-19.9%	-29.8%	-20.5%	-30.8%
Netherlands	-3.4%	-2.9%	-2.2%	-1.9%	-3.8%	-29.8%	-3.9%	-30.8%
Norway						-12.5%		-12.9%
Poland						-25.9%		-26.7%
Portugal	-3.2%	-2.7%	-2.1%	-1.8%	-3.6%	-29.8%	-3.7%	-30.8%
Slovak Republic	-2.3%	-2.0%	-1.5%	-1.3%	-2.6%	-12.2%	-2.7%	-12.6%
Slovenia	-1.8%	-1.6%	-1.2%	-1.1%	-2.1%	-23.0%	-2.1%	-23.7%
Spain	-5.0%	-4.2%	-3.2%	-2.8%	-5.6%	-25.8%	-5.7%	-26.6%
Sweden						-4.1%		-4.3%
Switzerland	-4.4%	-3.7%	-2.8%	-2.5%	-4.9%	-23.8%	-5.1%	-24.6%
United Kingdom	-7.3%	-6.2%	-4.7%	-4.2%	-8.2%	-29.8%	-8.4%	-30.8%
United States	-8.8%	-7.6%	-5.8%	-5.1%	-9.9%	-29.8%	-10.2%	-30.8%

Note: For some countries, low and high estimates are equivalent as only sectoral workplace closure requirements were imposed.

Source: Author's calculations based on estimated revenue losses during strict workplace closures (Statistics Canada, 2020^[19]), data on production for OECD countries (OECD, 2022^[43]), and (iii) data on the imposition of workplace closure requirements collected by the Blavatnik School of Government (Hale et al., 2021^[21]).

While the value of estimated losses is large, the estimated losses account for a relatively small part (less than 10%) of annual production (gross revenues) in most sectors (with the exception of arts, entertainment and recreation under the higher estimate) and countries (with the exception of Ireland and Mexico where longer closure periods were imposed). Table A.7 provides estimates of the production (gross revenue) losses as a share of annual production (gross revenue).

The actual and net revenue impact over time was also likely lower as businesses adapted their behaviour in response to the requirements imposed (i.e. the losses faced in the first month of closures were likely higher than in future months of similar closures). Business offered new ways to offer their products and services and consumers embraced new ways to access those products and services (online sales, delivery and take-out, etc.). Businesses were also able to reduce their fixed costs through temporary layoffs and reduced need for intermediate inputs into final products. As a result, actual and net revenue losses may have been lower than the estimates above – and likely declined over time as businesses and consumers adapted to the new environment. An OECD analysis of financial reporting data on revenues and profits (measured as earnings before interest, taxes, depreciation and amortisation – EBITDA) found that many of the companies in sectors that faced significant revenue declines in FY 2020 saw much more limited declines in profitability. For example, the percentage decline in profitability in the consumer services, transportation, automobile and components and consumer durable sectors was less than half of the decline in revenues (author's calculations based on (OECD, 2021^[47])).

In some of the most significantly impacted sectors, such as accommodation and food service activities and arts, entertainment and recreation, total salaries and wages declined substantially in many countries in 2020 relative to 2019 (supported in many cases by expanded job retention programmes and expanded unemployment insurance benefits) (see Table A.8). In many countries, wages in the accommodation and food service sector declined by more than 20% relative to 2019 (including Belgium, Bulgaria, Czech Republic, Germany, Greece, Iceland, Italy, Latvia, Luxembourg, Norway, Romania and Spain).

Table A A.8. Change in total wages and salaries in 2020 (relative to 2019): highly-impacted sectors (USD billions)

	Accommodation and food services	Arts, entertainment and recreation
Australia	-0.029	-0.206
Austria	-1.537	-0.100
Belgium	-1.610	-0.269
Czech Republic	-0.483	-0.047
Denmark	-0.302	-0.030
Finland	-0.401	-0.090
France	-7.640	-1.008
Germany	-7.484	-0.849
Greece	-0.862	-0.141
Hungary	-0.196	-0.011
Ireland	-0.733	-0.087
Italy	-10.564	-1.621
Latvia	-0.124	-0.022
Lithuania	-0.049	-0.016
Mexico	-3.899	-0.181
Netherlands	-0.666	-0.095
Poland	-0.428	0.097
Portugal	-0.990	0.004
Slovak Republic	-0.077	-0.0031
Slovenia	-0.091	-0.023

	Accommodation and food services	Arts, entertainment and recreation
Spain	-17.277	-2.239
Sweden	-0.159	-0.031
Switzerland	-1.429	-0.155
United Kingdom	-10.293	-1.479
United States	-79.449	-7.887

Note: Data on total wages and salaries in France, Ireland, Mexico, Sweden, Switzerland, United Kingdom and United States in 2020 was not available. The estimates included in the table are calculated using the average decline in wages and salaries across other countries.

Source: Author's calculations based on OECD (2022_[20]).

A decline in payroll would have reduced the net revenue losses for companies in those sectors. Table A.9 provides adjusted estimates of value added (revenue) losses that take into account the decline in payroll in those two sectors.

Table A A.9. Estimated gross value added (value added revenue) losses – adjusted for wage declines: selected sectors (USD millions)

	Construction	Manufacturing	Wholesale and retail trade	Professional, scientific and technical services	Arts, entertainment and recreation	Accommodation and food services
Australia	-6 699.0	-4 524.4	-4 799.7	-3 833.9	-2 401.0	-6 833.0
Austria	-980.9	-2 384.8	-1 137.2	-478.6	-856.7	-2 612.2
Belgium	-1 688.7	-3 772.3	-2 365.6	-1 876.9	-795.4	-1 221.3
Czech Republic	-237.3	-901.4	-299.5	-126.6	-243.4	-93.3
Denmark					-1 074.8	-917.0
Finland					-259.9	-117.1
France	-9 203.1	-15 059.5	-10 589.0	-7 548.3	-7 456.4	-9 635.3
Germany	-2 792.2	-10 044.9	-3 524.0	-1 959.1	-13 374.8	-9 869.4
Greece					-234.7	-888.9
Hungary					-294.1	-223.2
Ireland	-1 306.2	-14 495.1	-2 489.4	-1 272.6	-646.3	-924.4
Italy	-7 128.8	-23 331.7	-13 123.7	-5 927.3	-4 101.8	-9 469.7
Latvia	-24.5	-39.3	-35.9	-9.9	-150.8	-35.5
Lithuania	-146.8	-307.2	-220.7	-47.1	-117.2	-115.3
Mexico	-15 672.3	-33 402.2	-27 678.2	-2 985.3	-1 336.3	-4 917.0
Netherlands	-1 369.7	-2 850.9	-2 520.3	-1 271.8	-2 579.5	-4 598.0
Poland					-1 113.8	-1 485.0
Portugal	-290.1	-782.5	-566.9	-162.9	-596.7	-2 913.5
Slovak Republic	-147.5	-414.1	-161.9	-75.3	-220.2	-96.7
Slovenia	-52.2	-176.6	-68.3	-34.5	-122.3	-193.1
Spain	-3 920.3	-6 461.6	-5 149.5	-1 738.4	-4 671.1	-4 330.0
Sweden					-227.2	-200.3
Switzerland	-1 509.3	-4 983.7	-2 993.6	-1 366.5	-1 149.9	-1 801.9
United Kingdom	-12 003.8	-15 923.5	-12 755.3	-7 997.5	-10 938.4	-12 980.3
United States	-78 695.1	-177 005.3	-116 668.0	-83 516.2	-58 337.3	-100 196.1

Source: Author's calculations based on estimated revenue losses during strict workplace closures (Statistics Canada, 2020_[19]), data on value added for OECD countries including gross wages and salaries (OECD, 2022_[20]), and (iii) data on the imposition of workplace closure requirements collected by the Blavatnik School of Government (Hale et al., 2021_[21]).

Annex B. Monetary and fiscal policy support for businesses and workers

Table A B.1. Monetary and fiscal policy support for businesses and workers

	Funding and asset purchases	Tax measures	Job retention schemes	Direct financing (equity, loans, guarantees)
Argentina	Liquidity and targeted lending support	Reductions and deferrals of employer social security contributions, tax payment deferrals		Yes
Australia	Liquidity and targeted lending support and corporate asset purchases	Expanded tax allowance/credits and loss offsets for business	Job Keeper (wage subsidy programme)	Coronavirus SME Guarantee Scheme Structured Finance Support Fund
Austria	Liquidity and targeted lending support and corporate asset purchases (ECB)	Reduced VAT on food and accommodation services, accelerated tax refunds and more flexible tax debt repayment	Kurzarbeit (short-time work scheme)	Guarantee scheme to support loan schemes by promotional banks and institutions Support to Austrian airlines, including guaranteed loans and a government grant
Belgium	Liquidity and targeted lending support and corporate asset purchases (ECB)	Expanded tax allowance/credits and loss offsets for business, reduced VAT for restaurant sector	Chômage temporaire (short-time work scheme)	Yes
Brazil	Liquidity and targeted lending support and corporate asset purchases	Employer social security contribution deferrals, tax payment deferrals, targeted VAT rate reductions	Yes	Yes
Bulgaria		Tax payment deferrals, targeted VAT waivers and rate reductions		Yes
Canada	Liquidity and targeted lending support and corporate asset purchases	Corporate income and property tax rate reductions, tax payment deferrals, expanded tax allowance/credits	Canada Emergency Wage Subsidy programme	Business Credit Availability Program Guarantee Mid-Market Guarantee and Financing Program Canada Emergency Business Account (loans) SME Co-lending Program (loans) Mid-Market Financing Program (loans) Large Employer Emergency Financing Facility (loans) Insured Mortgage Purchase Program Support for Agriculture and Agri-Food businesses

	Funding and asset purchases	Tax measures	Job retention schemes	Direct financing (equity, loans, guarantees)
Chile	Liquidity and targeted lending support and corporate asset purchases	Tax payment deferrals, expanded allowances/credits, corporate income tax rate reductions	Suspensión de contrato and reducción de jornada (short-time work schemes)	Yes
Colombia	Liquidity and targeted lending support and corporate asset purchases	Tax payment deferrals, targeted VAT and consumption tax reductions	Formal Employment Support Program (PAEF) (wage subsidy program)	Yes
Croatia		Corporate income tax rate reductions, tax payment deferrals		Yes
Czech Republic	Liquidity and targeted lending support	Enhanced tax loss offsets, VAT reductions for accommodation, culture and sport sector, tax payment deferrals	Targeted employment support programme "Antivirus" (short-time work scheme)	Yes
Denmark	Liquidity and targeted lending support and corporate asset purchases		Arbejdsfordeling work sharing scheme and Midlertidig lønkompenation wage compensation scheme (short-time work schemes)	Yes
Estonia	Liquidity and targeted lending support and corporate asset purchases (ECB)	Tax waivers on social taxes	Wage subsidy programme	Yes
Finland	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax allowances/credits, tax payment deferral, increased VAT relief threshold	Temporary layoff scheme (short-time work scheme)	Yes
France	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax allowances/credits, accelerated tax refunds, corporate income tax and property tax rate reduction	Activité partielle (short-time work scheme)	Loan guarantee scheme State Shareholding Agency to support "strategic economic actors" Increase of the Economic and Social Development Fund lending capacity
Germany	Liquidity and targeted lending support and corporate asset purchases (ECB)	Reduced VAT for restaurant sector, enhanced tax allowances/credits, enhanced tax loss offsets, tax payment deferral	Kurzarbeit (short-time work scheme)	Increased government guarantee framework to the national promotional bank special loan scheme Additional guarantee scheme under newly created Economic Stabilisation Fund Equity injections by the Economic Stabilisation Fund Refinancing of the national promotional bank guaranteed loans by Economic Stabilisation Fund

	Funding and asset purchases	Tax measures	Job retention schemes	Direct financing (equity, loans, guarantees)
Greece	Liquidity and targeted lending support and corporate asset purchases (ECB)	Reductions in employer social security contributions, targeted VAT reductions, tax payment deferral	Special purpose compensation (short-time work scheme)	Yes
Hungary	Liquidity and targeted lending support and corporate asset purchases	Reductions in employer social security contributions in certain sectors, enhanced tax allowances/credits, corporate income tax rate reductions	Job Protection Wage Subsidy (short-time work scheme)	Yes
Iceland		Reductions in employer social security contributions, enhanced tax loss offsets, enhance tax allowances/credits	Reduced employment ratio (short-time work scheme)	Yes
Ireland	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax loss offsets, accelerated tax refunds, VAT rate reductions	Short-time work support (short-time work scheme) and Temporary wage subsidy scheme (TWSS)/Employment Wage Subsidy Scheme (EWSS) (wage subsidy programmes)	Yes
Israel		Enhanced tax allowances/credits, accelerated tax refunds, tax waivers	Unemployment benefit during unpaid leave (short-time work scheme)	Yes
Italy	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax allowances/credits, social security contribution deferrals and waivers, targeted property tax waivers, tax payment deferrals	Cassa integrazione (CIGO, CIGS, CID) (short-time work scheme)	Yes
Japan	Liquidity and targeted lending support and corporate asset purchases	Employer social security contribution deferrals, enhanced tax loss offsets	Employment Adjustment Subsidy (short-time work scheme)	Yes
Korea	Liquidity and targeted lending support and corporate asset purchases	Corporate income tax waivers, VAT reductions	Employment retention subsidy (short-time work scheme)	Yes
Latvia	Liquidity and targeted lending support and corporate asset purchases (ECB)	Tax payment deferrals	Allowance for fully-employed employees (short-time work scheme)	Yes
Lithuania	Liquidity and targeted lending support and corporate asset purchases (ECB)	Employer social security contribution deferrals, targeted VAT rate reductions, tax payment deferrals	Wage subsidies during idle time (short-time work scheme)	Yes

	Funding and asset purchases	Tax measures	Job retention schemes	Direct financing (equity, loans, guarantees)
Luxembourg	Liquidity and targeted lending support and corporate asset purchases (ECB)	Reduced employer social security contributions, enhanced tax allowances/credits, tax payment deferrals	Chômage partiel (short-time work scheme)	Yes
Mexico	Liquidity and targeted lending support	Enhanced tax allowances/credits, targeted tax waivers, property tax waivers,		Yes
Netherlands	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax allowances/credits, enhanced tax loss offsets, target tax waivers, tax payment deferral	Regulation Short-TimeWork (short-time work scheme) and Temporary Emergency Measure Bridging Employment (NOW) (wage subsidy programme)	Yes
New Zealand	Liquidity and targeted lending support and corporate asset purchases	Enhanced tax loss offsets, enhanced tax allowances/credits, tax payment deferrals, accelerated tax refunds	COVID-19 Wage Subsidy and COVID-19 Wage Subsidy Extension (wage subsidy programme)	Business Finance Guarantee Scheme Equity injections into two state-owned enterprises Small Business Cashflow Scheme (loans)
Norway	Liquidity and targeted lending support and corporate asset purchases	Reduced employer social security contributions, enhanced tax loss offsets, tax payment deferral, enhanced tax allowances/credits, VAT rate reduction	Temporary lay-off scheme (wage subsidy programme)	Yes
Peru	Liquidity and targeted lending support	Tax payment deferrals, enhanced tax allowances/credits, enhanced tax loss offsets, corporate income tax waivers		Yes
Poland	Liquidity and targeted lending support	Enhanced tax allowances/credits, employer social security contribution waivers, enhanced tax loss offsets, targeted VAT reductions	Guaranteed Employee Benefits Fund (GEBF) (wage subsidy programme)	Yes
Portugal	Liquidity and targeted lending support and corporate asset purchases (ECB)	Tax payment deferrals, accelerated tax refunds, enhanced tax loss offset, enhanced tax allowances/credits, targeted VAT reductions	Layoff and Simplified layoff (short-time work scheme)	Yes
Romania	Liquidity and targeted lending support			Yes
Slovak Republic	Liquidity and targeted lending support and corporate asset purchases (ECB)	Employer social security contribution waiver, enhanced tax loss offset, corporate income tax rate reduction (self-employed), targeted VAT reductions	First Aid schemes (wage subsidy programme)	Yes

	Funding and asset purchases	Tax measures	Job retention schemes	Direct financing (equity, loans, guarantees)
Slovenia	Liquidity and targeted lending support and corporate asset purchases (ECB)	Tax payment deferrals, employer social security contribution waivers and payment deferrals, targeted VAT reductions,	Anti-Coronal Law (short-time work scheme)	Yes
Spain	Liquidity and targeted lending support and corporate asset purchases (ECB)	Enhanced tax allowances/credits, tax payment deferrals, targeted VAT reductions	Expediente de regulación temporal de empleo (ERTE) (short-time work scheme)	Yes
Sweden	Liquidity and targeted lending support and corporate asset purchases	Reduced employer social security contributions, enhanced tax allowances/credits	Korttidsarbete (short-time work scheme)	Yes
Switzerland	Liquidity and targeted lending support and corporate asset purchases	Employer social security contribution and tax deferrals (interest on arrears), targeted VAT reductions	Indemnité en cas de réduction de travail/Kurzzeitsentschädigung (short-time work scheme)	COVID-19 guarantee scheme for bridging loans by commercial banks Government guarantee for loans to support airlines and a specific programme for start-ups Equity injection in air traffic control sector
Türkiye		Targeted VAT reductions, tax and employer social security contribution deferrals	Short-time Working Benefit (short-time work scheme)	Yes
United Kingdom	Liquidity and targeted lending support and corporate asset purchases	Accelerated tax refunds, enhanced tax loss offsets, enhanced tax allowances and credits, targeted VAT rate reductions, tax payment deferral	Coronavirus Job Retention Scheme (short-time work scheme)	Bounce Back Loans Scheme (guarantees) Coronavirus Business Interruption Loan Scheme (guarantees) Coronavirus Large Business Interruption Loan Scheme (guarantees) Future Fund (loans) COVID-19 Corporate Financing Facility
United States	Liquidity and targeted lending support and corporate asset purchases	Employer social security contribution deferrals and tax credits, enhanced tax allowances/credits, enhanced tax loss offsets, tax payment deferrals, accelerated tax refunds	Short-Time Compensation (STC) (short-time work scheme)	Paycheck Protection Program (guarantees) Loans to the aviation industry and businesses critical to maintaining national security Equity injections into the Federal Reserve's emergency lending facilities via special purpose vehicles

Source: BIS (2020_[11]), Moretti et al. (2021_[13]), OECD (2021_[4]) and OECD (2021_[48]).

Annex C. Overview of selected pandemic risk insurance programme proposals²⁷

Europe

EIOPA has developed an issues paper setting out some of the issues and options for establishing an insurance solution for addressing pandemic-related business interruption losses (“shared resilience solution”), based on discussions with representatives from the insurance industry and commercial insurance buyers. The issues paper outlines potential options for addressing risk assessment challenges (such as the modelling of non-damage business interruption (NDBI) risk) and incentivising risk prevention measures (through pricing and contractual terms) as well as some potential product design features to provide NDBI cover in the short or medium term (such as the choice of payment trigger, the scope or mandatory nature of the cover). The paper also sets out risk transfer approaches based on different mechanisms for risk sharing between insurers, reinsurers and governments at national or European level (EIOPA, 2020^[49]). In February 2021, EIOPA issued a staff paper examining possible approaches to improving the insurability of pandemic business interruption risks, including through prevention measures, risk transfer to capital markets and by establishing a multi-peril solution for systemic risks (EIOPA, 2021^[50]).

The European Parliament, in its Report on a New Industrial Strategy for Europe, has called on the European Commission to “work towards the creation of a framework involving institutional investors, Member States and the EU, to cover the losses due to business interruption in case of a future pandemic” (Parliament, 2020^[51]).

France

The French Minister of Economy and Finances established a working group comprised of representatives from business and insurance associations, CCR (public reinsurer) and members of Parliament with a mandate to develop a framework for providing insurance for exceptional events, such as a global pandemic.

The Fédération française de l’assurance, a member of the working group, has published its proposal for a CATEX (*catastrophes exceptionnelles*) programme to provide coverage for business interruption losses that result from a reduction in economic activity following an extraordinary event (pandemics, terrorist attack, natural catastrophe, etc.). Under the proposal, the coverage could be triggered by a state administrative action that resulted in the closure of businesses in a given geographic region for a specified amount of time and would apply to businesses directly affected by the administrative order as well as those indirectly affected as a result of reduced economic activity outside the specified region. The coverage would be attached to either commercial property or business interruption coverage and would be available to SMEs (TPE and PME in French). The coverage would provide lump-sum payments (i.e. without loss adjustment) and would be calibrated to replace gross business disruption costs net of salaries and profits. The coverage would be funded by a premium paid by SMEs and backed by the government based on the existing regimes for natural catastrophes and terrorism risk. French insurers and reinsurers indicated that they would provide EUR 2 billion in capacity based on an expectation that CCR would provide reinsurance for additional amounts (FFA, 2020^[52]).

²⁷ This overview was first published in OECD (2021^[36]). Some minor updates have been made to reflect recent developments.

Germany

The German Insurance Association (GDV) established an expert group from the insurance industry to develop potential models to address the economic impacts of pandemics. The GDV published a Green Paper in June 2020 proposing the establishment of a legal entity that would collect funds from policyholders (either directly as risk-based premiums or through a compulsory flat-rate levy attached to certain policies) and would make payments to policyholders in the event of a WHO-declared pandemic and/or the declaration of regional epidemic by the relevant German public authorities. Payments would be made to all businesses (flat-rate levy model) or those that paid premiums for coverage based on the amount of capital accumulated by the legal entity (including as a result of any reinsurance coverage acquired by the entity) – with the government providing a backstop for losses above the capacity of the legal entity (GDV, 2020^[53]).

Italy

Generali Group published a perspective on pandemic risk pooling in September 2020 that recommends the establishment of a public-private partnership to provide insurance protection against pandemic-related business interruption losses for SMEs, harmonised at the European-level. The mechanism would include an initial coverage that would potentially be funded by the insurance sector and could potentially be based on a mix of parametric triggers (Generali Group, 2020^[54]).

United Kingdom

In the United Kingdom, industry representatives have formed working groups to develop solutions to the business interruption protection gap for pandemic risk.

A set of working groups have been established to develop a proposal to establish *Pandemic Re* which would create a government-backed reinsurance pool. The initiative includes broad participation from across the UK insurance sector and intended to submit a proposal to the UK government in late 2020.

In addition, the Lloyd's market has developed and published details on three proposed solutions to address various elements of the pandemic-related business interruption protection gap (Lloyd's, 2020^[55]). The proposals have been published as open-source frameworks for the design of programmes to deal with non-damage business interruption (including pandemics) in the short and longer-term:

- For the short-term, Lloyd's has proposed the establishment of a *ReStart* programme that would pool capacity within the Lloyd's market to provide business interruption coverage for small companies for future potential waves of COVID-19 (with the possibility to extend the scope of the programme to include SMEs more generally).
- For the medium and longer-term, Lloyd's has proposed the establishment of *Recover Re* which would collect premiums (under a policy that lasts multiple years) to be used to make payments to policyholders for non-damage business interruption after an event, including the current COVID-19 pandemic as well future pandemics or other perils that lead to business interruption (without the physical damage that triggers such coverage in many commercial property policies). Policyholders would make continuous premium payments over many years to fund a pool that would provide this coverage. The role of government would be to provide a guarantee against policyholder premium payment defaults and, potentially, to fund pay-outs in the initial years before *Recover Re* accumulates sufficient capital.
- For the longer-term, Lloyd's has proposed the establishment of *Black Swan Re*, a reinsurance pool backstopped by a government guarantee that would provide coverage for systemic non-damage business interruption losses. Under this proposal, the insurance industry layer would be relatively small at first but would increase over time (subject to loss experience).

United States

In the United States, a legislative proposal to establish a federal pandemic risk reinsurance programme – the “Pandemic Risk Insurance Act of 2020” (PRIA) – has been introduced in Congress. The programme would operate in a similar way as the Terrorism Risk Insurance Program by providing a federal backstop for business interruption and event cancellation losses incurred by participating insurers as a result of a “covered public health emergency” (i.e. an event certified as such by the Secretary of Health and Human Services, such as a pandemic or infectious disease outbreak). Under the draft PRIA legislation, the private sector would take on some portion of the future pandemic risk. The federal reinsurance would cover 95% of losses above an individual participating insurers’ deductible once an industry loss threshold of USD 250 million was achieved – with an overall annual limit of USD 750 billion in annual pay-outs. The purchase and offering of the federally-reinsured coverage would be voluntary (Dawson and McCarty, 2020^[56]), (Sclafane, 2020^[57]). The legislation has been endorsed by a number of business and insurance associations, including Non-profit New York, the U.S. Travel Association, The National Retail Federation, the American Society of Association Executives, and the Council of Insurance Agents and Brokers (amongst others) (Office of Congresswoman Carolyn Maloney, 2020^[58]).

A group of US insurance associations (American Property Casualty Insurance Association (APCIA), the National Association of Mutual Insurance Companies (NAMIC) and the Independent Insurance Agents and Brokers of America (Big I)) have proposed the establishment of a Business Continuity Protection Program that would provide federal compensation for up to 80% of specific types of operating expenses (including payroll, employee benefits and other operating expenses) for up to three months following the declaration of an emergency. Businesses would need to purchase this protection in advance and would need to certify that: (a) the proceeds of the compensation will be used to retain employees and pay necessary operating expenses; and (b) that the business will implement all applicable federal guidance on health and safety measures during the health emergency. The protection could be acquired by any business incorporated in the United States on a voluntary basis. The private sector would not take on any of the future pandemic risk, and it would be completely backstopped by the U.S. federal government (NAMIC, APCIA and Big I, 2020^[59]), (Hatler, Mihocik and Roman, 2020^[60]).

A “Pandemic Reinsurance Corporation” proposal has also been reported in the media although it does not appear to have been formally proposed as legislation. Under this proposal, reinsurance coverage would be made available for both small and large businesses although with small businesses receiving pay-outs based on a standard formula and large businesses receiving pay-outs calculated on an indemnity basis. The coverage would automatically be included in small business insurance policies (business owner policies or workers compensation policies) although large businesses would need to specifically acquire the coverage. The insurance industry would be responsible for approximately USD 15 billion of losses faced by small businesses and a similar amount for large businesses after a few years (Sclafane, 2020^[61]).

In early July 2020, a large US property and casualty insurer (Chubb) released a proposal for establishing a Pandemic Business Interruption Program involving facilities for small companies and for medium and large companies. For small businesses, the programme would provide a fixed payment based on a multiple of payroll costs in the event of a government-declared pandemic and lockdown with a first layer of losses (beyond a deductible and up to USD 250 billion) co-insured by insurance companies and government (with the industry share increasing over time) and an excess layer of USD 500 billion funded by government. Policyholders would only be required to pay premium to cover the industry share of losses which would reduce the cost of this insurance. Companies would be required to opt-out of purchasing this coverage and, in doing so, would confirm that they will not have access to business interruption coverage or federal assistance programmes in the event of a pandemic. For medium and large companies, business interruption coverage could be acquired on a voluntary basis from private insurers who would cede a proportion of the risk (and premium) to a government reinsurer (Pandemic Re). Coverage would be limited

to USD 50 million per policy and the industry retention would be limited to USD 15 billion initially and increasing over time (Chubb, 2020^[37]).

In December 2020, Zurich North America released a draft concept for providing financial protection against future pandemics. The proposed approach would provide business interruption coverage to businesses for essential expenses (up to 80% of expenses for three months, capped at USD 20 million per month) with a deductible (waiting period) chosen by the policyholder and reduced premium rates for smaller businesses. Insurers would be required to offer this coverage but can choose to cede 90%, 95% or 100% of the risk to government-backed reinsurance pools. The coverage would be triggered in the event of federal emergency disaster declaration, federal disaster declaration for the relevant state and a business shut down declaration made at the state level (Zurich (North America), 2020^[62]).

A coalition of US businesses (Business Continuity Coalition (BCC)) has also been established to advocate for an insurance coverage for future pandemic-related losses. The BCC is recommending the establishment of a pandemic risk insurance programme that would support the availability of affordable non-damage business interruption coverage as well as respond to emerging insurance coverage gaps in other lines of business such as event cancellation, workers compensation and general and employment practices liability. The coverage would be distributed by the insurance sector and available to businesses of all sizes with subsidised premium rates. Payments would be made on a parametric basis triggered by national health declaration and business closure orders made at the state-level. The programme would encourage insurers to assume some portion of the risk and make use of international reinsurance and capital markets to assume some of the risk taken by government (Business Continuity Coalition, 2020^[63]).

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