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A Framework for Defining a Role for
Insurance in "Uninsurable" Risks: Insights
from COVID-19

Howard Kunreuther
Jason Schupp



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NAIC Executive Office
444 North Capitol Street, NW
Suite 700
Washington, DC 20001
202.471.3990

NAIC Central Office
1100 Walnut Street
Suite 1500
Kansas City, MO 64106
816.842.3600

NAIC Capital Markets
& Investment Analysis Office
One New York Plaza, Suite 4210
New York, NY 10004
212.398.9000

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A Framework for Defining a Role for Insurance in "Uninsurable" Risks: Insights from COVID-19

Howard Kunreuther | Jason Schupp

IMPORTANCE The recent pandemic has demonstrated a need for varied economic solutions and greater flexibility in the face of the growing portfolio of risks that the insurance model has traditionally regarded as "uninsurable."

OBJECTIVES This paper draws on insights from the insurance response to COVID-19 to develop a decision-making framework for evaluating the performance of risk management strategies for dealing with the impacts of risks traditionally considered by insurers as uninsurable.

RETHINKING UNINSURABILITY While many have viewed insurability as a binary choice with respect to a risk (i.e., insurable or uninsurable), insurability is more appropriately considered on a continuum, ranging from easy-to-insure, such as automobile or life insurance, to difficult-to-insure, such as pandemic, loss of the electrical grid, and other extreme catastrophic risks.

FRAMEWORK The role of private and public sectors in dealing with risks that are difficult-to-insure should be to develop strategies that enable a greater degree of insurability. To do so, the framework suggests that policymakers consider three fundamental options in dealing with the insurance industry:

1. **Status Quo (SQ)** – This option (SQ) contemplates a similar dynamic to that experienced with COVID-19, wherein businesses, nonprofits, and local governments found limited (if any) insurance coverage for their losses and ex post relief programs funded by the government.
 2. **Service Provider (SP)** – This option (SP) contemplates an administrative, non-risk-bearing role for the insurance industry while the entire cost of claims would be publicly financed.
 3. **Service and Risk (SR)** – In addition to its role as a service provider as characterized by SP, this option (SR) would expect insurers to commit capital – in an amount that does not threaten their financial viability – to cover a specified layer or other defined element of losses.
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CONCLUSION Insurance should be part of a risk management strategy to support businesses, non-profits, and local governments to address the risks they face – even if those risks are difficult to insure by traditional measures. The insurance industry can play an important role either through the continued development of ad hoc state-by-state initiatives (SQ), a private-public partnership in which the insurance industry commits its servicing capabilities (SP), or a private-public partnership drawing on both its servicing and risk-bearing capabilities (SR). The recent pandemic offers an opportunity to examine the role of insurance in providing protection and reducing losses from other catastrophic and systemic risks facing society today.

A Framework for Defining a Role for Insurers in “Uninsurable” Risks: Insights from COVID-19

Howard Kunreuther*
Jason Schupp**

Abstract

Recognizing the challenges facing insurers and the public sector in dealing with the COVID-19 pandemic, this paper proposes a decision-making framework for evaluating the performance of risk management strategies for dealing with the impacts of risks traditionally considered by insurers as uninsurable. We discuss three alternative options through which the property/casualty (P/C) industry may be able to play a role in supporting businesses, nonprofits, and the public sector in managing future pandemics and other catastrophic and systemic risks.

* Wharton Risk Management and Decision Processes Center; kunreuth@wharton.upenn.edu.

** Centers for Better Insurance; Jason.schupp@betterins.org.

Introduction¹

The COVID-19 pandemic has proven to be one of the most extensive and complex catastrophic risks the global economy has ever faced. This paper views pandemic risk as one of the “uninsurable” risks facing businesses, nonprofits, local governments, and families in an increasingly complex and interconnected world.

Recent papers, such as Richter and Wilson (2020) and Khanna et al. (2021), have considered the insurability of pandemics. We view the risk of a future pandemic as a useful illustration of a risk that does not fit neatly within traditional notions of insurability, but which urgently requires a risk management response. We propose a decision-making framework for evaluating the performance of risk management strategies for dealing with the impacts of risks traditionally considered by insurers as uninsurable. Our hope is that the framework will initiate a dialog between the relevant stakeholders for defining a role for insurance in managing business interruption (BI) and other losses resulting from future pandemics—i.e., pandemic risk—and other similarly “uninsurable” risks.

We discuss **three alternative options** through which the P/C industry may be able to play a role in supporting businesses, nonprofits, and the public sector in managing “uninsurable” risks in the U.S. We draw on the responses of the insurance industry and public policymakers to the COVID-19 crisis to illustrate how one could address the risk of future pandemics:

1. **Status Quo** – Private insurers provide certain coverages that may respond to pandemic losses (e.g., workers’ compensation, surety, and event cancellation insurance). However, property insurance generally requires a physical loss to trigger these coverages, and the insurance policy may contain a virus or pandemic exclusion. Against the prospect of significantly limited and heavily contested COVID-19 BI insurance payouts, the public sector stepped in to provide ex post relief to fund payroll continuation and ongoing fixed expenses (e.g., rent and utilities) for many businesses. Status quo (SQ) contemplates a similar dynamic for future pandemics with limited insurance coverage and government-funded ex post relief programs.
2. **Service Provider** – Service provider (SP) contemplates a non-risk-bearing role for the P/C insurance industry in managing the risk of future pandemics. Insurers would provide underwriting expertise, marketing of pandemic risk-related products, and claims payment administration on a fee-for-service basis. The entire cost of pandemic-related claims would be publicly financed.
3. **Service and Risk** – In addition to its role as an SP, service and risk (SR) would have P/C insurers commit capital, in an amount that does not threaten their financial viability, to cover a specified layer or other defined

1. We thank Chris Lewis and a reviewer for helpful comments on an earlier draft of this paper.

element of losses from a future pandemic. SR contemplates insurers pricing pandemic risk coverage, thereby sending economic signals for incentivizing loss reduction measures.

We propose three guiding principles to evaluate the performance of each of these alternative options following future pandemics. The paper concludes by raising several practical issues for stimulating a dialog between insurers and other interested parties in designing a risk management strategy that addresses pandemics and other “uninsurable” catastrophic and systemic risks.

To set the context for this discussion, there are two fundamental characteristics of the pandemic risk that necessitate a public response:

- The scale, correlations, and complexity of pandemic risk, as evidenced by ongoing COVID-19 losses, far exceed traditional parameters that define the concept of *insurability* for private insurers and reinsurers, as noted in Section I.
- The P/C insurance industry’s *financial capacity* for covering foreseeable losses from future pandemics is inadequate, so substantial public sector participation in financing pandemic losses will be necessary, as noted in Section II.

Scale and Complexity of the Pandemic Risk

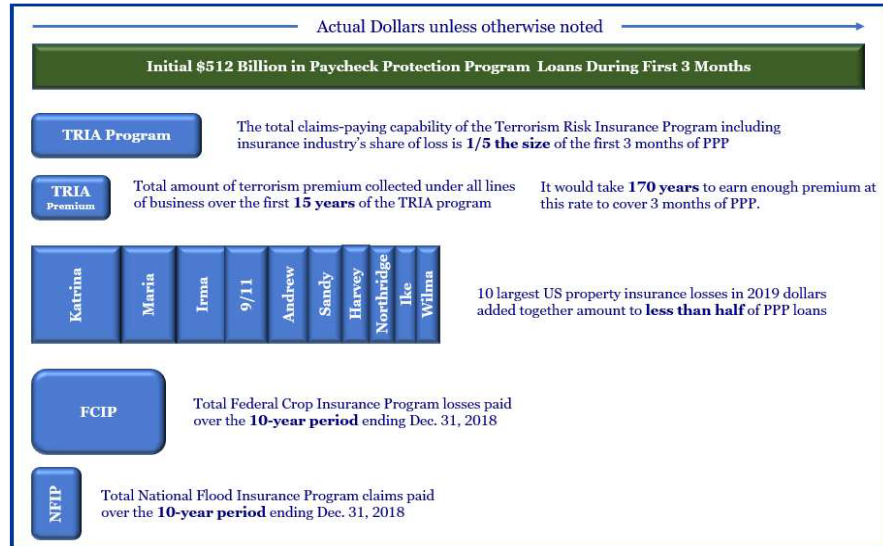
The U.S.’s experience in responding to COVID-19 suggests that the scale and complexity of the pandemic risk is greater than that of other extreme events for which private-public partnerships have been established.

Scale

The U.S. government’s response highlights the magnitude of the pandemic challenge facing the country. For example, during the months of April through June 2020, the first installment of the Paycheck Protection Program (PPP), a federally funded eight-week small business program, approved more than five million applications for forgivable loans representing some \$525 billion in pandemic relief. This banking-administered relief effort eclipses the scale of any historical insurance-based catastrophe response: the PPP’s outlay between April and June 2020 was more than twice the amount of U.S. property insurance claims from the 10 largest property insurance loss events combined, or the equivalent of 170 years of insurance premiums associated with the Terrorism Risk Insurance Act (TRIA), as shown in Figure 1. This allotment of PPP funds is the first of several federal and state relief programs directed to individuals, businesses, nonprofits, and local governments. With the passage of the American Rescue Plan Act of 2021 signed by President

Biden on March 11, 2021, the expenditures by the public sector for COVID-19 relief now total more than \$3 trillion.²

Figure 1:
Paycheck Protection Program Expenditures (April – June 2020) Compared to Historical Insured Losses and Other Program Dimensions



Sources: U.S. Department of the Treasury (Treasury Department) PPP Loan Data (U.S. Small Business Administration [SBA], 2021); Insurance Information Institute (III) data regarding U.S. catastrophes; and the Treasury Department's *Report on the Effectiveness of the Terrorism Risk Insurance Program* (Federal Insurance Office [FIO], 2020).

Complexity

Businesses, nonprofits, and governments face a dynamic catalogue of exposures from COVID-19. As illustrated in Table 1, these exposures include the suspension of business operations due to lockdown orders and liability for infection of employees, customers, or others. Future pandemics would likely present similar risks and exposures (e.g., event cancellation and surety), as well as other losses that have yet to emerge that could take years or even decades to fully understand.

2. See: USA Spending, <https://www.usaspending.gov/disaster/covid-19>.

Table 1:
Risk and Exposures from Future Pandemics

Risk	Exposure
Lockdown Orders	Business Interruption Modification to Reopen
Infected Workers and Family Members	Workers Compensation Liability
Infected Customers and Suppliers	Liability

Parameters of Insurability

Here we highlight the insurability criteria discussed by Hartwig and Gordon (2020) in a white paper published by the American Property Casualty Insurance Association (APCIA) in May 2020 that led them to conclude that pandemics are an uninsurable risk.³ The paper has played an important role in why insurers perceive that pandemic insurance cannot be covered by the private sector. The criteria they specify are:

- A risk must consist of many exposure units so that the losses of the few can be **distributed** across the entire population of policyholders.
- Losses must be **accidental** or random and unintentional in nature.
- Losses must be determinable and **measurable**, enabling accurate and timely adjustment.
- Losses cannot be exceedingly catastrophic or financially **ruinous** to the risk pool as a whole.
- The probability of loss and its consequences must be **calculable**, a characteristic necessary for the proper modeling and pricing of risk.
- The premium charged by insurers to transfer the risk of loss must be economically **affordable**.

3. Richter and Wilson (2020) and Khanna et al. (2021) also subsequently discuss the challenges with respect to the insurability of pandemic insurance.

While this and later papers suggest that insurability is a binary choice with respect to a risk—i.e., insurable or uninsurable⁴—we submit that insurability is more appropriately considered on a continuum, ranging from easy to insure (e.g., automobile or life insurance) to difficult to insure (e.g., catastrophic risks). Certainly, the U.S. experience in dealing with COVID-19 shows that pandemic risk is toward the difficult end of that spectrum. That said, there are steps that can be taken to nudge the pandemic risk toward a greater degree of insurability, such as:

- **Containing the probability and severity of risk:** COVID-19 and earlier pandemics (e.g., the Spanish flu [1918 – 1920], the Hong Kong flu [1968], the Asian Flu [1956 – 1958], and the H1N1 flu [2009]) provide data that insurers can utilize to estimate probability and potential losses and deaths from future pandemics of different magnitudes. Catastrophe models with respect to pandemics are now evolving and could eventually be used to complement historical data as a basis for pricing insurance (Cohn, 2021). Because statistical information on prior pandemics is extremely limited, insurers would likely incorporate risk margins in their premium calculations, resulting in higher prices and reduced capacity. Despite its severity, COVID-19 can be viewed as mild compared to the 1918 Spanish flu pandemic. The current pandemic has killed over 4.5 million people worldwide as of Aug. 30, 2021. Barry (2004) noted that the number of fatalities in the 1918 flu pandemic is estimated to be between 50 and 100 million. In a January 2021 interview, he pointed out that adjusting for population, the number of fatalities today would be equivalent to between 225 and 450 million people (American Medical Association [AMA], 2021). The impact of future pandemics on the insurance industry is discussed in a Lloyd’s (2008) report. This report emphasizes that any insurance proposal must be designed to withstand a more severe pandemic than COVID-19.
- **Capping potentially ruinous exposure:** Following the severe acute respiratory syndrome (SARS) outbreak in 2003, even though insured losses from that event were modest, insurers identified the potentially unmanageable severity of the pandemic risk and thus excluded losses due to BI, property damage, and liability in most of their commercial policies.⁵ As a result, pandemic exclusions were widely in place with respect to certain products and markets for years prior to the outbreak of COVID-19. The U.S. experience with COVID-19 affirms the potential of extreme losses from pandemics. A private-public partnership, such as a federal

4. Richter and Wilson (2020) state, “the industry has learned that business interruption is not an insurable risk if it is caused by containment activities to manage a global pandemic,” and Khanna et al. (2021) state, “[r]isks that lack the characteristics for insurability...are uninsurable risks.”

5. New Endorsement Filed to Address Exclusion of Loss Due to Virus or Bacteria, ISO Circular, LI-CF-2006-175 (July 6, 2006).

backstop or similar mechanism, would cap overall exposure of the pandemic risk to the insurance industry and could create a limited private market for covering well-defined and limited amounts of losses from future pandemics.

- **Dealing with affordability:** The public sector could assist businesses and other entities that cannot afford a risk-based insurance premium through means-tested vouchers, tax credits, or other subsidies.

Private-Public Partnerships in Response to Other Extreme Risks

History shows that many insurers have been willing to provide coverage against extreme risks perceived as having a low probability of large claims payments. After suffering a severe loss from an “unexpected” extreme event, insurers may increase premiums significantly (if allowed to do so by state insurance regulators), reduce the amount of protection they are willing to offer through higher deductibles and/or lower limits of coverage, or conclude that the risk is uninsurable.

Aware of these issues, the insurance industry and policymakers at the federal and/or state level have sometimes established and continuously refine a private-public partnership to assist in managing extreme risks, as illustrated by the following examples:

- **Flood insurance** was offered by many insurers from the 1890s until 1928, when two severe floods led every responsible company to discontinue coverage, declaring the flood risk to be uninsurable (Knowles & Kunreuther, 2014). The National Flood Insurance Program (NFIP) was established in 1968 to provide homeowners in flood-prone areas with financial protection against damage to their property. Currently, most residential flood policies in the U.S. are provided by the NFIP, with private insurers marketing coverage and processing claims but not bearing any risk.
- **Earthquake insurance** was widely available to homeowners in California starting in 1916, but few homeowners purchased coverage. Following the Loma Prieta earthquake in 1989 and the Northridge earthquake of 1994, there was increased interest by homeowners in earthquake-prone areas of California in purchasing earthquake insurance. In 1995, insurers concluded that they could not risk selling more residential earthquake policies. This led to the formation of the California Earthquake Authority (CEA), a state-created entity that has offered earthquake insurance since that time (Roth, Jr., 1998, pp. 67–95).
- **Terrorism coverage** was provided by insurers on commercial property policies until after the attacks of Sept. 11, 2001. Insurers generally had not

evaluated how much to charge for this protection, despite the World Trade Center attack in 1993 and the Oklahoma City bombing in 1995, because they had not suffered severe losses from those events. Following 9/11, most insurers refused to include terrorism as part of their commercial property coverage, especially in central business districts, or they charged extremely high premiums (Kunreuther et al., 2013). This market reaction led the U.S. Congress (Congress) to enact TRIA, a private-public partnership that has been renewed four times.

Addressing the Pandemic Risk

Insurers currently face a multifaceted push by policyholders, state legislatures, Congress, the courts, and public opinion for an “insurance solution” to COVID-19 and future pandemics.

In proposing a role that insurance can play with respect to the pandemic risk, it is appropriate to consider:

- Broad stakeholder participation (e.g., insurer, policyholder, and public sector interests) to ensure that the identification and definition of the economic and societal problems is solved.
- The potentially strong correlation between pandemic risk exposure and asset values (meaning that a pandemic is an exposure that affects both sides of an insurer’s balance sheet).
- The extent and potential volatility of reinsurance participation in protecting insurers against the pandemic risk and diversifying the risk globally.
- The capacity of insurers to commit to delivering administrative services (e.g., claims management) and incur risk-bearing with due concern for the industry’s concurrent role in insuring against non-pandemic exposures.
- The public policy objectives associated with the risk of future pandemics that fall outside of the purview of the P/C insurers but may have an impact on the size of BI losses or its larger economic consequences, such as:
 - Assisting employees temporarily laid off through programs such as expanded unemployment insurance.
 - Considering measures adopted by other countries, such as the short-time work (Kurzarbeit) program in Germany, where companies paid temporarily laid-off employees a significant portion of their salary for up to one year, and these companies were then reimbursed by the German government (International Monetary Fund [IMF], 2020).
- Khanna et al. (2021) note that PathogenRX, created by Marsh, is a parametric product that provides financial protection against BI due to an infectious disease outbreak, and AXIS Healthcare Medical Catastrophe Business Interruption and Extra Expense provides medical catastrophe “contagion” coverage for U.S. and Canadian hospitals.

Design Options and Proposals for Private-Public Partnerships for Pandemic Risk

The need to consider private-public partnerships for accelerating economic recovery from COVID-19 and providing protection against future pandemics is the basis for a report by Marsh (2020) that emphasizes the importance of examining the role of the insurance industry in concert with the public sector. The three alternative options for dealing with the pandemic risk noted above are now discussed in more detail:

1. **Maintain the Status Quo.** Under this option, private insurers would cover some pandemic losses, with the public sector providing ex post relief to businesses and their employees. For example, individual states may adopt some form of presumption of entitlement to workers’ compensation benefits or put *limitations* on third-party liability. Because insurance is regulated at the state level, responses are likely to differ considerably from one state to another.

As an illustration of state-by-state differences, bills were introduced in 2020 in Ohio,⁶ Massachusetts,⁷ and New Jersey⁸ that would invalidate existing virus or pandemic exclusions, but none were enacted. Under the Ohio proposal, insurance policies issued to businesses employing 100 or fewer workers would cover pandemic-related BI notwithstanding any virus exclusion or property damage requirement in the contract. Insurers paying these claims could seek reimbursement from the state’s BI insurance fund, financed through assessments levied on insurers in proportion to their share of annual statewide P/C premiums. By way of comparison, the Massachusetts proposal would apply to employers of 150 or fewer full-time equivalent workers. Insurers required to pay otherwise excluded pandemic BI claims could apply for reimbursement from the state insurance commissioner via assessments on insurers selling BI insurance in Massachusetts.

Even in the absence of state legislative interventions, insurers face considerable costs under the SQ. Bisco et al. (2020) conclude that even if insurers are successful in arguing that current policies do not cover BI losses from pandemics, they will likely incur significant legal expenses in defending denial-of-coverage and bad-faith lawsuits brought by policyholders.

6. Ohio House Bill 589 introduced March 24, 2020. <https://legiscan.com/OH/text/HB589/2019>.

7. Massachusetts Senate Bill 2655 introduced April 6, 2020. <https://malegislature.gov/Bills/191/SD2888>.

8. New Jersey Assembly Bill No. 3844 introduced March 16, 2020. https://www.njleg.state.nj.us/2020/Bills/A4000/3844_11.HTM.

2. **Service Provider Model.** Under this option, the insurance industry plays an administrative, non-risk-bearing role with insurers providing some or all underwriting, claims, distribution, and other capabilities on a fee-for-service or similar basis. For example, insurance agents and brokers may elect to sell a federally administered expense protection agreement to businesses and nonprofits. A business that purchased this protection and was later ordered closed due to a pandemic would receive an immediate payout of a previously determined amount. The most prominent proposal suggesting this approach is the Business Continuity Protection Program (BCPP) (APCIA, 2020).
3. **Service and Risk Model.** This option combines the insurance industry's administrative function described in SP with a risk-bearing role. The P/C insurance industry would insure a limited layer or other well-defined element of the pandemic risk without jeopardizing their financial viability. The public sector would limit the pandemic risk for insurers, distribute the overall cost of the program, and assist small businesses in purchasing coverage for pandemic risk through means-tested vouchers or tax credits. An example of this option is the Pandemic Risk Insurance Act (PRIA) introduced in May 2020 but not advanced before the end of the Congressional session.⁹ This proposal relied on TRIA; i.e., the approach developed for the terrorism risk after 9/11. Under this proposal, the private sector (insurers) would provide coverage for BI losses with a federal backstop reimbursing catastrophic losses that exceeded the ability of the private sector to insure. As Klein and Weston (2020) note, PRIA would be difficult to administer due to political interference. They point out that it would raise equity issues, and it could obligate the government to make payments to businesses that would not be adequately funded by the program. Furthermore, based on TRIA take-up rates, it is unclear how many businesses would buy coverage offered by insurers (FIO, 2020, p. 29).¹⁰

A proposal by the German Insurance Association (GDV) (2020) highlights the advantages of using existing customer relationships for a fast and efficient support payment process in future pandemics. As noted by Richter and Wilson (2020), a green paper by the GDV emphasizes the importance of strong government involvement in financing the financial consequences of a pandemic in concert with private insurance.

9. H.R.7011, 116th Congress, introduced May 26, 2020, has not been enacted. <https://www.congress.gov/bill/116th-congress/house-bill/7011>.

10. Treasury Department data indicates that take-up rates for available terrorism insurance coverage are between 60% and 80%.

Guiding Principles

The decision framework for evaluating the alternative options hinges upon the following three guiding principles.

Principle 1: Charge Risk-Based Premiums

Premiums that reflect risk from future pandemics provide businesses with signals as to the nature of the hazard they face and, to the extent feasible, encourage organizations to engage in cost-effective mitigation measures to reduce their vulnerability and insurance expenses. Risk-based premiums would reflect the insurers’ cost of capital to ensure an adequate return to their investors. Based on this principle:

- State insurance regulators would allow insurers to charge premiums against losses from future pandemics that reflect their best estimate of the risk and the cost of capital, and insurers would utilize catastrophe models and historical data to determine premiums.
- State insurance regulators would continue to ascertain whether insurers and reinsurers have sufficient capital so they are unlikely to become financially impaired or insolvent following a future pandemic.
- Insurers would consider offering premium reductions to firms that adopted appropriate standards or requirements, such as wearing masks or being vaccinated, that mitigate the severity of the pandemic risk to their employees.

Principle 2: Deal with Fairness and Affordability Issues

Businesses that cannot afford risk-based insurance premiums would be given financial assistance to purchase insurance:

- Specific means-tested criteria could determine who qualifies for this funding.
- Funding for this protection would come from the public sector rather than through subsidized insurance premiums.

Principle 3: Develop Risk Management Strategies Prior to the Next Disaster

To reduce losses and illnesses from a future pandemic, the public sector would develop and enforce regulations and standards, coupled with the following programs, to enable firms to keep employees on payroll and re-employ them as the pandemic subsides:

- Regulations by the public sector (federal, state, and local government) that require businesses to close and residents to shelter-in-place.
- Requirements for social distancing and wearing masks.
- Programs that provide funding to workers who are temporarily unemployed and firms that are in danger of failure.

Pricing Insurance Against Pandemic Risk

The success of any private-public partnership for pandemic risk will be measured by available insurance capacity—i.e., the nature and amount of coverage—as well as the premium; i.e., the affordability of coverage. Empirical evidence supports the hypothesis that insurers will set higher premiums when faced with ambiguous probabilities and uncertain losses than they would for a well-specified risk. When underwriters were presented with scenarios where the probability and losses from an earthquake were ambiguous, they priced the premium between 43% and 77% higher than if the risks for this same disaster were well-specified (Kunreuther et al. 1993). Because the risk of a future pandemic and its consequences are even more ambiguous than for earthquakes, it is likely that underwriters would price the premium even higher, relative to a well-specified risk.

There may be considerable differences in the premiums set by underwriters even when they are given the same information on the nature of the risk due to noise. When underwriters in a well-known insurance firm were asked to set premiums on a specific risk, the median difference in their estimates was 55%. In other words, if the average premium across underwriters was \$10,000, another underwriter was likely to recommend a premium in the range of \$4,500 to \$15,500. There may have been many reasons why underwriters differed from each other, but the impact on the firm was a potential loss of millions of dollars (Kahneman et al. 2021).

Following a severe loss that affects their balance sheet, insurers may be reluctant to offer coverage in the future. This behavior is consistent with the *availability heuristic*, highlighting the importance of salient information in estimating the likelihood of an event (Tversky & Kahneman, 1973). Other biases or heuristics that can play a role are *optimism*, underestimating the risk; *myopia*, focusing on obtaining short-run returns instead of long-term impacts; *amnesia*, forgetting the lessons of past disasters; and *herding*, the tendency to base choices on the observed actions of others (Meyer & Kunreuther, 2017).

To deal with these issues, decision-makers could utilize a checklist that requires them to consider the risks they face more systematically.¹¹ Examples relevant for insurers include:

- Carefully consider the potential for extreme events rather than assuming “it will not happen to us.”
- Quantify the firm’s risk appetite and tolerance for taking on risks.
- Reframe the probability of an extreme event’s occurrence over the next 30 years rather than next year.
- Gain insights from near misses.

A Framework for Evaluating Proposed Strategies

A decision-making framework to evaluate the three alternative strategies for dealing with pandemics involves the following elements depicted in Table 2:

- *Options* under consideration. There are three options: Option 1 = SQ, Option 2 = SP, and Option 3 = SR.
- *Events*—i.e., hypothetical pandemics—that affect the performance of each of the options. These n distinct events, denoted as E_1, E_2, \dots, E_n are scenarios characterizing the nature of future pandemics based on data from past pandemics and future projections. Event 1—i.e., E_1 —could be COVID-19. Epidemiologists and other experts can provide estimates of the likelihood and uncertainty associated with other scenarios. As Richter and Wilson (2020) point out, scenario analysis is important for both setting and assessing insurers’ risk appetite in a dynamically changing environment.
- *Consequences* when Option O_i is chosen and Event E_j occurs is denoted as C_{ij} in Table 2 for the three alternative options being considered. The consequences reflect impacts to the different interested parties (e.g., insurers, businesses/firms, employees, taxpayers, and the public sector—i.e., communities, state, regional, federal) as a function of the option chosen and specific pandemics that could occur. Suppose Event 1 was COVID-19. Then C_{11} would be the impacts of COVID-19 if one maintained the SQ; C_{21} would be the impacts if insurers had an SP role; and C_{31} would be the impacts if insurers had an SR role as part of private-public partnership.

The options can be evaluated as to how they would perform in dealing with pandemics of any severity. The framework can also assess variations of the above

11. An expanded list of steps for dealing with catastrophic risk are highlighted in Kunreuther and Useem (2021) based on a study of large publicly traded firms in the U.S and abroad.

options by evaluating their impacts on other projected pandemics. The credibility of such an analysis depends on the accuracy of the assumptions for evaluating the different consequences for each of the options in the context of COVID-19 or future pandemics. The stress scenarios discussed in Khanna et al. (2020) could be the basis for constructing events $E_1 \dots E_n$, and the alternative private-public partnership proposed by Richter and Wilson (2020) could be evaluated as a risk management strategy for Option 3.

Table 2:
Framework for Linking Options and Events with Consequences

		<i>Events</i>					
		E_1	E_2	\dots	E_j	\dots	E_n
<i>Options</i>	<i>Option 1 = SQ</i>	C_{11}	C_{12}	\dots	C_{1j}	\dots	C_{1n}
	<i>Option 2 = SP</i>	C_{21}	C_{22}	\dots	C_{2j}	\dots	C_{2n}
	<i>Option 3 = SR</i>	C_{31}	C_{32}	\dots	C_{3j}	\dots	C_{3n}

To illustrate, consider the three options if scenario $E_1 = \text{COVID-19}$. Option 1 is the SQ with its impacts evaluated for its impact on key stakeholders (e.g., insurers, businesses and their employees, and the public sector) if another pandemic identical to COVID-19 occurred in the future. A similar evaluation would be undertaken with respect to Option 2 where insurers would play an administrative role and the entire cost of a COVID-19-related claims would be publicly financed. Option 3 evaluates the impact on key stakeholders dealing with another COVID-19 pandemic under the proposed private-public partnership. One could evaluate the expected performance of the three options with respect to other future pandemic scenarios (E_2, \dots, E_n). Stakeholders play a key role in designing risk management strategies for reducing the impacts of future pandemics.

Practical Issues

To facilitate interaction among insurers and other interested parties, such as state insurance regulators, legislators, and businesses, regarding the potential role of the insurance industry and the public sector in managing the risk of future pandemics, the following practical issues must be considered.

The Criteria for Providing Pandemic Relief

Much attention has focused on the financial challenges facing businesses that were “locked-down” due to pandemic orders at the state or local levels. As a result, proposals such as the BCPP and PRIA would provide BI insurance that pays benefits-only firms that have been locked down by governmental order. However, there is no evidence to suggest that using lockdown orders as a basis for providing pandemic relief loans or as a criterion for providing insurance benefits would capture the universe of employers or business operations affected by the economic consequences of a pandemic.

Traditional BI insurance compensates for a business’s lost income and continuing expenses incurred from an event that causes physical loss or damage to the insured property. In contrast, the economic impact of a pandemic may be felt just as severely by businesses that are not ordered to close as those that are. Moreover, this economic impact is likely to extend over a protracted period and vary from region to region and industry to industry, so using a lockdown order as a criterion for an insurance benefit is likely to be inappropriate.

An effective pandemic relief program would contemplate a range of criteria in assessing the need for financial assistance to firms and employees, including:

- Decline in revenue / Lower profits or losses.
- Continuation of fixed expenses (e.g., rent, mortgage payments, utility expenses).
- Unemployment / Reduced working hours.
- Cost of childcare during school closures.

In assessing the effectiveness of a proposed program, stakeholders should consider the financial relief to be delivered during a pandemic and the recovery period, bearing in mind:

- The purpose and amount of the benefits to be provided to businesses, nonprofits, and local municipalities and the cost of these benefits over time.
- The parties who should bear the costs of these benefits over relevant time periods as a function of the severity of the pandemic and its impacts.

Evaluate, Improve, or Set Aside Existing COVID-19 Pandemic Relief Programs

State and federal policymakers have utilized a wide array of programs and policies for dealing with the economic consequences of the COVID-19 pandemic. The dialogue among stakeholders should consider which programs should remain for future pandemics, which programs require improvement, and which programs should be abandoned. Potential programs and policies to consider include:

- Expanded eligibility for unemployment benefits.
- Increased unemployment benefit amounts.
- Economic Impact Payments to individuals.
- Expanded leave entitlements for employees.
- The PPP, the Emergency Capital Investment Program (ECIP), the Coronavirus Relief Fund, and the Coronavirus Economic Relief for Transportation Services (CERTS) Program.¹²
- Limitations on or immunity from liability for health care providers, businesses, and others with respect to injury caused by exposure to COVID-19.
- Presumption of compensability under state workers' compensation systems for medical expenses, wage loss, and permanent or temporary disability from contracting COVID-19.

Identify the Role the Insurance Industry is Best Positioned to Play

With an understanding of what did and did not work during COVID-19, the dialogue among stakeholders can focus on expanding the role of the insurance industry as part of a private-public partnership for addressing future pandemic risks. Questions to be considered include:

- How and to what extent can the insurance industry fill gaps in the existing set of programs and policies?
- How and to what extent can the insurance industry augment the effectiveness of an existing program or policy?
- What existing programs or policies might insurance or an insurance administered solution replace?

12. The PPP provided small business employers with forgivable loans to be used to continue payroll and cover continuing operating expenses. The ECIP encouraged lending to small businesses in vulnerable communities affected by COVID-19. The Coronavirus Relief Fund provided fiscal support to state, local, and tribal governments. The CERTS Program provided emergency funding to airlines and other eligible transportation services.

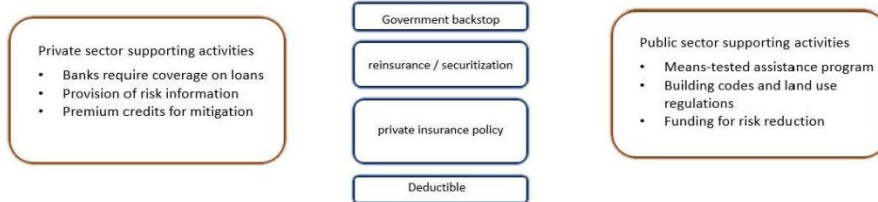
An issue brief by the NAIC (2021) states that it “supports Congress passing legislation establishing a forward-looking federal mechanism to help ensure widespread availability of BI insurance for pandemic risks without jeopardizing the financial condition of the insurance sector or undermining state insurance consumer protection.” As noted in a recent report by Lloyd’s (2020), “COVID-19 has set in motion irreversible societal change, calling for new insurance solutions.” The importance and opportunity to address this issue now, while it is still high on everyone’s agenda, cannot be overemphasized.

Insurance Against Catastrophic and Systemic Risks

The need to prepare for future pandemics offers an opportunity to examine the role of insurance in providing protection and reducing losses from other catastrophic and systemic risks facing society today. Implementable risk management strategies will need to focus on efficiently and equitably distributing responsibility for reducing future losses and aiding the recovery process. Lowering the costs of future disasters through investments in loss reduction measures will increase the insurability of the risk.

Figure 2 depicts a schema for insuring future catastrophe losses, with the private and public sectors incentivizing or requiring mitigation measures and addressing fairness and affordability concerns.

Figure 2:
Managing Future Catastrophic Risks



Note: The size of the boxes is not necessarily proportional to the amount of coverage in each layer. Figure adapted from Kousky and Kunreuther (2018).

As depicted in the bottom layer of the middle panel of Figure 2, the property owner or commercial enterprise would be responsible for the first layer of losses through a deductible, which reduces moral hazard and creates an incentive to reduce losses. Higher deductibles would lower insurance premiums for those able to self-insure a higher portion of their losses.

The second layer of losses would be covered by private insurance with premiums reflecting risk. Banks and financial institutions could require this

coverage as a condition for a loan or mortgage. The public sector could assist those in need.

The next layer of losses would be covered through private reinsurance or other forms of risk transfer. The terms of reinsurance or other forms of risk transfer would reflect market practices and capacity constraints (Kousky & Kunreuther, 2018).

The top layer of losses would be covered by the public sector. Coverage at the federal level could involve ex ante premiums or ex post assessments to recoup some or all the public expenditures. The attachment point for public sector payments needs to be carefully determined so the private market is encouraged to bear as much risk as feasible. This would require a detailed market evaluation and ongoing adjustment over time. As shown in the right-hand and left-hand boxes in Figure 2, the public and private sectors would both need to engage in supportive activities to ensure comprehensive risk management.

Conclusion

COVID-19 has demonstrated the challenges that policymakers, insurers, businesses, and employees face when disaster assistance programs are developed after the pandemic has already started. There is now an opportunity to design and implement effective and efficient solutions to manage the financial risks of a future pandemic.

The insurance industry will be part of that solution set, whether through the continued development of ad hoc state-by-state initiatives (SQ), a private-public partnership in which the insurance industry commits its servicing capabilities (SP), or a private-public partnership drawing on both its servicing and risk-bearing capabilities (SR). Policymakers, state insurance regulators, businesses, and other stakeholders interacting with representatives from the insurance industry can assist in defining its role in providing protection against the financial consequences of future pandemics.

More importantly, we see pandemic risk as one of many potentially similar “uninsurable” risks. If policymakers and the insurance industry embrace the concept of insurability as a matter of degree, rather than a binary choice between “insurable risk” and “uninsurable risk,” stakeholders can tailor the respective roles of the private and public sectors to effectively and efficiently support businesses, nonprofits, local governments, and households to manage these risks.

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Cummins, J. David and Richard A. Derrig, eds., 1989. *Financial Models of Insurance Solvency*, Norwell, Mass.: Kluwer Academic Publishers.

Manders, John M., Therese M. Vaughan and Robert H. Myers, Jr., 1994. “Insurance Regulation in the Public Interest: Where Do We Go from Here?” *Journal of Insurance Regulation*, 12: 285.

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