OECD Working Papers on Public Governance No. 27

Managing disaster-related contingent liabilities in public finance frameworks

Catherine Gamper,
Benedikt Signer,
Luis Alton,
Murray Petrie

https://dx.doi.org/10.1787/a6e0265a-en

OECD

OECD WORKING PAPERS ON PUBLIC GOVERNANCE

No.27

Managing disaster risk related contingent liabilities in public finance frameworks

By Cathérine Gamper (OECD), Luis Alton (World Bank), Benedikt Signer (World Bank), Murray Petrie (Consultant)

JEL classification: H12, H3, H54, H63, H68, H7, H81, H84

OECD WORKING PAPERS ON PUBLIC GOVERNANCE

This series gathers together OECD working papers on the tools, institutions and practices of public governance. It includes both technical and analytical material, prepared by staff and experts in the field. Together, the papers provide valuable context and background for OECD publications on regulatory policy and governance.

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the authors.

Working Papers describe preliminary results or research in progress by the authors and are published to stimulate discussion on a broad range of issues on which the OECD works.

Comments on Working Papers are welcomed, and may be sent to either gov.contact@oecd.org or the Public Governance Directorate, OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

Authorised for publication by Rolf Alter, Director, Public Governance Directorate.

OECD Regulatory Policy Working Papers are published on
http://www.oecd.org/gov/regulatory-policy/

Applications for permission to reproduce or translate all or part of this material should be made to: OECD Publishing, rights@oecd.org or by fax 33 1 45 24 99 30.
© OECD 2017

Please cite this paper as:

Gamper, C., Alton, L., Signer, B, Petrie, M, (2017), " Managing disaster risk related contingent liabilities in public finance frameworks", *OECD Working Papers on Public Governance*, No 27, OECD Publishing, Paris.

WORKING PAPER

MANAGING DISASTER-RELATED CONTINGENT LIABILITIES

Cathérine Gamper (OECD), Benedikt Signer (World Bank), Luis Alton (World Bank), Murray Petrie (Consultant)

ABSTRACT

Natural disasters have caused, and continue to cause, a significant amount of economic costs. The costs of disasters are often, and to a large extent, shouldered by governments, especially in economies where private insurance markets are not well developed. Governments are asked to provide financing for explicit commitments made prior to a disaster, and are often under pressure to make payments for which no such commitments were made earlier. Ex-post costs to governments take the form of contingent liabilities within national budgeting and government balance sheet frameworks. Disasters can thereby cause both downside risks to government revenue as well as to expenditure. There is little evidence, and hence limited policy advice, on how disaster-related contingent liabilities are managed by governments. This paper sets out to clarify the concept of contingent liabilities and the channels through which they can impact government balance sheets, including fiscal risks. It provides a framework for identifying and quantifying disaster-related contingent liabilities with a view to inform country case studies for comparative policy analysis.

JEL Classification: H12, H3, H54, H63, H68, H7, H81, H84

Key words: Disasters, government disaster assistance, contingent liabilities, disaster risk financing

NOTE BY THE SECRETARIAT

This paper is part of the OECD High Level Risk Forum Work Program and informs the monitoring of the OECD Council Recommendation on the Governance of Critical Risks as well as the Disaster Risk Financing Recommendation. It is closely coordinated with the OECD Senior Budget Officials Network. It is part of a joint OECD-World Bank study that seeks to compare the management of disaster related contingent liabilities in OECD country contexts compared to non-OECD higher middle income country contexts, with a view to improve the availability of policy advice. The work follows a mandate that was given to the OECD by APEC in 2015 as part of the Cebu Action Plan, specifically to contribute to the objective of enhancing financial resilience to disasters in the APEC region. The results of the work will therefore inform APEC in terms of progress towards this objective.

TABLE OF CONTENTS

NOTE BY THE SECRETARIAT 6
1. INTRODUCTION 9
2. THE ECONOMIC IMPACT OF DISASTERS 11
3. THE FISCAL CONSEQUENCES OF DISASTERS 14
3.1 Determinants of the size of a disaster's fiscal impact 14
3.1.1 Indirect fiscal impacts from disasters 16
3.1.2 Upside risks 16
3.2 Country examples of fiscal impacts during past disasters 17
3.2.1 The fiscal impact of select disasters 19
4. MANAGING DISASTER-RELATED CONTINGENT LIABILITIES 21
4.1 Institutional arrangements for managing contingent liabilities and fiscal risks 22
4.2 Identification of disaster-related contingent liabilities 23
4.3 Quantification of disaster-related contingent liabilities 25
4.3.1 Direct estimation of disaster-related contingent liabilities 25
4.3.2 Estimation of disaster-related contingent liabilities through probabilistic modelling 26
4.4 Disclosure of information on disaster-related contingent liabilities 26
4.5 Integration of disaster-related contingent liabilities in overall fiscal forecasting 29
4.6 Mitigating disaster-related contingent liabilities and financing residual fiscal risk 30
4.6.1 Making provisions for remaining fiscal risk 32
References 35

Figures

Figure 3. IMPACT OF DISASTERS ON FISCAL BALANCE: SELECTED EXAMPLES 19

Boxes

Box 1. The economic impact of disasters: damages and losses 11
Box 2. Sources of disaster-related government expenditures and changes in government revenues 14
Box 3 Fiscal risks and contingent liabilities: Definitions 16
Box 4. Institutional arrangements for fiscal risk management: country examples 23
Box 5. Japan's legal frameworks that guide government commitments in disaster assistance 25
Box 6. Minimising implicit disaster-related contingent liabilities 31
Box 7. Risk transfer options for governments 33

1. INTRODUCTION[1]

Large scale catastrophic and smaller recurrent disasters[2] generate considerable economic losses. Over the past 30 years, damages from major disasters have increased significantly. In the last 10 years alone OECD and fast growing middle income countries have experienced an estimated USD 1.2 trillion in economic costs from disruptive shocks from natural risks such as storms or floods (OECD, 2014a). Single shocks have caused damages in excess of 20% of GDP, such as the recent earthquakes in New Zealand and Chile, affecting disproportionately local economies and populations.

The costs of disasters are often and to a large extent shouldered by governments, particularly where insurance coverage for these costs is limited (OECD, 2012). Governments are not only responsible for the costs related to restoring public assets and services, but are also asked to provide financing for explicit and implicit commitments made prior to a disaster and for various other needs. The cost imposed by disasters on governments (and ultimately taxpayers) are contingent liabilities or contingent revenue losses. These expenses and revenue losses arise only if a contingent event, such as a disaster, happens.

Disaster-related contingent liabilities are one type of government contingent liabilities. Other such liabilities stem for example from public pensions, state guarantees or other legal claims that might be brought to the government. The key difference that marks disaster-related contingent liabilities is the uncertainty of the intensity and the frequency of disasters occurring in any given fiscal year.

Often unclear rules on 'who pays for what' following a disaster may not only lead to delays in disaster response, but also create larger implicit contingent liabilities for the government. If not properly managed, such disaster related contingent liabilities can cause major budget volatility when they materialise. This, combined with the uncertainty when disasters strike, makes it challenging for public finance managers to plan ahead. In recent years disasters have hit some middle income and OECD countries in times of increasing public debt, making a difficult situation worse.

Financial planning for such risks helps governments shift from emergency borrowers to becoming more effective risk managers and match potential liabilities with appropriate financial resources. Japan, for example, had to rely on ad-hoc post-disaster borrowing after the 2011 Great East Japan Earthquake (Mahul et al., 2013). While ad-hoc arrangements still dominate most official approaches to meeting the costs of

[1] This paper has been shared for comments with delegates to the OECD High Level Risk Forum. It has received valuable and extensive comments from Cigdem Aslan (World Bank), Delphine Moretti (OECD), Abha Prasad (World Bank), Douglas Sutherland (OECD), Hideaki Hamada (World Bank), Dr. Charlotte Benson (Asian Development Bank) and Leigh Wolfrom (OECD). The paper benefited from extensive guidance from Stephane Jacobzone (OECD.

[2] In the remainder of this document the term "disasters" refers to disasters of natural origin, and excludes any other man-made type of disaster.

disasters, a growing number of governments, such as Mexico and New Zealand, have started to develop and implement financial protection strategies that help smooth fiscal shocks and avoid disruption of longer term economic growth and fiscal objectives.

This joint work by the OECD and the World Bank aims to improve understanding of contingent liabilities arising from natural and climate-related disaster risks and how they can be managed in public finance frameworks. This should inform countries of emerging good practices in managing disaster-related contingent liabilities and support implementation of the OECD guidance in this area.[3]

The objective of this paper is to provide the background for an evaluation framework that will help assess and document how advanced and middle income countries identify, quantify and manage the financial impacts of disasters on public finances. This will be the analytical basis for country case studies of OECD and middle income countries, and will inform the development of a country survey. Ultimately, the work should help strengthen countries' institutions and policies through policy recommendations based on identified good practices.

[3] The OECD Recommendation on the Governance of Critical Risks suggests for countries to "plan for contingent liabilities within clear public finance frameworks by enhancing efforts to minimise the impact that critical risks may have on public finances and the fiscal position of a country" (OECD, 2014b). The OECD Recommendation on Disaster Risk Financing Strategies (*forthcoming*) recommends that governments "effectively manage the financial impacts of disasters on public finances by" …"i) Evaluating the potential financial exposures of government to disaster risks…."; " ii) Developing an *ex ante* plan or plans for managing the financial impacts of disasters on public finances…."; " iii) Publicly disclosing, where permissible, that plan or plans (or portions thereof)…"; and " iv) Assessing the benefit of risk retention or risk transfer relative to *ex ante* investments in risk prevention, taking into account appropriate discount rates."

2. THE ECONOMIC IMPACT OF DISASTERS

As a first factual and very limited observation, the number of events registered as disasters in OECD and middle income countires has tended to increase over the last 30 years, although it has decreased somewhat since the middle of the last decade. It is expected that climate change will further drive the intensity and frequency of meteorological disasters, including extreme temperatures, storms and floods, in the future (Banholzer et al., 2014) but geophysical events are not subject to a specific trend. What is more significant, is that disaster related damages and losses (Box 1) have similarly been increasing, albeit with considerable year to year variation and largely as a result of increased vulnerability driven by unbalanced economic development. In the last decade OECD and MIC countries have experienced an estimated USD 1.2 trillion in damages from disasters stemming from natural hazards such as storms or earthquakes (OECD, 2014a). Figure 1 shows the increasing share of disaster losses from natural hazards suffered by fast growing middle income economies over the period 1990-2012. These economies are marked by a rapid growth of assets through urbanisation and construction of new infrastructure (World Bank 2014).

Box 1. The economic impact of disasters: damages and losses

In the literature on disasters and their economic impact, the same terms are often used to denote different things, or conversely, the same thing is denoted by different terms. This paper uses the following definitions of losses and damages when discussing the economic effects of disasters:

Damage is the replacement value of physical assets wholly or partly destroyed, built to the same standards that prevailed prior to the disaster.

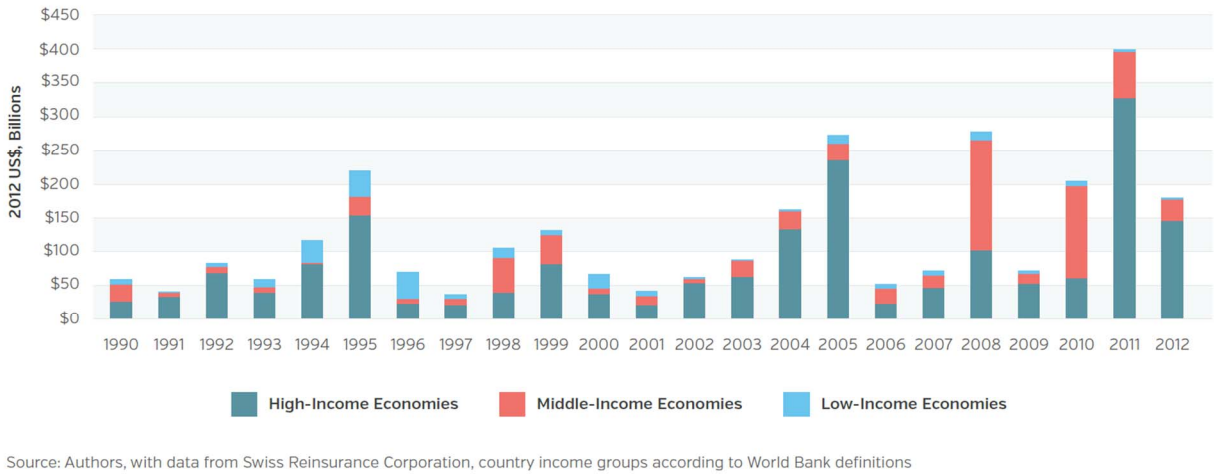
Losses are the foregone economic flows resulting from the temporary absence of the damaged assets and/or due to any other disruption of economic activity caused by the disaster.

Source: Global Facility for Disaster Reduction and Recovery, 2017

The impact of disasters on human lives, livelihoods, and infrastructure is the result of three parameters, including the interaction of natural hazards with the vulnerability and exposure of people and their assets. Disaster risk is driven by hazard, exposure and the vulnerability of that exposure.

- In the context of disasters 'hazards' refers to the geo-physical or hydro-meteorological events that have the potential to cause injury or death to the exposed people, to damage exposed assets, and to disrupt socio-economic activity. Climate change has been observed as a driver of hydro-meteorological disasters.
- 'Exposure' refers to the location of both assets and people in areas prone to any of the above described hazards.
- 'Vulnerability' is defined as "the characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard" (World Bank, 2012).

Figure 1 Direct disaster loss by income group 1990-2012



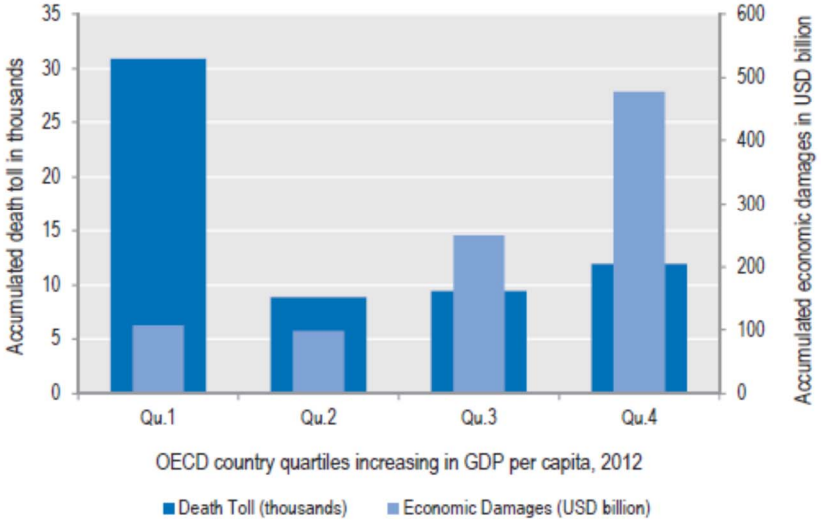
Source: World Bank, 2014, 11

The aggregate impact of disasters on economic growth is complex and depends on a number of factors, but in general, most studies find a negative relationship between the occurrence of disasters and economic growth. For example, Von Peter, von Dahlen and Saxena (2012), using data from Munich Re's NatCat Service for 2 476 major natural catastrophes since 1960, found that the average disaster leads to a fall in growth of 1 percent of GDP upon impact and a cumulative loss to GDP of 2.6 percent. In another study, Felbermayr and Gröschl (2014) found that disasters can reduce per capita GDP by up to 6.8 percent on impact. Impacts are inversely related to income. OECD countries with lower GDP per capita suffer relatively more fatalities, while countries with higher GDP per capita experience larger absolute costs in terms of destroyed assets (Figure 2). However, damages and losses are a much lower as a percentage of GDP in larger economies, reducing their relative economic impact.

While storms account for nearly 30 percent of all disaster events over the past 40 years, average damages stemming from earthquakes are more than four times higher than from storms, and average costs from droughts are around twice as high. Floods are the second most frequent source of disasters and the damages caused by floods are particularly rapidly growing in rapidly urbanizing areas.

Among OECD countries the United States, Japan and Italy have been most affected by large-scale disasters over the past 40 years, while Iceland, New Zealand and Australia are among those most affected relative to population size (OECD, 2014a). Recent disasters in smaller OECD economies have had a large economic impact: damages and losses from the Chile earthquake in 2010 were around 18 percent of GDP, and from the Christchurch earthquakes in 2010-2011 were approximately 20 percent of GDP. Within countries, the regional economic impact can be large and long-lasting in (OECD, 2014a). Hurricane Katrina for example caused an estimated USD 96 billion to USD 108 billion in economic losses, which were felt disproportionately by the impacted geographic area, its population, and related economic activities, while the impact on the national level was only 0.1 percent of GDP (OECD, 2014a). The Great East Japan Earthquake destroyed or damaged 190,000 buildings and left the surrounding areas of the Fukushima nuclear plant (around 800 km²) uninhabitable, with 23,600 hectares of farmland ruined (Ranghieri and Ishiwatari, 2014).

Figure 2 Death Toll and Economic Damages of OECD Country Quartiles, 1995-2010



Note: Does not include data on the European heat wave of 2003 due to the difficulty to determine the actual causes of death during this disaster. The figures are shown true to the event.

Source: OECD, 2014

While there is a high degree of uncertainty, several forces are driving future trends in terms of exposure to disasters. Apart from drivers related to socio-economic development (see OECD, 2014a for a detailed discussion), the frequency and severity of extreme weather events is expected to be impacted by climate change (World Bank series 'Turn Down the Heat'[4]; UNFCCC, 2012; Wolfrom and Yokoi-Arai, 2016). As a result, there is a need to refine deterministic analyses and interpretations of historical disaster events and available retrospective data, which tend to under report low frequency but high impact events. This can be done using forward-looking scenarios and probabilistic calculations that take the potential impact of climate change into account.

This paper is primarily concerned with disasters caused by adverse natural hazard events. However, many of the approaches discussed could provide a basis for looking at the contingent liabilities associated with man-made, technological, or health disasters and their fiscal impact if these materialize.

[4] http://www.worldbank.org/en/topic/climatechange/publication/turn-down-the-heat

3. THE FISCAL CONSEQUENCES OF DISASTERS

3.1 Determinants of the size of a disaster's fiscal impact

The aggregate fiscal impact of a disaster is a function of the changes in government expenditures and revenues caused by the disaster (Box 2). Expenditures made in response to disasters are referred to as government **contingent liabilities** (Box 3) which are liabilities that are contingent on the occurrence of a disaster event. Expenditures for such liabilities may cause deviations in fiscal outcomes from those that were forecast. They could lead to an increase in public debt and, depending on their size, create a fiscal risk (Box 2) to government finances, especially if governments do not make provisions to meet these possible costs (OECD, 2012).

Box 2. Sources of disaster-related government expenditures and changes in government revenues

Government expenditures following disasters can include payments for the following costs:

- Relief payments to affected populations.
- Spending for the reconstruction of damaged public infrastructure and assets, particularly in case of damage to uninsured public corporation assets.
- Cash transfers to public health facilities and to publicly-owned, or guaranteed, insurance companies to address claims obligations.
- An increase in short-term social transfers due to an economic slowdown that follows a disaster, such as health and medical support, temporary mortgage, debt or tax relief.
- Expenditure to stimulate the economy following a disaster, e.g. support to key industries or businesses and providers of critical infrastructure, capital injections or loans to public or private corporations or financial incentives for housing (re-) construction.
- Expenditures due to guarantees issued to public or private entities suffering disaster losses. The government may for example face pressure to finance the restoration of public services provided under a PPP contract if the PPP operator's assets were not covered by disaster insurance.
- Payments to sub-national levels of government faced with fiscal constraints in the aftermath of a disaster.

Disaster-related changes to government revenues can be caused by:

- Reductions in tax bases through, e.g. the negative impact disasters can have on personal and corporate income, natural resource extraction, and consumption.
- Business interruption risks to revenue collection authorities.
- Disrupted operations of public corporations (including natural resource extraction companies) that result in changes in income and production and therefore risks to royalties and dividends to government.

Source: International Monetary Fund, 2016; OECD, 2015a

The size of the government's liability in the event of a disaster, i.e. the amount of government obligations to pay for goods and services given the impact of a particular disaster depends on both **explicit** and **implicit contingent liabilities**.

Explicit contingent liabilities are payment obligations that are based on government contracts, laws, or clear policy commitments that could fall due in the event of disaster. Expenditures triggered by the destruction of public assets and infrastructure and spending due to pre-arranged commitments fall under this category. The exact value of explicit contingent liabilities depends on the value of legal and contractual obligations, which could be triggered by a disaster. The role of governments as providers and

owners of public infrastructure as set out in various government policies also influences the value of explicit contingent liabilities. In some countries, the government may also have a role in providing insurance for public or private assets which creates explicit contingent liability for any claim payments under the insurance coverage provided (OECD, 2015a).[5]

Implicit contingent liabilities are expenditures the government is expected to make in response to a disaster due to a perceived moral obligation, political pressure, or even in an attempt to stimulate growth by speeding up recovery, even though it has not entered any formal commitments to pay for them. The size of a government's implicit contingent liability could depend, among other factors, on a government's strategic outlook, or on the relative political power of key affected population groups. Unlike explicit contingent liabilities, implicit contingent liabilities tend to be challenging to identify and quantify. Although previous disasters may serve as a point of reference for the expected post-disaster government assistance, it can be difficult for governments to accurately predict the contingent liabilities arising from moral expectations and political pressure (OECD 2015a). In some countries, statutory levels of compensation provide an indicator of the expected level of compensation to be made after a disaster, but in practice these can be exceeded given the political pressures in the aftermath of a disaster. The level of insurance coverage of exposed assets partly determines the size of government contingent liabilities. For instance, insurance of public infrastructure reduces the size of the explicit contingent liabilities. If economic costs to households and business are covered by insurance, the political pressure on governments to provide economic relief may be smaller, hence reducing the government's implicit contingent liability.

The size of the liabilities also depend on a government's rate of compliance with meeting its liabilities, which means its ability and willingness to meet its ex ante commitments to shoulder specific disaster related costs. In theory, a government may be legally or contractually obliged to shoulder certain costs caused by disasters but renege on its promise to do so. This would include scenarios where governments meet their obligations in nominal terms, but finance them by inflationary money creation, thereby not meeting them in real terms.

Finally disasters can also have impacts on government revenues, especially through their negative impact on economic activity. This is usually the consequence of a decline in various tax as well as non-tax revenues, but it could also be caused by disruptions to tax-collection efforts. In principle, disasters could also lead to revenue gains, either through increased revenues following a strong economic rebound from a disaster due to reconstruction activities or through increased receipts in international aid.

Changes to the value of assets and liabilities of governments are often directly linked to changes in expenditure and revenue flows. For example, a reduction in the value of public infrastructure assets due to a disaster might be responsible for a corresponding increase in expenditure on the affected assets. While there is no doubt that the latter constitutes a fiscal impact caused by a disaster, changes in government asset values by itself might often be overlooked in accounting for the fiscal impacts of disasters, not least because many governments do not publish comprehensive balance sheets that include non-financial assets. However, it is important to take account of the effect of disasters on the balance sheet of a country in a comprehensive way, if the fiscal impacts of disasters are to be properly assessed.

[5] In many cases, government insurance schemes operate in a similar way to private insurance companies, collecting premiums to create a reserve to cover expected claims payments. In such cases, the explicit contingent liability would be any difference between the claims payments due and the level of reserves accumulated.

Box 3 Fiscal risks and contingent liabilities: Definitions

Fiscal risks describe changes in the expected fiscal outcomes as outlined in a country's annual budget or forecasting documents. Fiscal risks may have positive or negative effects on the annual budget. While governments tend to foresee and arrange for positive fiscal risks with relative accuracy, the possible negative impact of fiscal risks is often underestimated.

Governments may face a various types of fiscal risks, ranging from various shocks to macroeconomic variables to the realization of contingent liabilities, such as in the event of disasters. Other fiscal risks can include government bailouts for troubled financial institutions and state-owned enterprises and private corporations, demands for government compensation, as well as subnational governments that require financial support from the central government.

Contingent liabilities refer to (government) obligations that are triggered when a potential, but uncertain future event occurs. Contingent liabilities can cause large unexpected increases in government debt.

Contingent liabilities may be **explicit or implicit.** Explicit contingent liabilities are expenditures that might arise due to pre-arranged explicit commitments made, for example in contracts or through laws. Implicit contingent liabilities are expenditures that might arise due to moral obligations without any prior commitments or due to public expectations or political pressure on the government.

The impact of fiscal risks may be direct, e.g. in the case of foreign and domestic sovereign debt (explicit liability) or in the case of future recurrent costs of public investments (implicit liability), or **indirect**, such as in the case of state insurance schemes (explicit liability) or bank failures (implicit liability).

Source: International Monetary Fund, 2016; OECD 2015a

3.1.1 Indirect fiscal impacts from disasters

In addition to the above listed government expenditures and risks to revenues that disasters can cause, there are a number of potential indirect disaster-related fiscal impacts, which are more difficult to observe, but no less important to consider. These include the possibility of deterioration in the terms at which the government can in the short term refinance public debt or raise additional debt. For example, a recent report by Standard & Poor's Rating Services (2015a, b) estimates that a 1-in-250 year cyclone could lead to ratings downgrade of 4 or more notches in many countries. A 4-notch credit rating downgrade is likely to lead to an increase in borrowing costs of 20 -40 basis points or more (Hanusch et al., 2016). Another channel through which disasters might impact public finances is through the impact of a disaster on domestic equity markets that may cause a loss of value of public financial asset portfolios and through a reduction in the net worth of government-owned insurance companies or banks exposed to the disaster. Finally, indirect fiscal impact may also arise from policy or economic responses following a large disaster, e.g. a cut in interest rates by the central bank to stimulate economic recovery, or depreciation of the currency due to the economic impact.[6] If a disaster leads to a depreciation of a country's exchange rate due to a deterioration of its current account positions, public debt levels could increase significantly in local currency terms in countries, where exposure to foreign currency denominated debt is high.

3.1.2 Upside risks

Finally, when assessing fiscal risks posed by disasters it is important to keep in mind that certain disaster risk management measures may present opportunities to raise additional revenues. Additional revenues, albeit earmarked, may be obtained through inflow of financial assistance, as well as through

[6] See IMF (2016) for discussion of common policy and economic responses to major disasters or other contingent liabilities.

technical assistance, which may reduce the government's reconstruction liabilities. Insurance payments may also reduce the government's liability, as they cover at least parts of the spending demands arising from disaster recovery needs.

3.2 Country examples of fiscal impacts during past disasters

Despite the considerable interest in and research on disasters and their social and economic impact, data on the fiscal costs of past disasters is limited. This is for a number of reasons:

- Accounting systems do not directly record spending related to disasters. Such spending may be undertaken by a wide range of entities, across different functions, programs, projects and outputs. While some data may be available on spending by a particular ministry or disaster fund on a particular disaster response, recording total disaster-related expenditures requires ad-hoc exercises since it is not generated by standard budget classification and accounting systems.
- Some expenditures, such as emergency relief and early recovery activities, are most often financed by transferring funds from other budget heads that are unspent or where a decision is taken to defer spending in favour of disaster response e.g. deferral of maintenance expenditures, or of new capital spending, or, in countries receiving development assistance, diversion of funds from existing projects to disaster relief. Often, these transfers from other budget lines are poorly captured in reporting systems, particularly when funds are rededicated within the same budget line (e.g. in operation and maintenance budgets).
- Expenditures are often undertaken by all levels of government (central, regional and local), and there is typically a lack of consolidated data on the total (general government) fiscal impact.

Partial estimates of the fiscal costs from a disaster are often made using information and data from the following sources:

- Expenditures reported from a general annual budget contingency appropriation, where such spending is reported against the specific disaster-related program or activity or is tagged to disaster response.
- Expenditures reported from a dedicated disaster contingency appropriation or a dedicated disaster fund.
- Supplementary budget or budgets.
- Expenditures financed from emergency spending authority.[7]
- An earmarked disaster recovery line in a capital or development budget.
- Identifiable projects for the reconstruction of public infrastructure.

[7] For instance, in New Zealand the Public Finance Act authorizes expenditure on a national emergency without Parliamentary appropriation, with the spending subsequently authorized in an Appropriation Act.

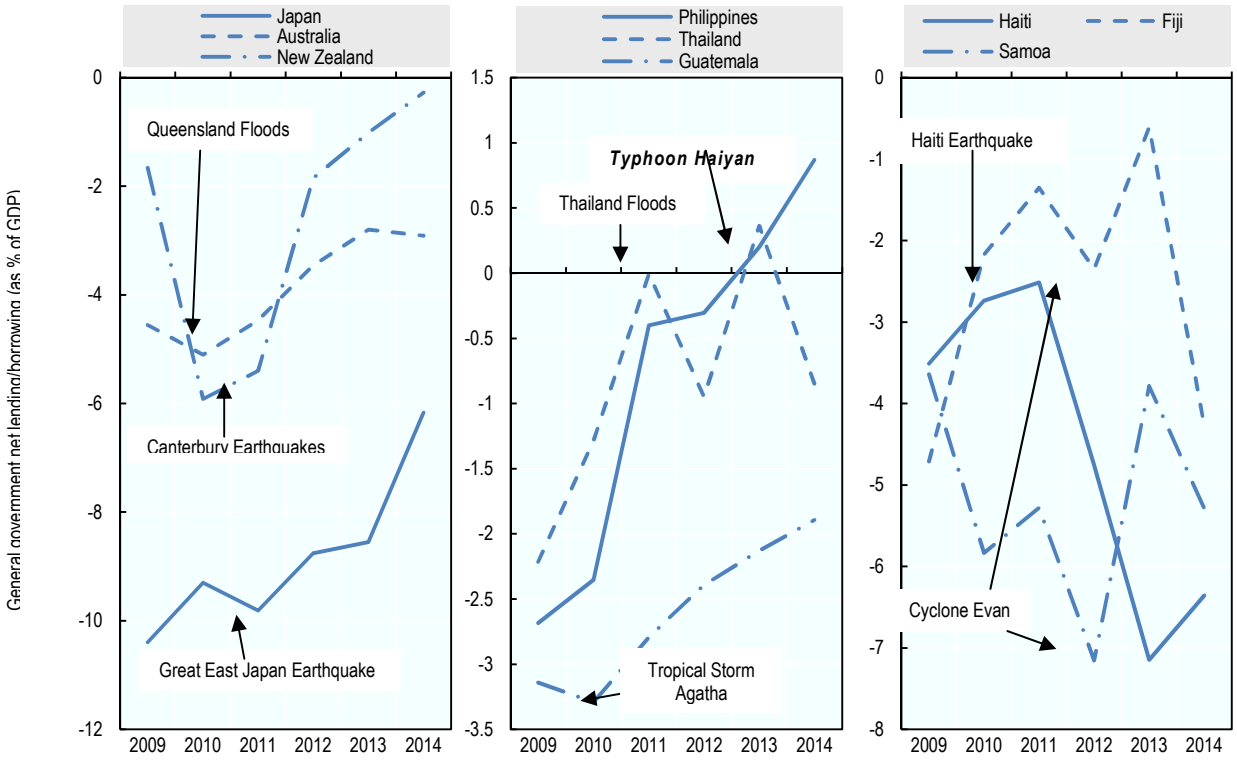
- Transfers to sub-national governments to meet the cost of disaster recovery and rehabilitation that are identifiable in separate budget lines.

A recent report on contingent liability realisations in 80 advanced and emerging countries identified 65 disasters that occurred during the period 1990-2014 and estimated the fiscal costs of 29 of these (International Monetary Fund, 2016).[8] On average, the fiscal cost of these events was 1.6 percent of GDP. The maximum fiscal cost identified was 6 percent of GDP. Compared to the fiscal shocks emanating from the realization of other contingent liabilities (e.g., those associated with the financial sector or SOEs), these results suggest that disaster related fiscal shocks, while relatively frequent, are modest. Given the particular sample on which these figures are based, it is likely that they understate the fiscal risk that disasters pose to countries that are strongly exposed to material disaster risks across a large percentage of their territory, such as Small Island Developing States that in many cases are heavily exposed to disasters, but also certain OECD countries, such as Chile, where the 2010 earthquake off the coast of central Chile cost an estimated 12-15 percent of GDP (Government of Chile, 2013). On the other hand, the quoted figures are likely to overstate the size of the average fiscal shock from disasters faced by larger developed countries, not least because the study only includes events with fiscal impacts larger than 1 percent of GDP.

Figure 3 shows the negative impact of selected recent disasters on fiscal balance (in general government net lending/borrowing as percent of GDP), illustrating that the fiscal impact of a disaster depends on the type of hazard, the size and use of the impacted territory and the provisions made for contingent liabilities. While in the case of Haiti, where the whole country was affected by the impact of the 2010 earthquake, the fiscal effects of which were met mostly on an ad-hoc basis *ex post* of the disaster (with a strong reliance on international aid), the fiscal impact of the Queensland Floods in Australia and the Canterbury Earthquakes in New Zealand, where the disasters were more localized, was much smaller, with *ex ante* provisions, such as dedicated risk funds, made.

[8] Note: The data set covered 34 advanced economies and 46 emerging economies. The coverage of the data depended on the country and year, but in general data for the 1990s was for central government, while for the 2000s it was general government (for a number of mainly advanced economies).

Figure 3. Impact of disasters on fiscal balance: selected examples



Source: International Monetary Fund - World Economic Outlook Database, 2016

3.2.1 The fiscal impact of select disasters

Japan

The Great East Japan Earthquake (GEJE), followed by the tsunami and the nuclear power accident, which struck the east coast of Japan in March 2011 imposed an exceptional cost on Japan's central government. The triple disaster caused an estimated USD 300 billion in total economic costs, out of which USD 210 billion were estimated to be damages. Quarterly GDP declined by 2.1 percent in the second quarter of 2011. The total central government funding for the event represented 4 percent of Japan's 2010 GDP, and 20.7 percent of the initial general account budget. Funding was allocated to disaster relief, recovery, and reconstruction initially through the general contingency budgets for fiscal years 2010 and 2011. Subsequent funding was allocated through three supplementary budgets in the 2011 fiscal year, with one relying largely on the issuing of bonds, as well as one financed primarily via cuts in previously authorized expenditure and one funded by budget surplus from the previous fiscal year. In the 2012 fiscal year additional financing was appropriated, with the majority obtained through the issuing of reconstruction bonds (Sato and Boudreau, 2014; Mahul et al., 2013). In addition to expenditure impacts, the government also immediately enacted tax relief measures for affected populations and industries, and built tax incentives into its reconstruction policy, which were sometimes complemented by subsidies.

New Zealand

The cumulative impact of two earthquakes that struck New Zealand in 2010 and 2011 is another recent example of the significant fiscal impact major disasters can have. The economic costs suffered from these earthquakes have been estimated to exceed 20 percent of New Zealand's annual GDP. Similar to the GEJE, the government's budget was impacted simultaneously on the expenditure side to pay for damages to assets and to shoulder other liabilities, but also on the revenue side due to foregone tax receipts and foregone revenues from the government's own operating services. In the year to June 30, the net fiscal outlays related to the earthquake were USD 6.3 billion.[9]

United States

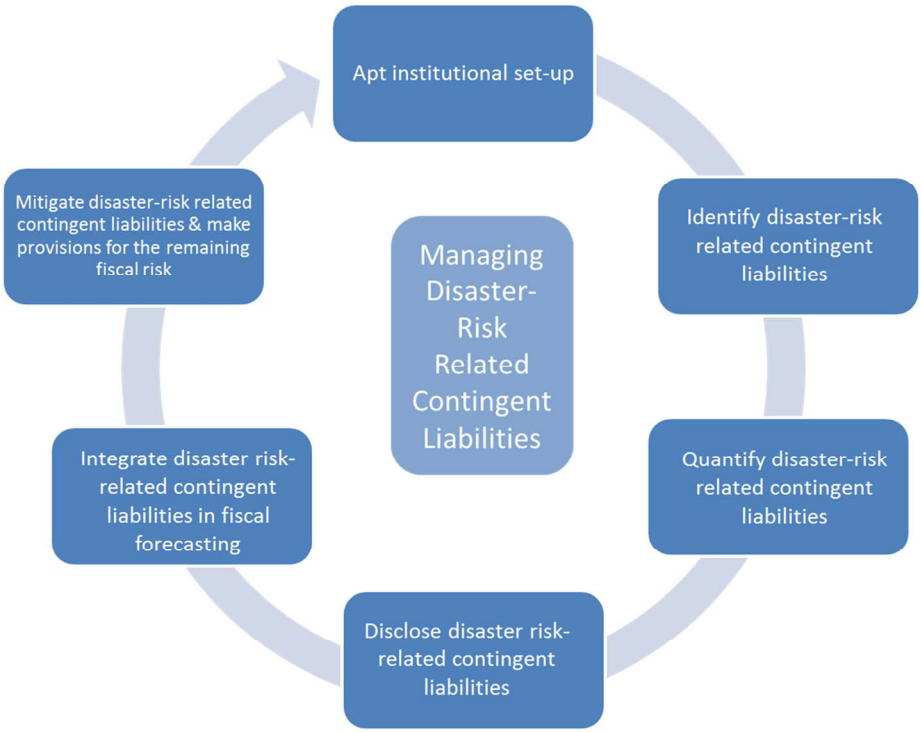
In the United States budget analyses have shown that historically the federal government covered on average a third of total economic losses following disasters. The United States Government published estimates of the cost to the federal government from extreme weather and fire through compiling data across a range of government programs as part of an exercise to assess the federal budget's exposure to climate risk. Over the last decade, the Federal government has incurred over USD 357 billion in direct costs due to extreme weather and fire alone, including for domestic disaster response and relief (USD 205 billion), flood insurance (USD 23 billion), crop insurance (USD 67 billion), wildland fire management (USD 34 billion), and maintenance and repairs to Federal facilities and Federally managed lands, infrastructure, and waterways (USD 28 billion). These estimates exclude a number of categories of spending, and potentially significantly understate actual direct costs. The United States Office of Management and Budget (2016) has recognised that a linear extrapolation of government fiscal costs in line with total economic losses may underestimate the true exposure of the Federal budget given that a major event or series of major events could, for example, affect the solvency of an industry, municipality or State (United States Office of Management and Budget, 2016). An estimated additional USD 16 billion in tax expenditures were incurred between 2006 and 2015 for tax relief associated with the 2005 Gulf Coast hurricanes, according to an estimate by the Congressional Budget Office (US Office of Management and Budget, 2016). There is also some evidence that federal spending is accounting for an increasing share of losses (23 percent for Hurricane Hugo in 1989, 50 percent for Hurricane Katrina in 2005, 69 percent for Hurricane Ike and over 80 percent for Hurricane Sandy in 2012) (Kunreuther and Michel-Kerjan, 2013).

[9] Source: www.treasury.govt.nz/financialstatements

4. MANAGING DISASTER-RELATED CONTINGENT LIABILITIES

A good understanding of a country's risk exposure and the institutional set up for managing fiscal risks are the first steps to evaluate a government's approach to managing disaster-related contingent liabilities. Country-risk assessments are a useful starting point for understanding risk exposure and may be complemented by a more detailed analysis of the potential financial impacts of disasters. Understanding the legal and administrative framework, which guides the allocation of roles and responsibilities in fiscal risk management and determines when a government is expected to bear the cost of disasters, are key steps for identifying the disaster-related contingent liabilities a government may face. To effectively manage contingent liabilities, governments do not only identify these liabilities, but should also quantify them. Once disaster related fiscal risks are identified, governments should disclose them according to clear criteria and integrate them in fiscal risk forecasting.

Figure 4. Managing disaster-risk related contingent liabilities



The identification and quantification of fiscal risks creates the basis for governments to control the size of disaster-related contingent liabilities and implement efficient strategies to manage potential shocks to public finances and avoid costly ad-hoc budget shifts.

Various instruments and approaches can be used to control the size of contingent liabilities and the remaining fiscal risk. Clarifying risk liability and deciding ceilings on government contingent liabilities are examples of instruments for controlling implicit and explicit disaster-related contingent liabilities. To meet the residual contingent liabilities that remain after implicit contingent liabilities have been made explicit and explicit contingent liabilities have been capped, governments can choose from a range of *ex ante* and *ex post* risk transfer and risk financing instruments. *Ex ante* risk financing instruments, such as dedicated reserve funds and dedicated budget lines, contingent credit facilities, insurance and catastrophe bonds, are

increasingly used to meet disaster-related contingent liabilities. In countries, where disaster risks are relatively small compared to the government's risk bearing capacity, *ex post* risk financing instruments, such as ad-hoc budget reallocations, tax increases and debt financing or borrowing might be adequate alternatives at lower opportunity costs prior to the disaster, but higher opportunity costs once disaster has struck. In some cases, international aid may also be an option to meet the cost of disaster-related contingent liabilities.

Aside from disaster risk financing and transfer instruments, governments limit their potential contingent liabilities *ex ante,* by investing in adequate risk management capacities, organisational as well as physical risk reduction measures.

4.1 Institutional arrangements for managing contingent liabilities and fiscal risks

A good understanding of the institutional set up for managing fiscal risks is the first step to evaluating how governments manage disaster-related contingent liabilities. Broadly speaking, governments can adopt two different institutional approaches to managing fiscal risks: Fiscal risk management can be decentralized across ministries and government agencies or centralized in one dedicated unit. Finance ministries tend to play a key role and typically are responsible for fiscal forecasting and analysis, as well as in ensuring an effective approach to the fiscal management of disaster risk (OECD 2012; Ülgentürk et al., 2016).

Aside from macroeconomic risks, the level of centralization has traditionally been limited, as pro-active fiscal risk management has evolved from the bottom up. In some countries, such as Australia and New Zealand, line ministries have significant responsibilities for fiscal risk management in their own spheres of operation. This generally takes place in the context of a clear allocation of roles and responsibilities as well as arrangements for monitoring and accountability such as accounting, reporting, internal control, and external audit. Where financial management is decentralised, line ministries may be responsible for maintaining a register of the explicit contingent liabilities they have taken on or to which they are exposed. They may also have responsibilities with respect to the appraisal of risks in public investment projects, and the monitoring of extra-budgetary funds and public corporations in their sector. Even in centralized systems, such as the United Kingdom and South Africa, line ministries and agencies may be responsible and accountable for managing risks within their control, such as operational risks like business continuity interruptions due to disasters[10] (Box 3). The links of fiscal risks to fiscal forecasting, fiscal strategy, and the budget process, as well as the need, at least in principle, to take into account interactions between different sources of risk, suggest that some degree of centralization in the central fiscal authority is desirable.

Exposure to disaster-related fiscal risks is not always explicitly considered by the different units in charge of fiscal risk management. In some countries, including Colombia, Panama, and Peru, risks from disasters are explicitly included in the mandate of dedicated fiscal risk management units, which are anchored in their ministries of finance (World Bank, forthcoming).

[10] In an assessment in 2008, the IMF concluded that the degree of decentralization of fiscal risk management functions to line ministries seemed to be associated with a higher degree of institutional development. Higher capacity and the development of accounting, reporting, internal control and external audit functions provide more confidence in a decentralised system. But countries also vary in the degree of centralization of PFM in a way that also reflects historical approaches to centralised versus decentralised systems, irrespective of the level of development.

When evaluating the institutional arrangements for managing disaster-related contingent liabilities it is important to identify where the information on such liabilities is produced, where it is collated and who has the responsibility for acting on this information.

Box 4. Institutional arrangements for fiscal risk management: country examples

The **New Zealand** Treasury has ultimate authority and control over borrowing, contracting obligations and assessing fiscal risk. However, individual agencies are primarily responsible for monitoring and provisioning for contingent liabilities and various risks within their functions. The Treasury publishes a regular statement on managing fiscal risks. All decisions to take on explicit fiscal risks are subject to parliamentary approval.

Australia operates a decentralized model, with agencies responsible for managing and reporting on risks through their annual reports and for contributions to a Fiscal Risk Statement that is published as part of the budget.

The **United Kingdom** has established a fiscal risk group within HM Treasury to identify and monitor fiscal risks. The group is chaired by the Treasury Chief Economist and comprised of senior treasury officials from various departments (including the tax department, spending areas, international, and financial stability department). It produces a dashboard of fiscal risks, with estimates of total exposure and rankings using the traffic light system. The U.K. Office of Budget Responsibility is also preparing to publish an in-depth fiscal risk report every two years, in addition to its regular semi-annual reporting on risks around the medium-term forecast.

South Africa has also established a fiscal risk committee with a mandate to identify the major sources of fiscal risk and quantify them as far as is possible, monitor risks and propose mitigating measures, and report on risks both for internal purposes and to the public. The committee meets quarterly and incorporates a wide range of actors from within the National Treasury that are required to report on their area of expertise. It is supported by a secretariat in the Fiscal Policy Department of the Treasury.

The **United States** has recently created an enterprise risk management office, headed by a chief risk officer within the Treasury Department, and is considering establishing similar risk management efforts in other agencies.

Source: International Monetary Fund, 2016

4.2 Identification of disaster-related contingent liabilities

Identification of disaster-related contingent liabilities requires the identification of both explicit and, to the extent possible, implicit liabilities.

To identify explicit contingent liabilities arising from disasters, it is necessary to understand a country's risk exposure and to assess the current legal and policy frameworks to determine the government's obligations to shoulder the costs caused by disasters.

Assessing the socio-economic exposure to disaster risks across a country's territory is the basis for understanding a country's potential financial exposure and potential contingent liabilities. The effects of a major earthquake in a densely populated area would, for example, be very different from the effects it would have if the epicentre were in a scarcely populated region, where little economic activity and infrastructure is located (OECD 2012). Depending on the territory and economic sectors, a government's contingent liabilities could vary significantly. To draw a complete picture, various tools are available, ranging from the forward-looking analysis of past disaster data to more structured hazard mapping and probabilistic prediction models, as well as vulnerability analyses of exposed population and assets.

The legal framework, which includes laws, regulations, and contractual obligations[11] with external entities, provides the basis for understanding when the government is expected to bear the cost of disasters across a country. In addition, any relevant announced government policies should be assessed if they are not, or not yet, reflected in legal obligations.

Laws, regulations and contracts that determine explicit contingent liabilities are those that:

- Define the legal responsibility of the central government to finance post-disaster response and recovery, and cost-sharing arrangements between the central and subnational governments.
- Define the legal responsibility of the central government for public asset reconstruction and maintenance as well as the explicit liability of the government with respect to any private assets. Where legal requirements related to the insurance of public assets exist, this assessment should analyse the government's exposure to uninsured losses (including co-insurance/deductibles), and consider the level of compliance with the legal requirements.
- Establish the legal liability of the central government for assets owned by regional, local, or municipal governments and for losses incurred by those governments as well as historical experience in this regard.
- Establish government guarantees for disaster losses incurred by public corporations and public private partnerships.

Implicit contingent liabilities can be identified from the following potential sources:

- Any established practices that may be considered de facto policies and point to possible or likely implicit contingent liabilities, e.g. financial assistance or compensation provided in a recent disaster that went beyond existing obligations. These practices may trigger a reliance of external actors on the government as an insurer of last resort.
- Any informal or implied indications of fiscal support in government statements.
- Any informal or implied indications of fiscal support in interactions between individual ministers, ministries or agencies and third parties e.g. 'letters of comfort' to third parties with respect to a public corporation, a sub-national government, or a PPP partner that suggest the government is well-disposed towards, generally supportive of, or in favour of an activity, project, or entity. These might become contingent liabilities if, for example, such an entity suffered losses in a disaster that impaired its ability to service its debt or deliver important services.
- Strong media coverage in the immediate aftermath of a disaster, which may contribute to an increase in implicit contingent liabilities, as public compassion will likely increase as knowledge about the magnitude of the disaster is spread and reiterated (Kunreuther and Michel-Kerjan, 2013).

Any elements of the above that limit or off-set the gross fiscal impact of the exposures also need to be identified, such as ceilings on coverage or compulsory insurance of public assets such as government-owned public corporations or sub-national governments.

[11] Contracts refer to those made with non-government organisations providing services to the government, and with entities providing infrastructure and other services under public private partnership contracts.

Box 5 provides an example of the sources that help identify disaster-related contingent liabilities of the government of Japan.

Box 5. Japan's legal frameworks that guide government commitments in disaster assistance

In Japan, a number of laws recognize the Government's legal or explicit commitment for supporting disaster response, reconstruction of public and certain private assets, and social and economic restoration:

- *Disaster Relief Act (1947)*, which provides for disaster relief and welfare support (including repair of private housing, cash transfers and/or loans); establishes subsidisation of local governments' measures.
- *Disaster Countermeasures Act (1961)*, sets out central and local governments' responsibilities for Disaster Risk Management, and defines fiscal mechanisms for disaster response, e.g. subsidy, tax and debt measures.
- Other laws such as the *Act on Special Financial Support to Deal with Extremely Severe Disasters (1962)* and the *Natural Disaster Victims Relief Law (1998)* further extend the scope of the government's financial responsibility. The latter law was amended following the GEJE with the central government's responsibility for disaster relief – shared with local governments – increased from 50% to 80%.
- A series of laws provide for government support to certain lines of insurance (earthquake, agricultural, fisheries, fishing boat, and forest) and establish a contingent liability of central government to pay a portion of reinsurance pay-outs under these schemes. For example, in the case of earthquake insurance, the Japanese government is responsible for a specific share of the losses covered by the Japan Earthquake Reinsurance (JER). The share of losses borne by the government increases with the amount of overall losses and is established on a periodic basis based on the capacity of the insurance sector to cover earthquake losses.

Underpinning and potentially expanding these explicit contingent liabilities are implicit expectations of society, which can result in extraordinary fiscal costs, as seen in the aftermath of the Great East Japan Earthquake. The Government is expected to not only reconstruct public assets, but to also restore social and economic well-being following a major disaster.

Source: Sato and Boudreau, 2014

4.3 Quantification of disaster-related contingent liabilities

To effectively manage disaster risk-related contingent liabilities it is useful to not only identify the government's contingent liabilities, but to try quantifying or estimating their potential size. There are two potential approaches to estimating the size of potential government contingent liabilities of disasters: (i) direct estimation and (ii) estimation through probabilistic modelling.

4.3.1 Direct estimation of disaster-related contingent liabilities

Historical data on direct government expenditures in response to past disasters can be a first step to providing an estimate of the probability of future loss and the expected size of future fiscal costs. The longer the historical data and the larger the volume of coverage the more reliable the estimate is likely to be. In countries with a dedicated disaster risk or catastrophe fund recent calls on the contingency appropriation are a useful source of information for the estimation of the size of potential liabilities. Another useful source of information could be that of a potentially existing flood insurance program or a credit guarantee program for small scale farmers that includes a disaster cover and which may have been operating for a sufficient amount of time for there to be a solid record of annual claims. Budget classifications, e.g. along the lines of the Classification of the Functions of Government (COFOG)

categories, which includes budget categories, such as civil defence and housing and community amenities, can be useful tools for identifying potential costs (OECD 2011), although expenditures for disasters in those budget categories may not always be made explicit.

The government of Colombia, for example estimated the value of exposed public property and of specific private property to determine the magnitude of disaster-related contingent liabilities. Following a review of past disasters it included uninsured buildings of the poorest two social groups as a government responsibility. Estimated losses associated with public properties were defined as the government's explicit contingent liabilities while estimated losses associated with private properties for which the government chose to compensate losses were defined as the implicit contingent liabilities for the government (Colombia Ministry of Finance and Public Credit, 2011).

In cases where quantification is difficult, disaster related fiscal risks may be classified into categories such as probable, possible and remote, based on judgments about their likelihood (International Monetary Fund 2016). This could be combined with broad estimates about the potential significance of the contingency, which is the probability multiplied by the estimated disaster exposure, to categorise the arising fiscal risks as minimal, small, moderate or major risks. While this is inevitably crude, given the level of uncertainty, it may help to focus attention on areas of greater potential risk. In Australia, for example, the annual Statement of Risks published with the budget each year contains a category of contingent liabilities described as 'significant but remote'.[12]

4.3.2 Estimation of disaster-related contingent liabilities through probabilistic modelling

In the absence of historical data on disaster expenditure or where available data is insufficient to estimate the probable occurrence and related fiscal costs of a disaster, probabilistic modelling can be a good complementary method to estimate the government's potential exposure to disaster costs (contingent liabilities). It is also helpful to have estimates of the probability of more extreme loss events that may not have occurred yet in the past when deciding whether to take on new contingent obligations, or when analysing, communicating and managing the potential impact of existing exposures.

Increasingly, probabilistic catastrophe risk models, such as Hazus in the United States[13] or the CatSim Model developed by the International Institute for Applied Systems Analysis (IIASA)[14], are used to inform financial decision making with a better understanding of their potential disaster losses. Probabilistic disaster risk assessments can provide the required information for governments to estimate the total size of contingent liabilities for given disaster scenarios or return periods by providing estimates of the potential damage to government-owned buildings and infrastructure and by providing estimates of the potential damage to privately-owned assets, which can be used to derive an estimate of the potential cost of compensation and financial assistance to individuals and business facing damages and losses. Where probabilities are known with reasonable confidence, this approach can be incorporated into cost-benefit analyses of different financial instruments that can be used to prepare for potential fiscal shocks arising from disasters.

4.4 Disclosure of information on disaster-related contingent liabilities

The identification and disclosure of contingent liabilities are mutually supporting activities. While identification is a pre-requisite for disclosure, the scrutiny that comes with disclosure creates pressure to

[12] http://www.budget.gov.au/2016-17/content/bp1/html/bp1_bs8-05.htm

[13] https://www.fema.gov/hazus

[14] http://www.iiasa.ac.at/web/home/research/researchPrograms/RISK/CATSIM.en.html

ensure that risks are identified, estimated, and managed. It also helps to unlock additional information from parties outside the central agencies and perhaps outside government that may help identify (and quantify) fiscal risks, including contingent liabilities from disasters (International Monetary Fund, 2009). Disclosure also promotes earlier and smoother policy responses, may increase confidence among stakeholders in the quality of fiscal management, reduces uncertainty for investors and taxpayers and may improve access to international capital markets (International Monetary Fund, 2008). In a similar manner, publishing the government's strategy for managing (disaster-related) contingent liabilities profits from the scrutiny that comes with publication and provides an incentive to maximise its use.

There is a range of approaches that governments can take to try to ensure that information on the existence of contingent liabilities is systematically captured, reported, and centralised. In specific cases clearly defined exemptions to disclosure may be required, for example to minimize moral hazard or to avoid negative economic side effects or disadvantage the country in negotiations. Reporting on implicit contingent liabilities might be inappropriate, if it creates a sense of an unconditional guarantee of post-disaster assistance.

Disclosure can take place through mechanisms for incorporating the potential fiscal impact of disaster-related contingent liabilities into budgeting and fiscal reporting, and finally into an overall fiscal risk management strategy. These mechanisms apply both to individual government entities, and to central government as a whole. The more important mechanisms for disclosure include:

- The annual budget call circular may require line ministries to provide information on contingent liabilities, for internal monitoring purposes and possibly for publication in annual budget documents.

- Ministry of finance documentation including the medium term fiscal framework, fiscal risk reports, or standalone reports on contingent liabilities.

- Regulations such as requirements to report contingent liabilities to the ministry of finance.

- The public financial management law or regulations may assign responsibility for quantifying, collating, monitoring and/or reporting of information on contingent liabilities to a centralised entity, e.g. to a debt management office for debt guarantees; to a specialised unit for independent assessment and quantification of contingent liabilities; to a fiscal risk unit for all contingent liabilities.

- A fiscal responsibility law may require regular public disclosure of contingent liabilities (possibly alongside other fiscal risks).

Many countries, including a majority of OECD countries, report on various contingent liabilities and commitments in their budgeting and fiscal reporting, but disaster-related contingent liabilities are not always featured (OECD 2016). A growing number of countries also prepare a dedicated fiscal risk report. For instance, in October 2015 the UK Parliament approved a revised Charter for Budget Responsibility that requires the UK Office for Budget Responsibility to produce a fiscal risks report at least once every two years and the Government to respond to it formally within a year of publication.

Compiling the information required for management and disclosure of contingent liabilities can represent a considerable practical challenge. Many countries lack consolidated reliable information on their total public assets. Guarantees and other explicit contingent liabilities are poorly documented and in some instances, may not be documented at all. Information on explicit contingent liabilities will generally be

held by individual government departments and agencies, and centralisation of this information is required to compile a register of, and to report contingent liabilities across government.

The IMF Fiscal Transparency Code sets out an evaluative framework for disclosure and management of public finances, including the potential fiscal exposure to disasters (International Monetary Fund, 2015). Table 1 shows how such an evaluation can be conducted. The rating 'not met' is applied when practices fall short of the basic practice. The OECD principle 9 of the OECD's Principles of Budgetary Governance (OECD, 2015b) similarly recommends identifying, assessing and managing prudently longer-term sustainability and other fiscal risks, through:

- applying mechanisms to promote the resilience of budgetary plans and to mitigate the potential impact of fiscal risks, and thereby promoting a stable development of public finances;
- clearly identifying, classifying by type, explaining and, as far as possible, quantifying fiscal risks, including contingent liabilities, so as to inform consideration and debate about the appropriate fiscal policy course adopted in the budget;
- making explicit the mechanisms for managing these risks and reporting in the context of the annual budget;
- publishing a report on long-term sustainability of the public finances, regularly enough to make an effective contribution to public and political discussion on this subject, with the presentation and consideration of its policy messages – both near-term and longer-term – in the budgetary context.

Table 1 Evaluation OF countries' level of quantification and disclosure of fiscal risks from disasters

Practice objective	Basic Achievement	Good Achievement	Advanced Achievement
The potential fiscal exposure to disasters are analysed, disclosed, and managed.	✓ The govt. identifies and discusses the main fiscal risks from disasters in qualitative terms.	✓ The govt. identifies and discusses the main fiscal risks from disasters. ✓ The govt. classifies them by type, explaining and, as far as possible, quantifying them on the basis of historical data. ✓ The govt. applies mechanisms to promote the resilience of budgetary plans.	✓ The govt. clearly identifies and discusses the main fiscal risks from disasters. ✓ The govt. classifies them by type, explaining and, as far as possible, quantifying contingent liabilities on the basis of forward-looking analysis of historical data complemented by disaster risk modelling capturing longer time period. ✓ The govt. applies mechanisms to promote the resilience of budgetary plans and to mitigate the potential impact of disaster risk-related contingent liabilities. ✓ The govt. makes the mechanisms for managing these risks explicit and reports in the context of the annual budget and/ or according to a published fiscal policy strategy.

Source: Author's compilation from information in International Monetary Fund, 2015b; OECD, 2015b

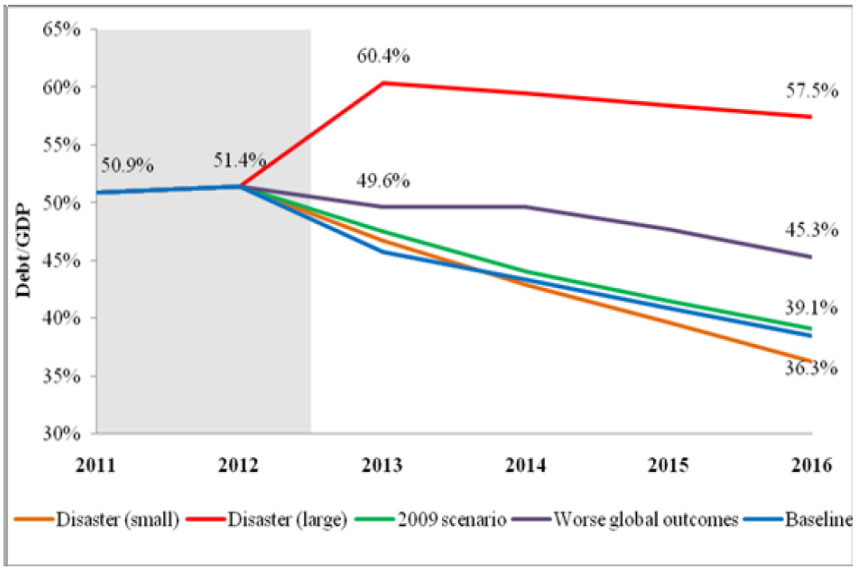
4.5 Integration of disaster-related contingent liabilities in overall fiscal forecasting

To ensure that the identified and quantified disaster-related contingent liabilities are considered in fiscal policy making, their potential impact should be incorporated into fiscal forecasts. There are a number of approaches for this.

The simplest method is to analyse the sensitivity of the current forecast path of public debt or the fiscal deficit to a contingent liability shock, for example, an assumed shock to the public finances of x percent of GDP from a disaster (OECD, 2014c). The International Monetary Fund has in the past used a standard sensitivity analysis of public debt sustainability of member countries over a five year period to selected shocks, one of which was the realisation of undefined contingent liabilities totalling 10 percent of GDP. The size of a disaster-related shock could be varied to assess the sensitivity of public finances to shocks of different magnitudes, such as 1%, 5% or 10% of GDP.

For example, the 2013 Fiscal Risk Statement published by the Philippines included a debt sustainability analysis that incorporated scenario analyses such as the occurrence of large disasters (see Figure 5).[15]

Figure 5 Philippines National Government Debt to GDP Scenario Analysis



Source: Philippines Fiscal Risks Report, 2013

The 2015-2017 Multiannual Macroeconomic Framework in Peru considered the macroeconomic and fiscal consequences arising from a severe El Nino episode, suggesting that the debt and deficit would increase slightly compared to the baseline (International Monetary Fund, 2015).

Sensitivity analysis has the advantages of methodological simplicity, limited data requirements, and ease of communicating the results through tables or fan charts. It is commonly used to illustrate the sensitivity of public finances to small changes in macroeconomic parameters (e.g. GDP, interest rates,

[15] See http://www.dbm.gov.ph/wp-content/uploads/DBCC_MATTERS/FiscalRiskStatement/FRS_2013.pdf

etc.), taken one at a time, or, when combined in plausible combinations, in alternative macroeconomic scenarios.

However, sensitivity and scenario analyses also have a number of shortcomings, amongst the most serious, in the context of exposure to the risk of a disaster shock, being the lack of data on the probability of the shock occurring, and the limited interaction between shocks. Much like other fiscal risks, a major disaster can cause an economic slowdown exacerbating the initial shock to public finances, which can potentially trigger further explicit and implicit contingent liabilities.

In a recent detailed survey and analysis of contingent liability realisations of all types, the IMF concluded that most fiscal risk scenario and sensitivity analyses in member countries tend to explore only modest-sized shocks and do not consider complexities in the impact on revenues and expenditures (International Monetary Fund, 2016). In response it has put forward a new fiscal stress test methodology intended to analyse the impact of very large shocks. The stress scenario is forward looking, rather than being based only on past experience. One of its key elements is the range and likelihood of both explicit and implicit contingent liabilities, and their interaction with large macroeconomic shocks. Disasters are one source in the contingent liability component of the stress test but, especially for advanced economies, not the largest. The framework, however, can incorporate the scenario of a very large disaster occurring during a period of an economic shock already playing out, in turn triggering both explicit and implicit contingent liabilities. An example of such a scenario is the Great East Japan Earthquake which, according to the Japan Cabinet Office, was a 'crisis in the midst of a crisis' for the Japanese economy and its public finances. A very large disaster, it occurred during a period of prolonged economic under-performance and when public debt levels were already very high, forcing the government to incur additional debts and increase taxation levels in an already tense fiscal environment (Sato and Boudreau, 2014).

4.6 Mitigating disaster-related contingent liabilities and financing residual fiscal risk

To mitigate the previously identified, quantified and disclosed disaster-related fiscal risks governments need to control and ideally reduce the size of contingent liabilities and decide how to provision for the residual risk.

A number of countries have centralised controls over granting government guarantees and other forms of contingent fiscal support, such as indemnities and warranties, which are all explicit contingent liabilities. Depending on the situation in individual countries, this may mean requiring the prior approval of the Minister of Finance, the Cabinet, or the Legislature. Some countries, e.g. Australia, also control the writing of letters of comfort (implicit contingent liabilities). In addition, some countries (e.g. South Africa) have a well-articulated policy framework regulating the justification, design, analysis, and approval of all forms of contingent fiscal support. The intention here is to integrate decisions over contingent fiscal support with the annual budget cycle, as far as possible, and with analysis of sectoral policies and budgets, so that such proposals are assessed against alternative instruments and programs with similar objectives, and against competing budget proposals.

When governments aim at reducing their contingent liabilities to disasters, clarifying and controlling implicit contingent liabilities and the management of moral hazard risks are of particular concern. This may entail policy changes that:

- make explicit and control a current implicit contingent liability e.g. announcing a ceiling on disaster recovery costs that the government is willing to cover in the event of a crisis, or putting in place a clear cost-sharing formula with sub-national governments (or other stakeholders) for disaster reconstruction costs, or clearly limiting the scope of the compensation or financial assistance that could be made available (e.g. not providing assistance to businesses);

- provide incentives (e.g. through fiscal transfer mechanisms) to encourage sub-national governments, households or businesses to reduce disaster risks, for example by investing in or maintaining protective assets, by enforcing building codes;

- provide incentives for sub-national governments, households and businesses to invest in risk transfer and risk reduction measures (see Box 6);

- move to risk-related disaster insurance premiums, as in Switzerland, where insurance companies inform customers about expected investments in self-protection and reduce or refuse damage compensation payments, if the self-protection measures are not taken;

- where private insurance markets are unwilling or unable to provide affordable coverage, establish a public private partnership to provide insurance against all or particular disaster perils, with exposure sharing between the public sector and private markets[16].

Box 6. Minimising implicit disaster-related contingent liabilities

A significant component of central government disaster-related contingent liabilities relate to the reconstruction of publicly-owned assets, whether owned and operated at the national or sub-national level. In many countries, sub-national governments own and operate a significant share of all publicly-owned assets, but depend on national governments to absorb some (or even most) of the cost of restoring those assets after a disaster. In such cases, national governments need to ensure that the compensation or financial assistance that they provide to sub-national governments after a disaster does not reduce the incentive for sub-national governments to invest in risk reduction or risk transfer. Some countries are beginning to consider these issues in the design of their approaches to providing financial assistance to sub-national government. For example, in Australia, state governments provide an overview of the insurance arrangements in place for the assets that they own to the Attorney-General who has the authority to review the arrangements, make recommendation on changes to those arrangements and penalise states that do not comply with those recommendations, including through reductions in the rate of reimbursement for reconstruction costs.

By providing a source of funding for reconstruction, insurance coverage can make an important contribution to reducing economic disruption after a disaster along with the cost ultimately borne by taxpayers. Higher-levels of insurance take-up by governments (all levels), businesses and households should reduce the demand on government to provide compensation or financial assistance for damages and losses suffered as a significant share of these damages and losses should be covered by insurance. A Lloyd's (2012) case study of five disasters (US hurricanes in 2005, UK flooding in 2007, Sichuan earthquake in 2008, the Great East Japan Earthquake in 2011 and the Thailand floods in 2011) found that a larger share of uninsured losses tended to be correlated with a larger overall cost to taxpayers. When properly designed, insurance can also provide incentives for risk reduction.

Source: OECD, 2016; Lloyd's, 2012

Clarifying who will be liable for costs (risk ownership), and promoting open public debate about assumptions, public preferences, options and trade-offs can also help to improve the quality of information on which the government's risk decisions are based. At the same time, this can strengthen incentives to increase resilience (invest in risk reduction and prevention) and reduce moral hazard.

[16] A public private partnership to provide insurance will not, on its own, reduce disaster risk. However, if such a scheme leads to higher insurance penetration than would have otherwise occurred without government intervention, this approach allows for the pre-funding of some disaster costs through the collection of premiums. In addition, the existence of an insurance scheme allows for appropriate pricing of risk through risk-based premiums and can provide an opportunity to maximise the transfer of risk to the private sector through exposure-sharing arrangements.

4.6.1 Making provisions for remaining fiscal risk

Even after implicit and explicit disaster-related contingent liabilities have been identified and reduced as outlined above, some fiscal risk remains. Financial protection strategies help governments to meet these remaining contingent liabilities in a way that meets cost and liquidity objectives. In the past, the remaining fiscal risk was often met on an ad-hoc basis after the disaster event (Bevan and Cook, 2014), but increasingly governments are putting in place multi-pronged financial protection strategies based on proactive planning to secure access to post-disaster finance *ex ante,* before a disaster strikes (See Table 2). These can help ensure that a range of tools are available ex post for each of the layers of risks, including the additional flexibility offered by insurance and other risk transfer instruments.

Table 2 examples of mitigation tools for residual fiscal risk

***Ex ante* financing**	***Ex post* financing**
• **Dedicated reserve fund** • **Insurance and reinsurance** • **Contingent credit facilities** • **Catastrophe bonds and other CAT-linked security/alternative risk transfer instrument**	• **Budget reallocation** • **Debt financing/borrowing** • **Taxation** • **Multilateral/international borrowing** • **International aid**

Source: OECD, 2012; OECD, 2015a

Emerging good practice in disaster risk finance sets out a process for governments to conduct a cost-benefit analysis of possible risk financing options, develop a national disaster risk financing strategy, and implement a layered approach to matching financing sources with the size of potential obligations, taking into account cost and liquidity considerations (World Bank, 2014a). To ensure a cost-effective and suitable mix of financing tools, the relative costs of transferring the risk or retaining the risk should also be assessed against the cost of reducing that risk through public investments in prevention.

A dedicated reserve fund that is financed through annual appropriations and lapses at the end of the year if unspent is a common *ex ante* budgeting mechanism for contingent liabilities (explicit or implicit) from disasters. This enables governments to respond immediately to disasters without having to cut other spending programs or seek additional legislative authority. Given the high opportunity cost of maintaining a liquid reserve these dedicated funds are particularly useful for high probability disaster events and in countries, where no other disaster risk financing options are available. In many cases, these mechanisms have been established in response to particularly severe disaster events. Mexico's disaster fund (*FONDEN)*, which has mandatory allocation of no less than 0.4% of the annual budget, is an example of a dedicated disaster reserve fund. In case of disaster, the fund provides the 32 Mexican states and the federal agencies with the necessary resources to cover the losses and damages caused by disasters, whose magnitude may exceed their financial capacity (OECD, 2015a).

In addition to reserve funds, governments commonly use supplementary budgets, financed e.g. by new debt or taxation. In some cases, multilateral or international borrowing, as well as international assistance may be used to finance contingent liabilities (OECD 2012).

In countries where the expected frequency and severity of disaster events is lower, a dedicated disaster fund may not be the right choice of risk financing. Instead, countries may opt for a contingency budget line, which is however rarely earmarked for disasters and hence often has only small amounts available to meet the cost of disaster-related contingent liabilities. The national budget in South Africa, for example, includes a contingency reserve that can be used in case of disasters, specified in the Annual Division of Revenue Act (DoRA). Contingent credit facilities, which also allow an immediate disbursement once a disaster hits, may also be more efficient for countries that face high damage, but low probability disaster events (OECD, 2012).

For governments facing disaster risks that are larger than their risk bearing capacity, risk transfer tools, such as insurance or catastrophe-linked securities, may be viable mechanisms to transfer the cost of disaster-related contingent liabilities and some countries have made use of these instruments (see Box 6). Although insurance offers an immediate and effective option to transfer disaster risk, it comes at the risk of payments not being immediately available and does not accumulate if a disaster does not occur. Fluctuations in pricing in global insurance markets also may make it a possibly expensive instrument. Catastrophe-linked securities, such as CAT bonds, which involve risk transfer to capital markets, may provide a more stable alternative to insurance that is particularly viable for higher layers of disaster risk. At the same time, catastrophe-linked securities may be too inflexible and come at high opportunity costs (OECD 2012).

Box 7. Risk transfer options for governments

A number of risk transfer tools can be developed in order to manage the disaster-related contingent liabilities:

- Insurance of public assets: Individual government asset-owners can acquire specific insurance coverage for the assets that they are responsible for (individually or on a portfolio basis). The cost of insurance can be reduced by choosing high deductible levels for the insurance policies acquired (i.e. covering only more extreme events) or by including a diverse set of assets into a single policy. Countries can benefit from pricing advantages by centralising the acquisition of insurance in a single department (or even through a public insurance vehicle). For example, Costa Rica is establishing an insurance vehicle for insuring public assets through a public insurer and transferring only excessive losses to international financial markets. A number of other countries also operate public insurers, either at the national or sub-national levels, to provide insurance for public assets (e.g. Australia, Philippines, Indonesia). In Colombia, the government procurement agency is establishing a group insurance policy and providing access to this policy to individual departments to insure their assets.

- Insurance of public expenditures: Another approach is to enter into risk transfer transactions that provide a pay-out based on the occurrence of a disaster as a means of providing a source of funds to finance reconstruction expenses. In many cases, these transactions are structured to pay-out based on the occurrence of a disaster of a specific magnitude (e.g. earthquake of a specific magnitude, flood or storm surge causing inundation of a certain level), which provides the benefit of a faster pay-out (although the risk that the pay-out may not correspond to actual loss levels). The risk transfer approaches may be structured through a regional risk pooling initiative (such as the Caribbean Catastrophe Risk Insurance Facility) - which also creates benefits through a more diverse set of risk - as a (re)insurance arrangement based on a parametric trigger, or through the issuance of catastrophe bonds (which are basically bonds that default in the event of a the occurrence of the specified event, allowing the transfer of bondholder funds to the bond issuer affected by the disaster).

Source: OECD, 2016

In countries, where disaster-related contingent liabilities are limited compared to the risk-bearing capacity of the government, *ex post* funding within existing financial capacities may be an appropriate strategy at lower opportunity costs prior to the disaster, but at higher opportunity costs once disaster has struck. Governments may for example rely on increasing taxation, reallocating budget (that was not previously allocated to a contingent budget line) or resort to debt financing/ borrowing. In some cases, international aid may also be an option to meet the cost of disaster-related contingent liabilities.

The balance between *ex ante* and *ex post* approaches to disaster risk financing is a key strategic issue. Some decisions intended to reduce or better manage disaster risks or their financial impact have the potential to inadvertently create new sources of fiscal risk. Some commonly used or advocated instruments in the field of disaster risk financing, such as tax incentives, extra-budgetary funds, public insurance, public private partnerships, can themselves, if not well-designed, introduce new sources of fiscal risks or exacerbate fiscal risk. Decisions on these instruments are often taken outside the budget process. Ministries of Finance therefore have an important role to play in ensuring appropriate scrutiny of new 'risk decisions' and their incorporation in routine budget and public financial management processes.

In the past, there has been a tendency in many countries to expend most resources on responding to disasters, and relatively less attention to investing in preventing and mitigating impact beforehand. To reduce the contingent impact disaster may have on public finances, governments may also choose to include this aspect in their overall disaster risk management strategies. Investments in appropriate structural measures, such as dams, earthquake-resistant buildings and evacuation shelters, and non-structural measures, such as building codes, land use planning and hazard mapping, and risk communication and awareness programmes, may also help to reduce not only disaster risks *ex ante*, but also disaster-related contingent liabilities.

References

Banholzer, S., J. Kossin and S. Donner (2014)."The Impact of Climate Change on Natural Disasters", In *Reducing Disaster: Early Warning Systems for Climate Change*, Springer Science & Business Media, Dordrecht, pp. 21 - 49

Bevan, D. and S. Cook (2014). Public Expenditure Following Disasters. https://www.gfdrr.org/sites/gfdrr.org/files/documents/Public%20finance%20and%20macroeconomics,%20Paper%201.pdf

Budina, N and M. Petrie, 2013. "Managing and Controlling Fiscal Risks. In: Public Financial Management and its Emerging Architecture,' Eds M. Cangiano, T, Curristine and M. Lazare, IMF, Chapter 5, pp. 175-204.

Colombia Ministry of Finance and Public Credit, 2011. Contingent Liabilities: The Colombian Experience. http://treasury.worldbank.org/bdm/pdf/Contingent_Liabilities_Colombian_Experience.pdf

Felbermayr, G., and J. Gröschl. 2014. "Naturally Negative: The Growth Effects of Natural Disasters." Journal of Development Economics 111: 92–106.

Global Facility for Disaster Reduction and Recovery (GFDRR), 2017. Damage and Loss Assessment (DaLA) Methodology. https://www.gfdrr.org/damage-loss-and-needs-assessment-tools-and-methodology

Gobierno de Chile [Government of Chile], 2013. Natural disasters and fiscal framework: the case of Chile. Presentation held on the occasion of the 2013 OECD High Level Risk Forum. http://www.oecd.org/governance/3rdoecdhighlevelriskforum.htm

Hanusch, M.; S. Hassan; Y. Algu; L. Soobyah and A. Kranz. 2016. The ghost of a rating downgrade : what happens to borrowing costs when a government loses its investment grade credit rating?. Macroeconomics and Fiscal Management (MFM) discussion paper; no. 13. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/241491467703596379/pdf/106667-NWP-MFM-Discussion-Paper-13-SARB-CreditRating-28-Jun-2016-PUBLIC.pdf

International Monetary Fund - World Economic Outlook Database, 2016 (October 2016 edition). http://www.imf.org/external/pubs/ft/weo/2016/02/index.htm

International Monetary Fund, 2008. Good Practices in Fiscal Risks Disclosure International Experience, presentation at the High Level Conference on Fiscal Risks in Pairs, October 2008, https://www.imf.org/external/np/seminars/eng/2008/fiscrisk/pdf/velloso.pdf

International Monetary Fund, 2009. Fiscal Risks: Sources, Disclosure, and Management. International Monetary Fund: Fiscal Affairs Department.

International Monetary Fund, 2015 . Fiscal Transparency Evaluations. Query Search. http://www.imf.org/external/ns/search.aspx?lan=eng&NewQuery=fiscal transparency evaluations

International Monetary Fund, 2016. Analyzing and Managing Fiscal Risks - Best Practices. June 2016. https://www.imf.org/external/np/pp/eng/2016/050416.pdf

Kunreuther, H. and E. Michel-Kerjan (2013). Managing Catastrophic Risks through Redesigned Insurance: Challenges and Opportunities, in *Handbook of Insurance*. http://opim.wharton.upenn.edu/risk/library/J2013Kunreuther+Michel-Kerjan_Managing-Cat-Risks-through-Redesigned-Insurance.pdf

Lloyd's (2012), *Lloyd's Global Underinsurance Report*, Lloyd's, London. https://www.lloyds.com/~/media/files/news%20and%20insight/360%20risk%20insight/global_underinsurance_report_311012.pdf

Mahul, O., Benson, C. and L. Boudreau (2013), Risk Assessment and Management of Natural Disasters from a Fiscal Perspective in Developing Countries, World Bank Working Paper (Draft)

OECD 2012, Disaster Risk Assessment and Risk Financing: A G20/OECD Methodological Framework, www.oecd.org/gov/risk/G20dissterriskmanagement.pdf

OECD 2014a. Boosting resilience through innovative risk governance, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264209114-en

OECD 2014b. OECD Recommendation of the Council on the Governance of Critical Risks. http://www.oecd.org/gov/risk/Critical-Risks-Recommendation.pdf

OECD 2014c. Fiscal Risks: New Approaches to Identification, Management and Mitigation. George Kopits. GOV/PGC/SBO(2014)4/Final. 12 August 2014.

OECD 2015a. Disaster Risk Financing: A global survey of practices and challenges, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264234246-en

OECD 2015b. OECD Recommendation of the Council on Budgetary Governance.

OECD 2016. "Accrual practices and reform experiences in OECD countries - Results of the 2016 OECD Accruals Survey". OECD Journal on Budgeting, Vol.2016/1, OECD Publishing, Paris. http://dx.doi.org/10.1787/budget-16-5jlv2jx2mtzq

Philippines Fiscal Risk Statements, Department of Budget Management, 2013. Available at http://www.dbm.gov.ph/?page_id=9010

Ranghieri, F. and Ishiwatari, Mikio. 2014. Learning from Megadisasters: Lessons from the Great East Japan Earthquake. Washington, DC: World Bank. World Bank. https://openknowledge.worldbank.org/handle/10986/18864

Sato, M. and L. Boudreau, 2012. The Financial and Fiscal Impacts. World Bank, Washington, DC. World Bank. https://openknowledge.worldbank.org/handle/10986/16165

Standard & Poor's Rating Services, 2015a. Storm Alert: Natural Disasters Can Damage Sovereign Creditworthiness. September 10, 2015.

Standard & Poor's Ratings Services, 2015b, The Heat is On: How Climate Change Can Impact Sovereign Ratings, *Ratings Direct*, 25 November.

Ülgentürk, L. et al., 2016, "The Role of Public Debt Managers in Contingent Liability Management", *OECD Working Papers on Sovereign Borrowing and Public Debt Management*, OECD Publishing, Paris

United Nations Framework Convention on Climate Change (UNFCCC), 2012. A literature review on the topics in the context of thematic area 2 of the work programme on loss and damage: a range of approaches to address loss and damage associated with the adverse effects of climate change. Note by the secretariat. FCCC/SBI/2012/INF.14, 15 November 2012.

United States Office of Management and Budget, 2016. *Analytical Perspectives – Budget of the U.S. Government*, Fiscal Year 2017: Federal Budget Exposure to Climate Risk, pp. 353. Office of Management and Budget. https://www.whitehouse.gov/sites/default/files/omb/budget/fy2017/assets/spec.pdf

Von Peter, G., S. von Dahlen and S. Saxena, 2012, "Unmitigated disasters? New evidence on the macroeconomic cost of natural catastrophes", *BIS Working Papers No. 394*, Bank for International Settlements, Basel, www.bis.org/publ/work394.pdf.

Wolfrom, L. and M. Yokoi-Arai (2015), "Financial instruments for managing disaster risks related to climate change", *OECD Journal: Financial Market Trends*. http://dx.doi.org/10.1787/fmt-2015-5jrqdkpxk5d5.

World Bank, 2012. The Sendai Report. Managing Disaster Risks for a Resilient Future. World Bank, Washington DC.

World Bank, 2014a. Financial Protection Against Natural Disasters: From Products To Comprehensive Strategies. World Bank, Washington DC.