

Climate-smart Public Financial Management MENA Conference

February 26–29, 2024
Cairo, Egypt



CLIMATE CHANGE, RISK MANAGEMENT AND IMPLICATIONS FOR PUBLIC FINANCES AND PLANNING

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Overview



1. Fiscal risks from climate change
2. Mitigating and managing climate-related fiscal risks
3. Policy instruments to achieve climate change goals and mitigate risks



1. Fiscal risks from climate change

Climate Change creates Physical Risks and Transition Risks

Physical risks: the size and frequency of extreme weather events, slow onset disasters, and longer-term changes in average conditions e.g., temperatures, rainfall patterns.

These risks impose costs: disaster recovery, long term productivity changes, and the costs of adapting to the changing climate by increasing resilience.

Exposure to the incidence of these risks is largely exogenous (outside the government's control) but actions can be taken to reduce exposure to the risks and to the costs if disasters occur e.g., more drought resistant crops, infrastructure in less exposed locations.

Transition risks: risks arising from the move to a low-carbon economy, including the policies to achieve that, and its indirect fiscal impacts via the size of the economy. Examples include the costs of mitigating emissions, and loss in value of oil and gas reserves or of value of public coal and gas fired power stations.

Transition risks are more endogenous (within the government's control).



Types of Climate-related Disasters

Sudden impact disasters	Tropical storms, heavy rains, flash floods, landslides, wildfires, heatwaves, sand and dust storms
Slow-onset (chronic) disasters (but potential tipping points)	Sea level rise, droughts, desertification, deforestation, pest infestation
Compound disasters	Combination of sea level rise and storm surges and/or tidal waves; epidemic disease following a major disaster; industrial accident triggered by a natural disaster; damage to key environmental infrastructure ▪

Fiscal risks: exposure to factors that could cause fiscal outcomes to differ from expectations or forecasts (IMF 2016).

Macroeconomic risks e.g., GDP growth



Specific fiscal risks



Institutional risks



Institutional risks: the capacity of government to manage fiscal risks e.g., the quality of information available, analytical capacity, appropriate allocation of roles and accountabilities, coordination across public sector.

While the fiscal risk literature typically only considers negative risks, fiscal risks should also be defined to include **opportunities (upside risks)**. With respect to climate change upside risks include revenue and financing opportunities (carbon taxation/pricing, international climate finance), and the opportunity to reduce fossil fuel subsidies.

Costs of adapting to climate change

The costs of adapting to climate change due to the likely *increased incidence and severity of natural disasters* and the *increased exposure of assets* to disasters e.g., preventive costs such as building protective infrastructure (flood barriers), incremental cost of building new infrastructure to higher standards. There are also financing opportunities.

The additional upfront costs of building more resilient assets depend on the asset, the hazard, and the country, and could subsequently be offset by lower maintenance and repair costs.

To adequately climate proof existing and strengthen new exposed infrastructure has been estimated to add on average 15 percent to the cost (Miyamoto 2019).

Estimating adaptation benefits is difficult, but there is growing consensus that benefits are large.

The challenge is more one of governance (Hallegatte et al., 2020).

The costs of maladaptation to climate change, such as continuing to construct public infrastructure in areas highly exposed to climate-related disasters; and inefficient adaptation, such as over- or under-investing in adaptation.

Maladaptation already exists with respect to the current climate in many countries in the form of failure to fully repair public assets from the impacts of past climate-related disasters and to maintain them to withstand current weather conditions. Poor maintenance can increase investment needs by 50 per cent in transport and more than 60 percent in the water sector (Hallegatte 2020).



Fiscal risks from climate change mitigation

- ***The costs of mitigation of GHG emissions:*** building new low carbon infrastructure generally entails higher initial capital outlays, although the cost of renewables has fallen, and operating costs may be lower.
- Governments may need to part-finance the transition to a low carbon economy to meet their international and domestic climate objectives and commitments e.g., investments in the electricity network to accommodate renewables, fiscal support (tax incentives, spending, guarantees) to de-risk private investment by reallocating, sharing, or reducing risks borne by private infrastructure investors.
- But there are also upside risks from carbon pricing, and/or reduction in fuel subsidies – net of compensation to ensure a just transition.



Institutional Fiscal Risks: Can Magnify the Fiscal Impacts of Climate Change Risks

Inadequate information on risks: e.g., lack of hazard maps; lack of data on exposure and vulnerability of existing assets and planned new infrastructure to climate-related hazards

Lack of government capacity to design effective and efficient climate policies e.g., capacity for modelling and forecasting, policy design and project appraisal, IT systems, data availability and management

Public investment management system not climate-sensitive: e.g., lack of well-designed and appraised climate-sensitive projects for financing

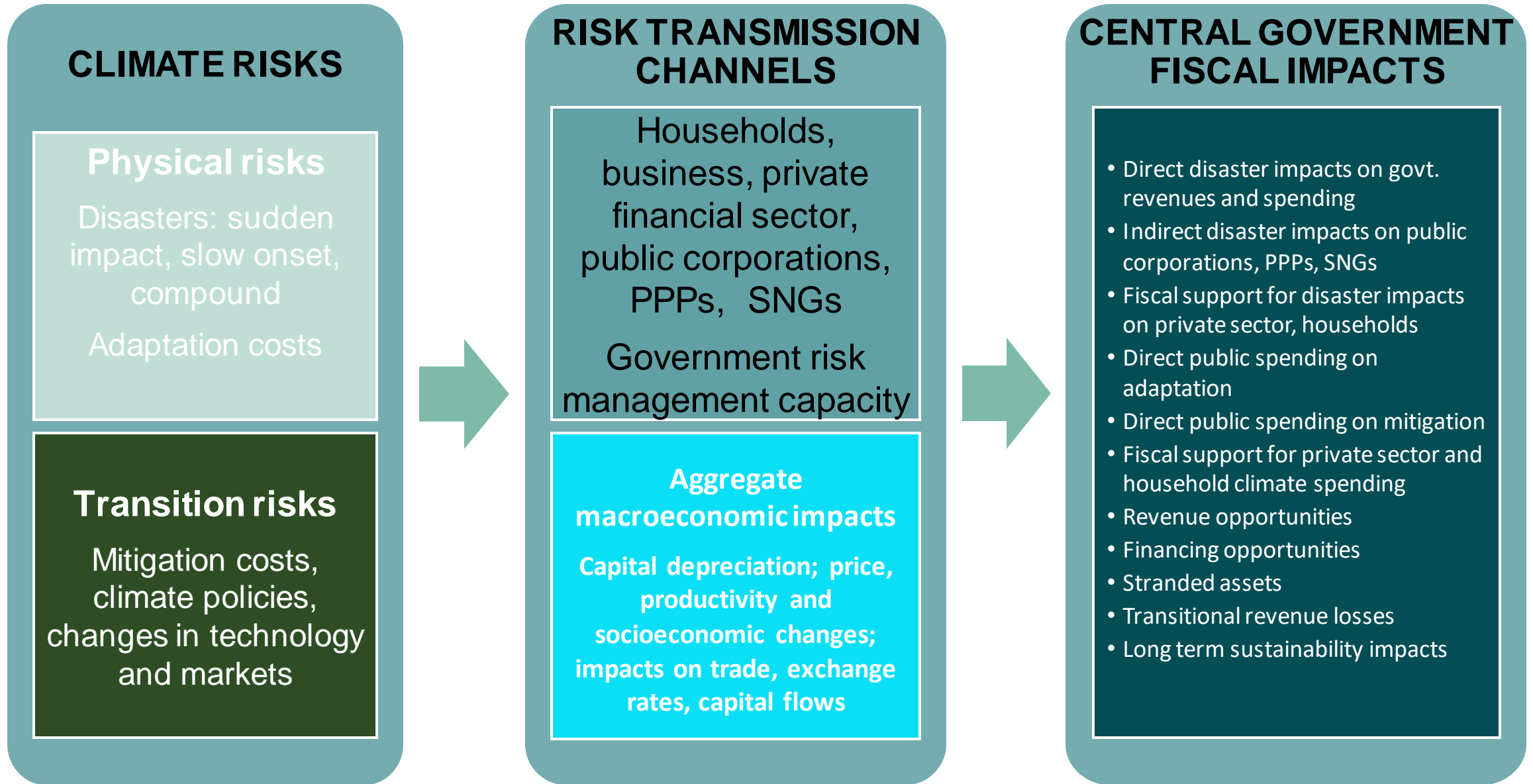
Climate policies not mainstreamed across government e.g., parallel 'climate budget' with little impact on decision-making

Coordination weaknesses: weak oversight of climate impacts of public corporations and sub-national governments

These constrain the effectiveness of risk management and can increase the probability of negative event occurring, and/or the cost if it does occur



Identifying the full range of fiscal risks from climate change



Adapted from Dunz and Power 2021.

SNGs = subnational governments, PPPs = public private partnerships

Mitigating fiscal risks from climate change (physical and transition): Some examples of risk mitigation measures.

Identify and quantify risks	<ul style="list-style-type: none"> Identify sources Estimate fiscal exposure 	Type of disaster; type of transition risk Value of asset exposure; potential financing
Mitigate risks	<ul style="list-style-type: none"> Direct controls and limits Regulation, incentives Risk transfer and sharing Strengthen risk management capacity 	Public corporation oversight; green procurement; build back better. Land use planning; design of transfers to SNGs Insurance, CAT Bond Invest in geographic information systems; early warning systems, build capability in climate PFM
Decide whether to provision for risks	<ul style="list-style-type: none"> Budget contingencies fund Buffer funds 	Contingency Fund available for disaster costs Disaster reserve fund
Decide whether to accommodate residual risks	<ul style="list-style-type: none"> Take into account in setting debt objectives 	Include major disaster in fiscal stress test, include long term impacts in debt sustainability analysis

MOF roles in Mitigating Fiscal Risks from Climate-related Disasters

- i. Analyze historical data on disaster impacts/costs, adapt historical data to allow for impacts of climate change using hazard and exposure data to estimate annual expected loss, probable maximum loss (Gamper et al 2017)
- ii. Incorporate in fiscal risk analysis and possible allowance in MTFF
- iii. Ensure effective financing arrangements in place for frequent low impact events (reallocations, contingencies allocation)
- iv. Monitor, report and review use of contingency appropriation/disaster funds
- v. Ensure sufficient maintenance funding, allowing for climate change impacts
- vi. Set requirements for asset registers and regular surveys of asset condition
- vii. Climate-sensitive Public Investment Management (PIM)
- viii. Prepare a Disaster Risk Financing Strategy as part of National DRM Strategy.
- ix. Requires coordination within MOF and with Planning and line ministries



Mitigating Climate Risks: Mainstreaming Climate Change Adaptation and Mitigation in Fiscal and Wider Policies

- In macro-fiscal policy: incorporating climate change in macro modelling
- In fiscal risk and debt sustainability analysis
- In tax and carbon pricing policy: carbon and other green taxes and charges, emissions trading schemes
- In the national disaster risk management strategy
- In the public investment management system:
 - National and sector planning
 - Designing, appraising and selecting climate-sensitive projects ready for financing
 - Building more resilient public infrastructure
 - Ensuring early action on slow-onset disasters (e.g., managed retreat)
 - Promoting low carbon investments and avoiding creation of ‘stranded assets’
- In the budget cycle: green Budget Circular, green spending analysis, climate budget tagging, reporting
- In financing: green financing; disaster risk financing.



3. Policy instruments to achieve climate change goals and mitigate risks



- Most of the cost of adaptation and the transition to a zero/low carbon economy will be borne by businesses, households, and communities.
- Government to set a carbon price across the economy – a key policy lever, includes impact of any subsidies for fossil fuels
- But carbon pricing alone is insufficient, needs to be supplemented by other policies due to the multiple market failures and governance failures
- Need to mobilize private capital and competence for huge investments in infrastructure

Barriers to transition to low emissions and climate-resilient economy

Governments need to consider all the tools at their disposal to guide the economy and try to design smart policy packages:

- Information provision: e.g., hazard maps
- Carbon pricing e.g., carbon tax, emissions trading scheme
- Other economic instruments: e.g., road user charges, charging for water use
- Regulation: e.g., tariff levels; improved regulatory governance
- Public spending and guarantees to de-risk private investments
- Public spending: need to avoid ‘expenditure bias’, focus on public goods, key market failures, and crowding-in private finance

'Smart' policy packages: decarbonising transport

- Regulations: retirement of old vehicles; vehicle emissions or fuel efficiency standards
- Road demand management: fuel price taxation; carbon pricing; congestion charging; road user charges; street parking pricing; vehicle registration fees differentiated by environmental impact
- Public investment spending: public transport including phased electrification (metro, bus, train); EV charging infrastructure and fiscal incentives for EV uptake; inter-modal infrastructure; cycling and walking infrastructure
- Public current spending: e.g., reduction of fossil fuel subsidies; recycling of carbon tax/ETS revenues to households impacted by higher carbon prices
- All in tandem with expansion in renewable energy supply



Key messages: Ministries of Finance, and Planning play key roles in translating government's climate goals into climate action



- Climate change creates a wide range of fiscal costs and risks, including upside risks.
- Country context is crucial: varying climate exposures and resilience, fiscal space, adaptive and institutional capacity.
- Climate change policies must address complex combinations of market failures and governance and coordination failures, using smart packages of policies: information, regulation, taxation, spending. Carbon price is critical to mitigation but not enough on its own.
- Climate-smart public investment management is a key lever for both adaptation and mitigation.
- A strong institutional and legal framework is required (Hallegatte et. al. 2020).
- The budget process is a powerful signaling, coordination, and prioritization device for climate action, and a driver of government action (Coalition of Finance Ministers for Climate Action 2023).

THANK YOU

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References

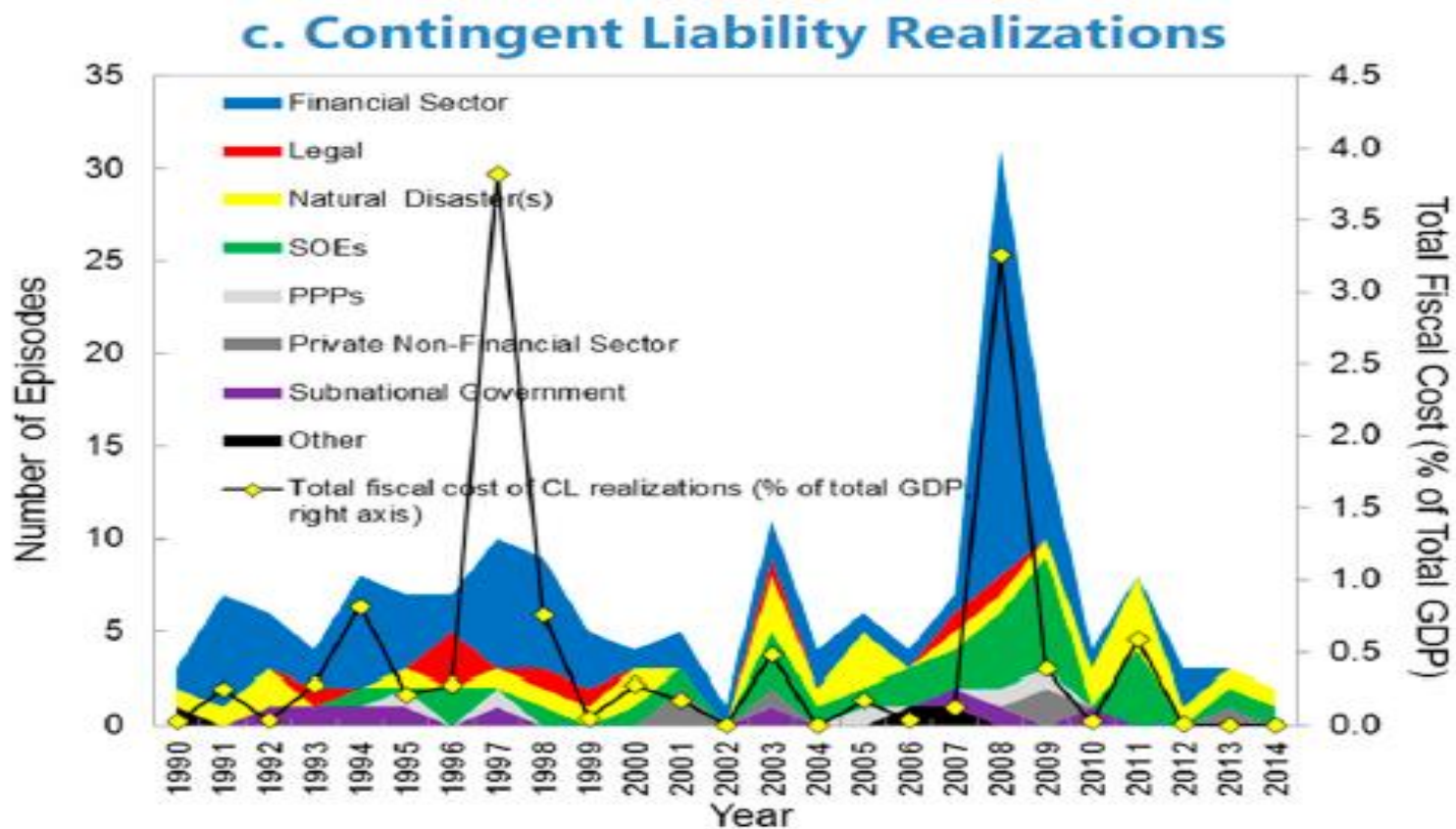
- Aligishiev, Bellon and Massetti, 2022. Macro-fiscal implications of adaptation to climate change. IMF Staff Climate Note 2022/002.
- Bova et al, 2016, The Fiscal Costs of Contingent Liabilities: A New Dataset. IMF Working Paper No. 16/14.
- Coalition of Finance Ministers for Climate Action, 2023. Strengthening the Role of Ministries of Finance in Driving Climate Action. A Framework and Guide for Ministers and Ministries of Finance.
- Duenwald et al, 2022. Feeling the heat : adapting to climate change in the Middle East and Central Asia. IMF.
- Dunz and Power, Climate-Related Risks and Ministries of Finance: An Overview. World Bank, for Helsinki Principle 5, Coalition of Finance Ministers for Climate Action. May 2021.
- Gamper, C. et al. 2017. Managing disaster-related contingent liabilities in public finance frameworks. OECD Working Papers on Public Governance, No. 27.
- Hallegatte, Rentschler, and Rozenberg. 2020. Adaptation Principles—A Guide for Designing Strategies for Climate Change Adaptation and Resilience. Washington, DC: World Bank.
- IMF, 2016. Analyzing and Managing Fiscal Risks—best practices. June 2016.
- Miyamoto International, 2019. Overview of Engineering Options for Increasing Infrastructure Resilience. World Bank.
- OECD/The World Bank, 2019. Fiscal Resilience to Natural Disasters: Lessons from Country Experiences, OECD Publishing, Paris.



Appendices

1. Fiscal costs of disasters and other contingent liabilities
2. Identifying explicit and implicit fiscal risks from disasters
3. Barriers to transition to low emissions and climate-resilient economy.
4. Barriers to transition to low emissions and climate-resilient economy (2)
5. Other fiscal risks from the transition to a low carbon economy
6. Disaster Risk Financing Strategy

App. 1 Fiscal Risks: Non-linear and Correlated (when it rains it really pours)

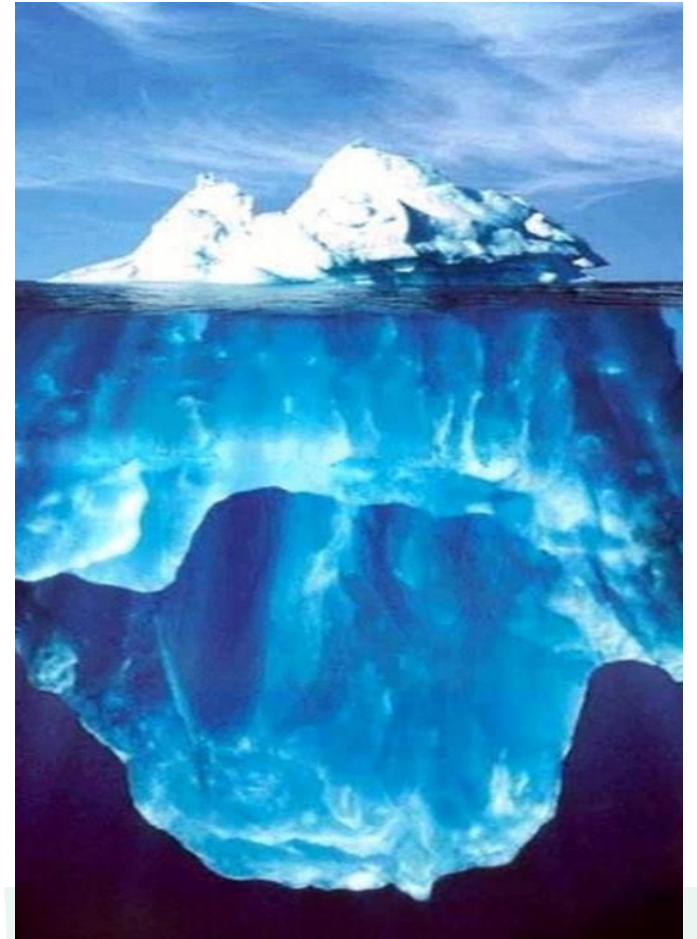


Bova and others (2016)

Average fiscal cost of all disasters 1.5% of GDP, maximum cost 6%. But losses can exceed 100% of GDP in small developing countries.

App. 2 Identifying Risks: Disasters Create Explicit and Implicit Fiscal Risks

- **Explicit risks:** Where government has clear obligation to provide support in the event of disaster e.g., damage to government assets, government disaster insurance
- **Implicit risks:** No explicit obligation but political pressure or to speed up recovery from disaster e.g., support to sub-national governments, uninsured households, or to SOEs or PPP operators to repair damaged infrastructure
- Internationally, central government support to local governments, often ad hoc and unplanned, can create large implicit contingent liabilities.
- The level of private insurance coverage is an important factor.
- Some advantages in clearly defining/capping the responsibility of the central government, to reduce the government's implicit risk and encourage other parties e.g., SNGs to reduce their risk.
- **Implicit risks are harder to identify but can be the largest and may be growing over time**



App. 3 Barriers to transition to low emissions and climate-resilient economy

1. Unpriced negative externalities from GHG emissions. Subsidies for GHG production and consumption and for natural resource use
2. Infrastructure lock in: spatial pattern of cities and lack of public transport locks commuters into reliance on private vehicles
3. Network externalities e.g., transition to EVs requires availability of charging stations, private investment in charging stations requires assurance of increase in EV take up
4. Market structure and governance: dominant role of Public Corporations and weaknesses in market regulation act as barriers to private investment in low emissions infrastructure

App. 4 Barriers to transition to low emissions and climate-resilient economy (2)

5. Lack of information: lack of hazard maps to guide public and private investment
6. Split incentives: e.g., building/housing owners pay for retro-fitting but their tenants gain the benefit of lower energy costs; central government supports SNGs with disaster recovery but SNGs bear the costs of adaptation
7. Co-benefits: investments in mitigation or adaptation may generate wider benefits e.g., investments in renewables will improve air quality
8. Innovation spill-overs: investors in new green technologies will not capture all the returns

➔ Need to use a range of instruments tailored to the specific market failures, coordination failures, and targeted transformations in systems and infrastructure concerned.

App. 5 Other fiscal risks from the transition to a low carbon economy

- The multiple market and coordination failures involved in climate change create risks of inefficient and ineffective public spending (including use of tax incentives).
- The loss of value of publicly owned fossil fuel resources, power stations, oil refineries, and other carbon-based infrastructure as carbon prices increase. These assets risk becoming ‘stranded assets.’
- Loss of revenues from carbon-based taxes such as petrol taxes.
- Fiscal support for those impacted negatively by higher carbon prices.
- Exposure of financial public corporations to losses on loans for or insurance of climate-exposed assets.
- Fiscal support for research and development on new technologies e.g., carbon capture and storage.
- The impacts of climate policies of other countries e.g., carbon border taxes.
- Delayed investment in energy transition resulting in escalating costs of mitigation as the length of the required/targeted transition becomes shorter and disorderly.



App. 6 Disaster Risk Financing Strategy

(Hallegatte et al, 2020)

Financing instruments to cover contingent liabilities from natural disasters

