

OVERVIEW

Catastrophe Risk Financing in Developing Countries

PRINCIPLES FOR PUBLIC INTERVENTION



THE WORLD BANK

J. DAVID CUMMINS
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Tribute to GFDRR Partners

Since its establishment in September 2006, the Global Facility for Disaster Risk and Reduction (GFDRR) has evolved into a partnership among Australia, Canada, Denmark, the European Commission, Finland, France, Germany, Italy, Japan, Luxembourg, Norway, Spain, Sweden, Switzerland, the United Kingdom, the UN International Strategy for Disaster Reduction, the USAID Office of Foreign Disaster Assistance, and the World Bank.

Catastrophe Risk Financing in
Developing Countries
Principles for Public
Intervention

Overview

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and
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Foreword

At a time when both the frequency and intensity of natural disasters are on the rise, the ability of developing countries to reduce their vulnerability to natural disasters and limit their fiscal exposure is becoming a priority. When disasters strike, countries with limited economic resilience often seek assistance from the international donor community or divert funds from development projects to cover emergency and recovery needs. Even though the importance of catastrophe risk financing is recognized, catastrophe risk markets remain hampered by market imperfections that limit their expansion, particularly in developing countries.

The 1992 U.N. Framework Convention on Climate Change and the subsequent Kyoto Protocol refer to the potential role of insurance in disaster mitigation. The Hyogo Framework for Action 2005–2015, signed in January 2005, identifies the need to promote the development of financial risk-sharing mechanisms, particularly insurance and reinsurance against disasters, as a priority action for building the resilience of nations and communities to recover from disasters. While this is only one recommendation among many, the need for innovative risk financing mechanisms is particularly relevant to the middle- and low-income countries.

The risks from natural disasters caused by a changing climate present a growing threat to developing countries that lack the financial and material resources to mitigate their risks. Furthermore, long return periods for the most severe disasters often tend to dampen public and private motivation to develop appropriate catastrophe risk financing programs, including

insurance programs. Funding for relief and reconstruction in developing countries generally comes from very different sources than is the case in industrialized countries. In more advanced economies, losses from natural disasters are typically funded through a combination of private risk financing arrangements and an efficient public revenue system relying on wide and deep taxation catchments. In middle- and low-income countries, which have relatively low tax ratios and ongoing fiscal pressures and where catastrophe risk markets are often underdeveloped, funding sources for post-disaster reconstruction tend to be more varied, with strong reliance on ex post borrowing and assistance from international donors. In addition, the lack of immediate liquidity in the aftermath of a disaster often retards recovery and forces the government to conduct an emergency budget reallocation, which can be detrimental to the long-term fiscal stabilization programs and investment programs. Assistance from multilateral financial agencies plays a particularly important role in middle-income countries, while support from bilateral donors is generally dominant in low-income countries. The World Bank alone has disbursed more than US\$40 billion in emergency loans related to natural disasters over the last three decades.

This book, *Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention*, is the result of a joint effort by two World Bank vice presidencies—the Financial and Private Sector Development Network and the Sustainable Development Network—in collaboration with the Global Facility for Disaster Reduction and Recovery (GFDRR). It aims to promote catastrophe risk financing as an integral part of a country's economic policy and an important component of a proactive and strategic framework for disaster risk management. The World Bank has led the agenda on country-level disaster risk management by developing a multi-pillar disaster risk management approach, in which catastrophe risk financing is an important component. The World Bank Financial and Private Sector Development Vice Presidency, working with regional colleagues, has assisted partner countries in the development of catastrophe risk financing solutions since the late 1990s. Examples include the Turkish Catastrophe Risk Insurance Pool, the Mongolia Livestock Insurance Pool, and the Caribbean Catastrophe Risk Insurance Facility. As part of the Sustainable Development Network, GFDRR is the World Bank's global initiative to enhance national capacities to reduce vulnerability by integrating risk reduction in country development strategies. It is supporting a number of

catastrophe risk financing projects, including the Pacific Catastrophe Risk Pool Initiative.

The book makes a compelling case for public intervention to enhance catastrophe insurance markets and help countries better shoulder the economic and fiscal impacts when disasters strike. The need for ex ante catastrophe risk financing that efficiently meets disaster needs and fosters longer-term risk management is critical, but such support will not become available without strong and proactive leadership from the donor community and international financial institutions, such as the World Bank.

The authors, J. David Cummins and Olivier Mahul, analyze the current market imperfections that hamper the development of catastrophe risk financing solutions in developing countries, discuss the rationale for public intervention in catastrophe risk financing markets, and propose a comprehensive risk financing approach that links the donor community's disaster assistance to low- and middle-income countries with the broader disaster risk management agenda. They offer a set of key principles for public intervention on catastrophe risk markets and recommendations aimed at stimulating efficient catastrophe risk financing solutions—for example, leveraging more public-private partnerships, promoting competitive risk markets, contributing to the development of risk market infrastructure, and providing technical assistance. Effective legal and regulatory frameworks and public subsidy incentives to minimize the distortion of price signals can also catalyze efficient and competitive insurance and reinsurance markets. The authors conclude that the role of the international development community is paramount in providing access to catastrophe risk markets and expanding the range of risks covered. This is welcome news for highly exposed countries that currently have only limited options and must struggle to recover from a disaster's devastating effects.

We hope that this book will contribute to the dialogue on disaster risk management with the disaster-prone countries and will assist them to engage in risk financing efforts.

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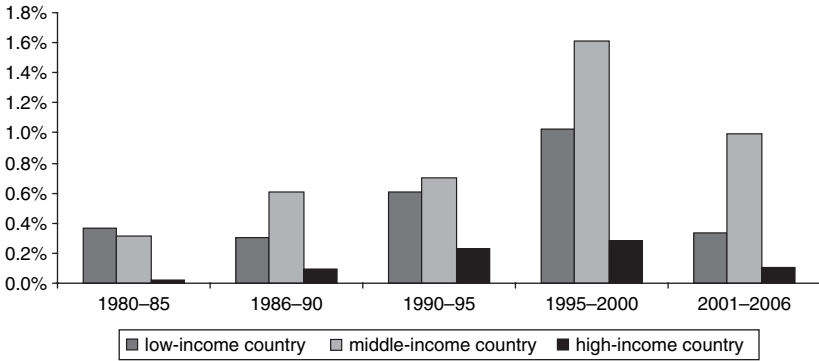
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Overview

The exposure of low- and middle-income countries to natural disasters is increasing. Because of a variety of factors, ranging from the growing concentration of population and assets in risky areas to increases in climate variability, the economic costs of major slow-onset disasters (e.g., drought) and rapid-onset disasters (e.g., hurricanes, earthquakes) in developing countries are on the rise. Although the costliest disasters generally occur in developed countries, which have the highest concentration of assets, small island economies experience the largest capital stock losses as a proportion of gross domestic product (GDP), as shown in Figure 1. Middle-income countries have experienced the largest direct losses, in terms of annual average direct losses compared to GDP.

Post-disaster financing strategies generally have high opportunity costs for developing countries. When a disaster occurs, budget allocations are often diverted from priority development projects to fund emergency and recovery needs. Raising new debt in an expensive post-event capital market may significantly affect the country's debt service, and raising taxes may discourage new private investments that are central to restarting the economy. Post-disaster assistance from the international donor community may be slow and unreliable. In the face of the rising frequency and intensity of losses in low- and middle-income countries, the old model of post-disaster financing and reliance on the donor community is increasingly inefficient.

Figure 1 Average Annual Direct Losses from Natural Disasters Compared to GDP

Source: Authors from CRED EM-DAT database, *Swiss Re (2007d)*, *World Bank (2006)*.

Note: Natural disasters are: drought, volcanoes, waves or surge, earthquake, flood, extreme temperature, windstorm, based on CRED EM-DAT classification. World Bank country classification (2006). See Appendix 1.

There is a critical need to develop ex-ante funding programs that are more efficient in meeting disaster needs and fostering disaster risk management (DRM) efforts. Ex-ante financial programs can be developed to meet several needs. They can provide immediate liquidity to governments for post-disaster relief and reconstruction of damaged government properties and infrastructure, and offer insurance to homeowners, businesses, and the agricultural community to mitigate the financial impact of disasters. Several recently completed and proposed projects have provided useful examples for developing efficient disaster financing strategies that dovetail with new efforts to outline a more proactive disaster risk management framework for the developing world.

Toward a Country Catastrophe Risk Financing Framework

International financial institutions and the donor community promote a proactive DRM approach. The donor community and international financial institutions (IFIs), like the World Bank, support a more proactive disaster risk management approach and encourage governments to shift their focus from post-event disaster response to a comprehensive DRM framework by developing better early warning systems, institutional capacities for emergency preparedness, risk mitigation investments

to protect critical infrastructure, and innovative risk financing products. In partnership with the United Nations, the World Bank established the Global Facility for Disaster Reduction and Recovery (GFDRR) in 2006 to facilitate comprehensive disaster prevention, risk management, increased investments in prevention and preparedness, and risk financing. Several major donors have joined this partnership. In particular, GFDRR financial and technical assistance supports the development of national strategies and capacity-building interventions to enhance investment in risk reduction and risk transfer mechanisms.

The DRM framework includes a country catastrophe risk financing model. To help countries reduce their reliance on external assistance, the World Bank has developed a country catastrophe risk financing model. This model promotes market-based catastrophic risk financing solutions for homeowners, businesses, farmers, and governments through public-private partnerships, supported by the donors and IFIs. It assists countries in developing tailor-made catastrophe risk financing strategies through an optimal combination of financial instruments. This framework relies on three pillars: i) assessing the government's contingent liability to natural disasters; ii) enabling risk transfer to competitive insurance and reinsurance markets; and iii) financing sovereign risk.

A few catastrophe insurance programs in developing countries have been successfully implemented. Despite the increasing involvement of the international donor community, only a few developing countries have developed affordable, effective and sustainable catastrophe insurance programs without heavy public subsidies. Many insurance pilots, particularly in agriculture, face technical, operational and institutional challenges when they are scaled up.

Property catastrophe insurance programs for homeowners have emerged in some middle-income countries, such as Turkey. The Turkish Catastrophe Insurance Pool (TCIP) was established in the aftermath of the Marmara earthquake in 2000, with the assistance of the World Bank. The pool offers efficiently priced earthquake insurance to homeowners. The TCIP sold more than 2.7 million policies (i.e., 20 percent penetration) in 2007, compared to 600,000 covered households when the pool was set up. A similar catastrophe pool is being developed in Romania and for South-Eastern European countries.

Index-based insurance offers new opportunities for the emergence of commercial agriculture insurance in low- and middle-income countries, but its scalability still needs to be demonstrated. The emergence of index-based insurance, both at the micro (farmer) and macro (government) level, supported by the World Bank and donors, contributes to a revisiting of a potential role for agriculture insurance in economies where agricultural sectors have become more profitable and commercially oriented. Index-based insurance products, which rely on the measurement of an objective and independent proxy, offer new opportunities to transfer the systemic components of crop losses caused by droughts, low temperatures or extended floods. An index-based insurance program is also piloted for livestock in Mongolia. While this type of insurance shows promise, it is cost-effective only for specific crops, perils, and geographical areas. Implemented in more than 15 countries, such as in India and Mexico, index-based agricultural insurance still needs to demonstrate sustainability and scalability, particularly in low-income countries.

Sovereign risk financing allows countries to secure access to financial capacity when a disaster hits. Sovereign risk financing is particularly justified for countries for which potential losses caused by natural disasters are large relative to their national economies, or where the cost of mobilizing post-disaster funding is high. A cost-effective sovereign risk financing strategy relies on an optimal layering of catastrophic risk, including establishment of a reserve fund to cover small and recurrent losses, contingent credit, and financial instruments such as reinsurance and catastrophe bonds. The Caribbean Catastrophe Risk Insurance Facility (CCRIF) offers Caribbean countries budget insurance akin to business interruption coverage that will provide immediate liquidity in the case of a major hurricane or earthquake. The Mexican government secured US\$450 million in contingent disaster financing through traditional reinsurance and catastrophe bonds covering a major earthquake affecting Mexico. The World Bank is investigating new financial services to help countries transfer their catastrophe risks to the capital markets, including multi-country catastrophe bonds and weather derivatives.

Regional catastrophe insurance pools can offer developing countries access to international reinsurance on competitive terms and new business opportunities to the reinsurance industry. Governments are often

hesitant to purchase insurance from private agents for bureaucratic reasons. Likewise, insurers may be reluctant to start a business relationship with a government, since it is unlikely to offer a long-term commitment because of changing annual budgets and political regimes. Regional catastrophe insurance pools, such as the CCRIF, can facilitate access to the reinsurance markets on competitive terms by pooling country-specific risks into a single, better structured portfolio. They create new business opportunities to the reinsurance industry, which may not have otherwise approached these countries on an individual basis because of the high transaction costs.

Why Should Donors Intervene in Catastrophe Risk Markets?

The historical framework of disaster recovery for low- and middle-income countries is a heavy dependence on post-disaster assistance, particularly contributions from donors. As the impact of disasters has increased, this system is becoming increasingly unsustainable and a more proactive approach to disaster risk management is needed. Evidence shows that disaster-related external assistance is usually not incremental, but instead largely displaces funding for development, if not immediately, then over one to two years. In addition to crowding out other investment lending programs, reallocations have been a large part of the IFIs' response to disasters. Although reallocations can give countries flexibility to react to unforeseen needs, they divert funds from their original purposes and can prevent the achievement of planned development goals.

The catastrophe insurance markets are underdeveloped in low- and middle-income countries. More than 40 percent of the direct losses from natural disasters are insured in developed countries, usually through compulsory insurance. On the contrary, it is estimated that less than 10 percent of these losses are covered by insurance in middle-income countries and less than 5 percent in low-income countries. This is a direct consequence of the underdeveloped non-life insurance markets. The insurance penetration, measured as a percentage of GDP, is 1.4 percent in Latin America and Africa, compared to 3 percent in Europe and almost 5 percent in North America.

Insurance is a complex financial product requiring sophisticated financial infrastructure. Insurance markets are heavily dependent on information flows. Information on policyholder risk characteristics is transmitted from insurance intermediaries, such as brokers and agents, to primary insurance companies that issue policies to individuals and businesses. Primary insurers in turn need to provide information to global reinsurers when they purchase reinsurance. This is often done through reinsurance brokers. Breakdowns in the informational flows at any point in the process can lead to serious market problems, such as incorrect pricing, inadequate loss reserves, insufficient equity capital, and poorly designed reinsurance programs.

Market imperfections can impede the emergence of competitive catastrophe insurance markets. On the demand side, the development of efficient catastrophe insurance markets is undermined by low non-life insurance penetration, inadequate awareness of catastrophic risk exposure, and limited ability to pay insurance premiums due to low incomes. At the government level, very few countries have developed national disaster risk management programs, which could facilitate the emergence of risk financing solutions and the availability of inexpensive post-disaster funding. For middle-income countries, some of the demand side imperfections are less severe than for the low-income countries. For instance, reasonably well-developed insurance markets exist in some middle-income countries, and the level of financial literacy among consumers tends to be higher (see Table 1).

Supply-driven market imperfections are mainly due to limited technical capacity, undercapitalization of local insurers, and regulatory impediments. The level of technical expertise required to interact effectively with the reinsurance and capital markets has grown rapidly. However, domestic companies in many developing countries tend to lack the necessary financial and actuarial expertise to design and price catastrophe insurance programs and to present attractive proposals to international reinsurers. The problem is most acute in low-income countries. International reinsurers are often discouraged from doing business in low- and middle-income countries because of a lack of data or the absence of catastrophe risk models. In addition, many of the domestic insurers, particularly in low-income countries, are undercapitalized,

Table 1 Summary of Market Imperfections in Low- and Middle-Income Countries

Market Imperfections	Challenges faced by donors		Comments
	LIC	MIC	
Demand Side			
Low non-life insurance penetration	H	M	Budget constraints and underdeveloped local insurance markets.
Low awareness of catastrophe risk exposure	H	M	Database and models need to be developed.
Low insurance education	H	M	Limited financial literacy.
Limited ability to pay	H	M	Health and life insurance has higher priority to buyers on limited budgets.
Weak institutional capacity	H	M	Need for institutional capacity building at national and sub-national levels.
Post-disaster assistance	H	H	Post-disaster assistance takes time to materialize and is usually earmarked to specific projects.
Low business volume	H	M	Reliance on post-disaster assistance also creates a moral hazard problem by providing disincentives for disaster mitigation and risk management.
Unstable demand for catastrophe insurance	H	M	Private reinsurers do not want to invest when potential business volumes are expected to be low. Government programs are unpredictable due to changing political leadership
Inadequate government attention to catastrophe risk management	H	M	Catastrophe risk management often is not part of the political dialogue. IFIs and donors have a major role to play in raising government and public awareness.

(continued)

Table 1 Summary of Market Imperfections in Low- and Middle-Income Countries (continued)

Market Imperfections	Challenges faced by donors		Comments
	LC	MIC	
Supply Side			
Limited access to international capital markets	H	M	Recent experience (e.g., Mexico, the Caribbean, India) supported by donors, shows that innovative solutions can facilitate access to international capital markets.
Insufficient domestic insurance capacity	H	M	Domestic insurance markets have limited financial capacity to be allocated to catastrophe insurance.
International reinsurance capacity	L	L	Capacity is increasingly available in low- and middle-income countries if programs are well structured and properly priced.
Reinsurance cycles	M	M	Less sensitive in developing countries than in high-volume developed markets when not correlated with peak risks in developed markets.
Agency & monitoring costs	H	H	Can significantly impact the cost of risk financing. Index-based products can lower these costs.
Limited technical capacity of the domestic insurance industry	H	M	Many domestic insurers lack actuarial, modeling, and financial skills to efficiently manage catastrophe risks. There is a need for capacity building.
Regulatory impediments	M	M	Arbitrary reinsurance rules may impede the adequate supply of catastrophe insurance or inflate the premium rates.
Informational costs	H	M	They can significantly increase the commercial (re)insurance premium through the uncertainty load.
Excessive cat risk transfer pricing	M	L	Pricing is competitive when programs are well structured. It tends to decrease because of new capital inflow on reinsurance and capital markets.

Source: Authors.

Note: The challenges faced by donors are rated H (high), M (medium), and L (low).
LC = Low-Income Countries; MIC = Middle-Income Countries.

which considerably limits their ability to offer catastrophe insurance. Regulatory requirements may also impede the supply of catastrophe insurance (see Table 1).

Catastrophe reinsurance capacity is available for developing countries as long as their risk portfolio is properly structured and adequately priced. The capacity of the global catastrophe reinsurance (and particularly catastrophe excess of loss) increased from US\$160 billion in 2006 to almost US\$180 billion in 2007, including more than US\$20 billion raised by new or existing reinsurance companies following the 2006 hurricane season. Capital also enters the catastrophe reinsurance market through a non-traditional financial instrument such as catastrophe bonds. Nearly US\$8 billion in new risk capital was raised in the CAT bond market in 2007. Although 75 percent of the catastrophe reinsurance capacity is allocated to North America and Western Europe, reinsurance companies are more and more interested in allocating capital to middle- and low-income countries in order to diversify their portfolios. However, the requisite portfolio preparation work, such as catastrophe risk modeling and data collection, can be expensive relative to potential revenues, particularly in low-income countries.

Catastrophe reinsurance prices in middle-income countries tend to be lower than those in some developed countries because of the diversification benefits. Catastrophe reinsurance prices are sometimes considered “excessive,” because reinsurance premiums are often much greater than the expected reinsured losses. The price of catastrophe reinsurance is mainly driven by the expected loss, the expense load, and the contingency load. In middle- and low-income countries, the expense load tends to be higher than that in developed countries because of higher startup and administrative costs. The total cost of capital tends to be lower for countries where catastrophic risks are not highly correlated with the peak risks in developed countries, because investors tend to reward risk diversification. The catastrophe bond in Mexico and the Caribbean Catastrophe Risk Insurance Facility demonstrate that well-structured portfolios can be placed on reinsurance and capital markets on good terms. Catastrophe reinsurance is currently almost non-existent in most low-income countries, except a few deals on agriculture insurance supported by the donor community. In those cases, catastrophe reinsurance prices tend to follow

those of middle-income countries when the deal is well structured, but this requires significant effort and investment.

Domestic insurance markets in middle- and low-income countries are particularly exposed to catastrophe reinsurance cycles. Reinsurance markets experience periodic market fluctuations (“hard markets”) when coverage supply is restricted and prices rise sharply. Such fluctuations have limited impact in middle- and low-income countries, where exposure to risk is relatively small and not highly correlated with peak exposures in developed markets, and particularly in the U.S. market. This is a direct consequence of the increasing pricing discrimination between countries, and even between regions within a country. Nevertheless, these fluctuations can significantly impact the domestic catastrophe insurance market in middle- and low-income countries, through price increases and/or reduction of supply, because many of the domestic insurance companies rely extensively on external risk capital provided by the international reinsurance markets. Undercapitalized insurers cannot retain more catastrophe risks when the market is hard and, consequently, their insurance prices follow the volatility of the reinsurance prices.

Catastrophe insurance market imperfections can justify intervention by the public sector, supported by the development community. The development of catastrophe insurance and reinsurance markets in low- and middle-income countries is impeded by a variety of demand side and supply side market imperfections. Overcoming these problems is an essential step in putting together risk transfer programs that can be presented to international reinsurance and capital markets. Technical assistance may be needed to create domestic insurance and financial infrastructure for risk packages that can be reinsured or securitized. If this step can be accomplished, the reinsurance placements and securitizations should be relatively successful, that is, risk transfer can be accomplished at a reasonable price and without significant exposure to supply constraints. The rationale is that risk transfer placements from developing countries are generally quite small in comparison with developed-market transactions and are valuable to reinsurers and investors for diversification purposes, because they cover off-peak perils and geographical areas where reinsurers and investors currently have little exposure. The story is similar for middle-income countries, except that some technical capability

is already present to assist in structuring packages of risks for transfer into global markets. However, there is significant heterogeneity across the middle-income countries in regard to the severity of the supply side imperfections.

How Should Donors Intervene in Catastrophe Risk Markets?

The donor community has an interest in facilitating the development of catastrophe risk financing markets, given market inefficiencies and the clear fiscal and developmental implications of natural disasters for middle- and low-income countries. To date, the World Bank has led this agenda among the development community, through building a DRM framework in which catastrophe risk financing is an important component and supporting the development of risk financing instruments and vehicles.

Public interventions in catastrophe insurance markets should be “market-enhancing.” The market-enhancing view recognizes that market failures can create suboptimal allocations of resources and that private sector coordination is not always effective. Public policy should facilitate the development of risk market infrastructure that enables market-based solutions, such as the creation of public goods (for example, data collection and management systems) and the provision of technical assistance. Governments should avoid creating permanent, new government institutions to substitute for private solutions, although government institutions can be invoked in very specific circumstances where risks are ill defined and private market solutions are not available.

Public intervention clearly has a role in catastrophe insurance markets, but inappropriate intervention can be ineffective or even detrimental, leading to public failure. Public insurance programs have been shown to be inefficient, because they are unlikely to follow the key principles for efficient catastrophe insurance, which rely on risk segregation and price discrimination to control adverse selection and the use of various mechanisms to control moral hazard. Likewise, the provision of direct insurance premium subsidies tends to distort the market price signal and encourages policyholders to overinvest in risky areas.

Five key principles should guide public intervention in catastrophe insurance markets. The principles reflect the need for close partnerships between the countries, the donor community, and international financial institutions such as the World Bank for the development of competitive catastrophe insurance and reinsurance markets.

- *Promote catastrophe risk financing in the dialogue on disaster risk management with low- and middle-income countries.* Disaster risk management should become part of a wider dialogue with countries regarding macroeconomic stability and growth. The lack of disaster risk financing has a significant impact on fiscal discipline, debt sustainability and country ratings. Catastrophic risk financing solutions, including insurance, should be encouraged within the five-pillar DRM framework. Risk financing solutions should be designed to further induce policyholders to mitigate their risks.
- *Enhance competitive catastrophe risk markets.* The development community can play an important informational role to help create more efficient insurance and reinsurance markets. An effective legal and regulatory framework is needed to support competitive markets. Public-private partnerships can stimulate the development of competitive domestic insurance industries and facilitate access to international reinsurance and capital markets to generate effective and affordable insurance solutions for private agents (for example, property insurance for homeowners) as well as governments (for example, sovereign insurance).
- *Use risk-based price signals to encourage catastrophe risk management.* One of the important roles of competitive financial markets is the provision of price signals. In competitive markets, insurance premiums should be risk-based and differentiated, thus reflecting the underlying risk exposure. These draw attention to the catastrophe risk exposure of individuals, firms, or governments, and allow them to evaluate the benefits of a disaster risk management program by comparing the cost of risk reduction investments with the resulting reduction in potential losses.
- *Limit public subsidy programs to those that minimize distortions of market price signals.* Premiums should be risk-based and differentiated, thus reflecting the underlying risk exposure. These market price signals

would inform policyholders about their true risk exposure and encourage them to engage in cost-effective mitigation measures. Market-enhancing insurance subsidies can be justified to finance the development of risk market infrastructure. These should be targeted at startup costs for specific insurance programs, the development of public goods and the provision of technical assistance. These public subsidies should be made available to all market players in order to enhance competitive markets. Direct insurance premium subsidies should be avoided, because i) they distort the market price signal and thus give policyholders the wrong economic incentives; ii) they tend to benefit high-risk policyholders to the detriment of low-risk policyholders; and iii) they are almost impossible to phase out in the long term. However, they could be justified as part of a social safety net program, where the government wants to provide financial assistance to targeted households and the delivery system developed by the insurance industry is more effective than the public delivery systems in reaching the targeted population.

- *Develop customized catastrophic insurance solutions.* Risk financing solutions typically need to be tailored to specific local conditions. The role of donors in the financing of natural disaster protection should be tailored to country-specific variables, including risk exposure, the ability to diversify risks spatially and across time (for example, debt level, tax base), the degree of development of the domestic insurance market, and the access to international (re)insurance and capital markets.

What Roles for the Donor Community?

The donor community can play four key complementary roles in the development of catastrophe insurance solutions for developing countries.

In appraising the role of donors and IFIs in supporting the development of catastrophe risk financing solutions, the following can be identified: convening power, promoter of public goods that permit the development of risk market infrastructure, provider of technical assistance for innovative catastrophe insurance solutions, and financier.

- *Convening Power.* Using their in-depth knowledge of the client countries, their relationship with donors, and their reputation for impartiality in dealing with countries and the international reinsurance market, the World Bank and other IFIs can play a catalytic role in the development of efficient partnerships among countries, donors, and private markets for the financing of catastrophic risks.
- *Promoter of Public Goods.* Donors can play a major role in financing public goods that contribute to the creation of a risk market infrastructure, which facilitates the development of market-based risk financing solutions. Public goods include information collection and management systems, catastrophic risk assessment programs, risk modeling development programs, awareness and education campaigns, and institutional capacity building.
- *Provider of Technical Assistance for Innovative Catastrophe Insurance Solutions.* Donors can promote the emergence of innovative risk financing solutions, including index-based insurance products, national and regional catastrophe insurance pools (for example, TCIP, CCRIF), and risk transfer vehicles (such as reinsurance, catastrophe bonds, weather derivatives).
- *Financier.* Donors and international financial institutions such as the World Bank can also finance catastrophe risk insurance programs by providing initial capital or reserves to public-private insurance vehicles, contingent loans, temporary premium finance, or by acting as enhancers or credit guarantors of future payments.

Public intervention in catastrophe insurance markets, supported by the donor community and the World Bank, should be country-specific. Low-income countries, where the domestic non-life insurance market is undeveloped, should focus in the short term on the development of sovereign catastrophe insurance solutions and the promotion of public goods related to risk market infrastructure. These countries are usually not mature enough for the promotion of catastrophe insurance pools for private homeowners. Middle-income countries, where the domestic non-life insurance market is more developed, should help the private insurance industry offer market-based catastrophe insurance solutions to homeowners and to

small and medium enterprises, including the agricultural sector. This book offers a framework, with lessons drawn from recent experience, guiding principles for public intervention and potential roles for donors and IFIs. They are expected to be used to develop affordable, effective, and sustainable country-specific catastrophe insurance programs.

Catastrophe Risk Financing in Developing Countries Principles for Public Intervention

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Catastrophe Risk Financing in Developing Countries provides a detailed analysis of the imperfections and inefficiencies that impede the emergence of competitive catastrophe risk markets in developing countries. The book demonstrates how donors and international financial institutions can assist governments in middle- and low-income countries in promoting effective and affordable catastrophe risk financing solutions.

The authors present guiding principles on how and when the governments, with assistance from donors and international financial institutions, should intervene in catastrophe insurance markets. They also identify key activities to be undertaken by donors and institutions that would allow middle- and low-income countries to develop competitive and cost-effective catastrophe risk financing strategies at both the macro (government) and micro (household) levels. These principles and activities are expected to inform good practices and ensure desirable results in catastrophe insurance projects.

Catastrophe Risk Financing in Developing Countries offers valuable advice and guidelines to policy makers and insurance practitioners involved in the development of catastrophe insurance programs in developing countries.



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