INTER-AMERICAN DEVELOPMENT BANK
WORKING GROUP ON DISASTER RISK FINANCING

DEVELOPING AND SUPPORTING THE USE OF DISASTER-LINKED FINANCIAL INSTRUMENTS: THE ROLE OF THE IDB IN LATIN AMERICA AND THE CARIBBEAN

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EXECUTIVE SUMMARY

Large areas of Latin America and the Caribbean are exposed to earthquakes, windstorms, drought, and floods, causing an exponential increase in catastrophe losses. Some of these hazards are suitable for risk pooling arrangements across countries in exposed regions but local financial markets do not have the capacity to provide risk-transfer and financing arrangements. The IDB can contribute with required funding while acting as a catalyst in the establishment of government-backed calamity funds and insurance pools that may access favorable risk-transfer opportunities in the international markets.

The IDB is ideally positioned to support a more *proactive* handling of catastrophe risks through assessing, mitigating, and financing exposures before they materialize into major economic losses. The Bank benefits from strong member country backing at high governmental levels, thanks to its long-standing and unfailing commitment to economic development in LAC. It has unparalleled economic, financial, and managerial expertise, coupled with significant regional market insights, retains the highest credit rating, and offers favorably priced credit facilities to deserving member countries. Moreover, its unfaltering reputation and strong international relations allow cooperation with other institutions in the development of regional risk management solutions.

The IDB should use these strengths to promote proactive risk management efforts across LAC, in collaboration with the World Bank and regional relief agencies when applicable. This effort should be based on a country-centric approach, with solutions tailored to the specific regional conditions by establishing professional risk management functions in the exposed member countries. The Bank should be in a position to advise on professional risk management practices and provide credit facilities to establish *ex-ante* funding. It should also assume a role in facilitating global risk-transfer opportunities and support ongoing risk management activities.

It should be noted that practices of *unconditional* government and donor relief after major disasters create disincentives for proactive risk management policies and, therefore, should be avoided. The risk prevention and mitigation facilities offered by the Bank have, so far, been underutilized due to a lack of economic incentives. In the end, this is a major governance issue for the institution. Hence, for the Bank to succeed in instituting more proactive risk management practices throughout the region will require unequivocal support from the Executive Board and the borrowing and non-borrowing member countries they represent.

There is a need to establish *formal* risk management entities in all exposed member countries to enable informed discussions about risk mitigation, risk-transfer, and risk-financing solutions. Today, most countries do not have a risk management organization that systematically tracks, monitors, and manages major exposures. As a result, the Bank rarely finds adequate national counterparts for substantive risk management discussions. The national risk management process should be anchored in a central government entity mandated to identify and assess major national exposures, determine government commitments, and consider appropriate risk solutions.

There are substantial economic gains to be had from the implementation of *proactive* risk management policies in the region. Effective proactive risk management practices – including risk identification, mitigation, preparedness, insurance, and financing – will reduce vulnerability and economic losses from disasters while inducing economic growth during post-disaster reconstruction. Hence, the Bank's products and services should encompass all risk management aspects to be able to contribute actively when a country is instituting and operating proactive risk management processes.

The report's main conclusions are the following:

- The Executive Board must unambiguously support the move toward *proactive* risk management practices by instituting consistent policies and making available the necessary internal resources for their implementation.

- There is a need to establish government risk management offices at the national levels in order to have suitable counterparts for risk management discussions and avoid the moral hazards of unprepared *ex-post* disaster financing.

- The proactive risk management initiatives across the region should be based on comprehensive country strategies, allowing products and services to be tailored to each country's specific risk identification, mitigation, and financing needs.

- Bank products and services must encompass all parts of the risk management process, including exposure identification, measurement, assessment, prevention, mitigation, transfer, financing, emergency response, and reconstruction.

- There is a need for *advisory services* to support the development of comprehensive risk management processes and risk-transfer solutions (in collaboration with multilateral and professional institutions that possess this expertise).

- More *credit products* should be introduced so that the Bank may offer a range of *ex-ante* risk-financing solutions, including long-dated rollover facilities, committed credit lines, and stand-by facilities.

- The Bank should promote proactive risk management practices by instituting economic incentives for borrowing members that want to abide by its policy guidelines, and consider risk-adjusted pricing.

- The implementation of a proactive risk management policy should be assessed on an ongoing basis by monitoring progress in view of targeted goals and institutional benchmarks.

1. GENERAL BACKGROUND

Many of the borrowing member countries at the Inter-American Development Bank (IDB) are exposed to natural disasters that may cause substantial economic and social disruptions. The management of these risks is critical to reducing the economic vulnerabilities associated with major catastrophe events and ensuring the continuation of essential development programs in exposed countries. Failure to accomplish this will put current IDB programs at risk and jeopardize the Bank's development mission. Insufficient mitigation and *ex-ante* financing of major disaster exposures diverts development funds to deal with immediate recovery needs when major events happen. Therefore, countries in the Latin American and Caribbean (LAC) region must take precautionary measures and establish reasonable risk covers to deal effectively with the financial repercussions of major natural disasters that hit large parts of the region with increasing intensity and frequency. The IDB should be positioned to support these initiatives.

1.1 Objectives and motivation

Considering the increasing disaster exposures in the LAC region, the objective of this report is to help identify key elements of a disaster finance strategy for the IDB that will enable borrowing member countries to better cope with the economic consequences of natural disasters. The analysis should point to actions the Bank may take in developing relevant risk-financing instruments and services for member countries in view of the different mechanisms countries may adopt to manage their disaster exposures. Dealing with disaster risks on an *a priori* basis will reduce the level of uncertainty ascribed to the economic consequences of various disaster events. Providing the means to establish a minimal risk-financing capacity can help ensure a reasonable level of stability and consistency in needed economic development programs. Hence, investing in risk management practices will allow countries to reduce the adverse economic impact of disasters and exploit potential advantages deriving from faster reconstruction of new economic infrastructure. While the IDB has introduced lending and technical assistance programs to support country risk mitigation strategies, these initiatives have been undersubscribed and have failed to fundamentally change the situation.

1.1.1 Key elements of a disaster financing strategy

Current risk management practices in the LAC region do not allow the IDB to use its financial resources effectively in pursuit of its mission. To remedy this, the IDB and the exposed borrowing member countries must engage in more *proactive* strategies to manage major risks and establish financing arrangements in support of post-disaster reconstruction for the benefit of the region's economic advancement. Hence, an essential part of a risk finance strategy for the IDB will consist of *advisory services* that support the development of effective risk management practices, and *financial instruments* that can provide exposed member countries with effective means to offset part of their disaster exposures.

1.1.2 Actions for *ex-ante* and *ex-post* financing instruments

Disaster financing arrangements established to deal with humanitarian assistance and reconstruction of economic infrastructure can take various forms, including calamity funds, insurance contracts, and lines of credit. However, for many countries it is difficult to accumulate sufficient savings for such earmarked purposes when other pressing needs take precedence in the political agendas. Moreover, the local insurance industry and the global reinsurance markets do offer some post-disaster resources but domestic transaction costs tend to be high. While countries with favorable credit ratings can access the international debt markets, loans become more expensive right after major disasters and negotiations are too laborious and time-consuming to accommodate *immediate* funding needs. As a consequence, many countries finance disaster reconstruction by eliminating critical investment programs and relying on the benevolence of

other nations. This state of affairs reduces the maneuverability of national governments and increases the dependency on the international community. This situation is further aggravated by a dramatic increase in the number of natural disasters observed across the LAC region, rising at a rate that is outpacing the financial disaster support available from donor countries.

Hence, there is a need for more effective risk management practices to consider appropriate mitigation efforts and establish *ex-ante* risk financing arrangements. Disaster preparedness and early warning systems can ensure that immediate actions are taken when disasters strike to prevent extreme humanitarian crises. Risk mitigation reduces the vulnerability of economic assets to disasters, while risk financing arrangements provide the financial resources to rebuild affected economic assets in the wake of a disaster.

Some basic trade-offs have to be considered in this context between *ex-ante* and *ex-post* financing activities. Since reconstruction of economic infrastructure offers an opportunity to install newer, more efficient equipment, effective post-disaster reconstruction can provide an impetus to economic growth. On the other hand, *ex-ante* risk mitigation efforts have diminishing economic return characteristics that should be weighed against the need for up-front investments. Since insurance covers for higher levels of disaster exposures become progressively more expensive, there are comparable trade-offs between the affordability of insurance premiums and the required *ex-post* loss coverage. Effective disaster financing strategies should obviously take these trade-offs into consideration.

1.1.3 Mechanisms to manage disaster risk by member countries

The IDB is exposed indirectly to regional disaster risks in a number of ways. Over extended periods of time there is a relationship between the credit standing of borrowing member countries and the quality of the Bank's loan portfolio. If the credit standing of borrowers falls due to ineffective responses to the adverse economic effects of disasters, the credit quality of the Bank's loan portfolio may also fall. The Bank's development mission may be further jeopardized when investment programs are interrupted and funding is diverted to support immediate needs of unprepared disaster situations. The IDB – as *de facto* lender of last resort to the LAC region – often feels obliged to make loans available when exposed member countries are most economically vulnerable and faced with unexpected disaster financing requirements. Hence, the IDB itself will ultimately be affected by ineffective risk management practices when borrowing member countries have to cope with the economic consequences of mounting catastrophe exposures. Neglecting risk mitigation opportunities and failing to engage in timely financing arrangements that secure effective post-disaster reconstruction of essential economic assets will put the Bank's development mission at stake. Thus, the Bank's risk-financing strategy must provide *incentives* for exposed member countries to engage in more effective risk management practices and make available financial instruments and services for this purpose.

1.2 Status of IDB risk position

There is general agreement that the negative economic impacts from natural hazards are increasing, with devastating consequences for the development prospects of most countries in the LAC region.[1] The economic losses associated with natural disasters have increased over the past decades at a pace well above the economic growth rates of the region. It is difficult to assess the exact monetary losses associated with physical damages but the direct economic losses from natural phenomena in the LAC region are now estimated in excess of US$3 billion per year, and these losses are growing exponentially. Natural disasters on average affect around 4 million

[1] See, for example, the Companion Paper to the Draft Disaster Risk Management Policy of the Inter-American Development Bank , (IDB, 2007).

people in the LAC region every year.[2] However, historical data largely show positive relationships between various disaster events and subsequent economic growth (Albala-Bertrand, 2000, 2003; Andersen, 2005), i.e., there is a potential economic windfall to be gained if funds are readily available to replace economic infrastructure with more productive assets after major disasters. The *caveat* here is that the demand for reconstruction funding is outgrowing available emergency donations from the international community. Moreover, the increasing catastrophe frequencies observed across LAC will inevitably impose further strains on government budgets. As a consequence, the exposed countries tend to divert investment funds from the public budgets, a practice that eventually will have adverse economic development effects (Benson and Clay, 2000, 2002). This diversion of funds from governments' long-term investment budgets will reduce the efficacy of IDB's development loans either directly – as loans are restructured – or indirectly, as public funding is reorganized to cover short-term emergency requirements. Thus, the rising disaster trend will gradually reduce the credit standing of highly exposed countries and may eventually be mirrored in a lower credit standing of the IDB, if the loan portfolio deteriorates significantly.

1.2.1 Major catastrophe exposures in LAC

The most common natural hazards across the LAC region are earthquakes, windstorms (hurricanes), floods, and drought (often *El Niño* related phenomena). *Earthquakes* represent a very costly natural hazard, based on reported losses. The 1985 Mexico earthquake (loss estimate of US$4 billion), the 1999 Columbia earthquake (US$2.9 billion loss), and the 2001 earthquakes in El Salvador (total loss estimate of US$2.8 billion) constitute some of the highest single losses. Based on the *number of people affected* by natural hazards, droughts and floods are among the most significant disasters in the region. Based on reported *direct loss estimates*, earthquakes, storm events, and floods are most significant.

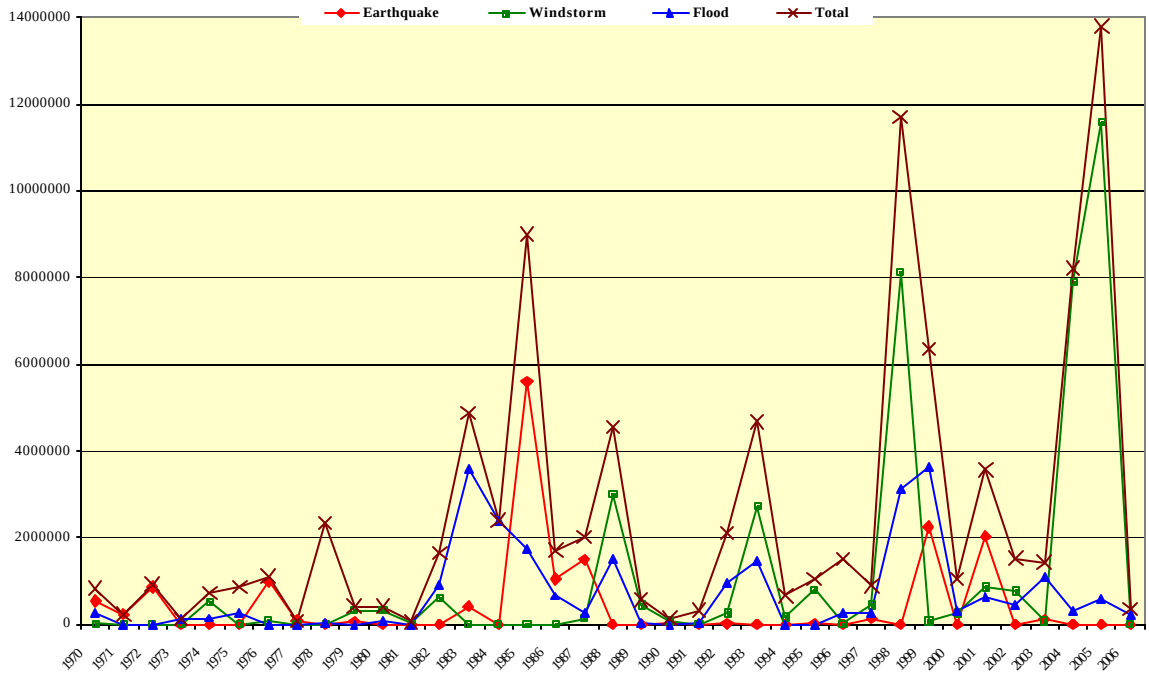
Storm events account for some of the largest reported natural catastrophe losses. Hurricane George, in passing through the Caribbean in 1998, caused estimated damages of US$ 2.2 billion in the Dominican Republic. Honduras and Nicaragua were hit by tropical storm Mitch the same year, with aggregate damages of US$3 billion. Hurricane Gilbert hit St. Lucia, Jamaica, and Mexico during 1988 causing total damages of around US$3.4 billion. The hurricane intensity has clearly been increasing in recent years. The large storms Charley, Ivan, Jeanne, and Rita caused major damages in Jamaica, Cuba, and Haiti during 2004. Mexico was hit by three hurricanes (Emily, Stan and Wilma) in 2005. Wilma caused total losses approaching US$ 20 billion across Mexico, Jamaica, Haiti, and Cuba. Stan caused major rainfall, floods, and landslides in Mexico and Central America, with insured losses amounting to some US$ 2.8 billion. In contrast, 2006 was a year with comparably modest wind damage to the region.

Major *flood events* affected Venezuela in 1999, with estimated losses of US$2 billion, and Peru in 1997-98, with damages around US$1.2 billion. *Drought* events are associated with lower reported losses. One of the major incidents registered loss estimates of US$1.2 billion in Mexico during 1996. Brazil experienced major droughts in 2005, with total losses of around US$ 1.4 billion. Drought events typically emerge over time, i.e., they do not constitute rapid-onset events, often characterized by high loss estimates. Nonetheless, drought may affect the economic conditions of large rural populations, e.g., repeated droughts in Peru in 1983, 1990, and 1992 affected more than 4 million people.

[2] The Centre for Research on the Epidemiology of Disasters (CRED) provides estimates for affected people in approximately 75% of the reported incidents in the LAC region and registers loss estimates in around one third of these cases. CRED, which is located at the *Université Catolique de Leuvain* in Belgium, is a major source of information on direct economic losses from natural catastrophes, with data collected from all publicly available information sources, such as, major insurance companies, various multilateral organizations, and news media.

The catastrophe events are distributed unevenly throughout the LAC region, leaving some countries more exposed than others and exposing countries to different types of environmental hazards. Many Caribbean countries are exposed to severe windstorm damages as hurricanes permeate the region. The tropical hurricanes also affect the mountainous regions of Central America and expose countries to damages from windstorms, floods, and landslides. Parts of South America are exposed to floods and drought, and contain earthquake-prone regions.

Figure 1.1 Development of Major Catastrophe Losses in the LAC Region 1970-2006 (US$ 1,000)



Source: Centre for Research on the Epidemiology of Disasters (CRED)

1.2.2 IDB disaster risk exposure

Countries in LAC largely rely on multilateral institutions for their emergency financing requirements, including the IDB as lender of last resort to the region (Freeman and Martin, 2002). This situation creates a so-called *moral hazard*[3], because over-reliance on multilateral funding reduces the political incentives to deal with natural catastrophe exposures before they happen (Andersen and Masci, 2001) and proactive risk management practices tend to be disregarded. This means that prevention and risk mitigation efforts that could lead to significant reductions in economic vulnerability receive limited attention. It also means that there is little inducement to engage in *ex-ante* risk financing arrangements that could facilitate fast and effective post-disaster funding for the reconstruction of affected economic assets.

It is now widely believed that climate change is in part responsible for the rise in the frequency and intensity of natural disasters across the world, making it a factor to reckon with in disaster risk management. An assessment of the composition of the Bank's current loan portfolio suggests that approximately 60% of IDB's loans relate to projects that are sensitive to changing climatic conditions while the remaining 40%, devoted to upgrading social, administrative, and governance

[3] In economic theory, moral *hazard* refers to the possibility that the redistribution of risk *changes people's behaviour*. For example, a person whose automobile is insured against theft may be less vigilant in locking the vehicle than an individual who is not insured.

conditions, are deemed less sensitive.[4] A preliminary analysis of 45 lending projects over the 2003-05 period indicates that over 10% of the loans could be considered highly sensitive to climate change while around 25% of the loans are deemed moderately sensitive. These figures call for more *systematic screening for climatic risk factors* in the administration of the loan portfolio to protect the Bank's assets against the adverse effects of potential disaster events.[5] The annual direct losses attributed to natural disasters in LAC over the past decades make up more than half of the total annual loans extended by the IDB to the region, which shows that the mounting catastrophe financing requirements are substantial compared to the IDB's loan capacity.

According to the Office of Evaluation and Oversight (OVE), the Bank's policies and operational practices with respect to disasters pose a great challenge to most countries in LAC and necessarily affect the IDB's engagements in the region.[6] Yet, the greatest challenge for the Bank is not maintaining the quality of its loan portfolio but accomplishing the Bank's development mission, as borrowing member countries continue to face disaster risks without proper advance preparation to counteract the adverse economic effects. Unfortunately, the Bank does not systematically assess and monitor the associated economic costs to the LAC region or take concerted policy actions to deal with changing climatic (and related environmental) conditions.

1.2.3 Regional disasters and IDB exposure

The *direct* economic losses from natural disasters comprise the physical destruction of economic assets like dwellings, business properties and industrial facilities, and public assets like power plants, water supply, drainage and telecommunication systems, roads, bridges, harbors, airports, hospitals, educational institutions, central administration, and the like. The *indirect* economic effects arise from the subsequent disruption of economic activities that can be reversed by effective rehabilitation and reconstruction efforts. The potential direct losses can be estimated with reasonable accuracy and used as a basis for assessing possible risk mitigation efforts and engagement in catastrophe risk financing arrangements. However, while the emergency response capacity of countries in the region has improved, adherence to systematic risk management practices is still limited (Andersen, 2005; Charveriat, 2000; Freeman et al., 2003). This situation obviously increases the IDB's direct and indirect level of exposure to the adverse economic effects of natural disasters in the region.

Exposed governments in LAC often feel politically obliged to honor the insurance claims of the general public, normally covered by the private insurance sector in economies with developed risk-transfer markets (Freeman et al., 2003). In this case, the government *de facto* acts as an unconditional insurer and assumes the risk, without giving any prior consideration to how to finance the associated costs. The claims may comprise damages to private housing, workman's compensation, and other relief payments that may constitute a significant part of public post-disaster costs. These claims do not necessarily have a direct bearing on the productive capacity of the country but may constitute social costs that receive high political recognition. Hence, there is an apparent need for some type of intervention to establish mechanisms that provide insurance coverage for these exposures.

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[4] However, some social investments and educational facilities may also be climate-sensitive. See, Iqbal, F.Y., Reducing Vulnerability to Climate Change and Variability in LAC: A Resource Overview of the IDB, Inter-American Development Bank, January, 2007.

[5] While there may be general guidelines for considering the environmental risks in the processing of new loan commitments, there do not seem to be consistent practices in place for ongoing monitoring of the loan portfolio with regards to the potential effects of climate and environmental change.

[6] RE-292, Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters, Office of Evaluation and Oversight (OVE), Inter-American Development Bank, April 2004.

1.3 Conclusions

- Exposures to natural catastrophes and associated losses continue to grow exponentially across the LAC region.
- There is potential for pooling specific hazard risks across countries in exposed sub-regions.
- Unconditional coverage of catastrophe losses by governments in exposed countries creates moral hazards.

2. REGIONAL RISK-TRANSFER MARKETS

The local insurance markets are generally underdeveloped throughout the LAC region and securitization of catastrophe risks – in the form of risk-linked securities placed among investors as capital market transactions – is virtually non-existent. Hence, the capacity for transfer and financing of catastrophe risks in national markets is very limited.

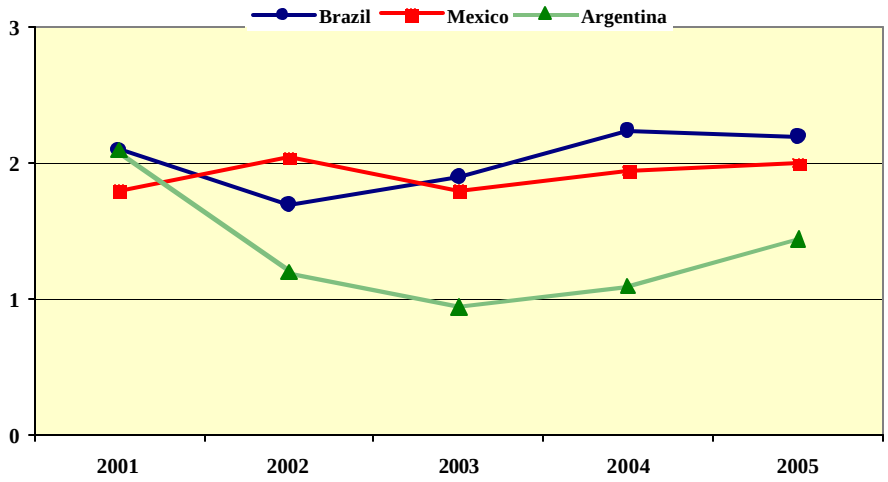
2.1 Insurance markets in LAC

The insurance penetration remains relatively low, with total premium incomes of casualty and life insurance amounting to around 2% of regional Gross Domestic Product (GDP).[7] While the LAC region accounts for approximately 8% of the global population and its GDP represents around 6% of global wealth creation, non-life insurance premiums make up only 2.8% of global premium income.[8] More than half the premiums derive from property and casualty insurance, with the remainder spent on life and health insurance. On average, 1.3% of GDP is spent on non-life insurance and 0.7% on life insurance.[9] There are some differences from country to country in the region, with penetration rates ranging between 0.7% and 1.9%. 90% of total premium income derives from the markets in Argentina, Brazil, Chile, Columbia, Mexico, and Venezuela. Argentina, Brazil and Mexico account for 75%, and Brazil and Mexico for two-thirds of the total LAC insurance market. The insurance penetration rates throughout LAC have not changed dramatically in recent years (Figure 2.1). Property and casualty insurance premium incomes in the region are expected to grow by around 4% p.a. over the coming years, somewhat above the expected GDP growth.[10]

Non-life insurance premium income rose in line with GDP development during 1995-2000. While the relatively low penetration rates suggest a high potential for growth, this category is strongly associated with the underlying GDP trend, i.e., it is closely linked to the level of economic prosperity (spurred by construction investments, industrial production, and consumption). Periodic economic downturns, therefore, cause insurance premium income to drop accordingly. Auto insurance accounts for the largest share of non-life insurance business and the premiums show high income elasticity whereas property insurance, which account for a smaller market share, are mainly influenced by the price developments in the international reinsurance markets. Property and casualty insurance have relatively high *cession rates* (also known as "reinsurance rates") of around 21-25%, due to the higher catastrophe exposures.

[7] Casualty insurance premiums typically range between 0.6-1.3% of GDP across countries in the LAC region, compared to 3-3.5% of GDP in the U.S. market.
[8] Sigma, 2/2002, Insurance in Latin America, Swiss Re.
[9] The corresponding global average penetration rates are 3.0% for non-life insurance and 4.9% in the case of life insurance.
[10] Benfield, Latin America Insurance Market Review, February 2007.

Figure 2.1 Development in Insurance Penetration Rates (casualty and life), 2001-2005



Source: Benfield, Latin America Insurance Market Review, 2007

There is a large *international* presence in the regional insurance market, accounting for more than 40% of property and casualty insurance, and an even higher share of life insurance. It is a major challenge for private insurers to develop viable products that cater to a wider section of the population; challenging because transaction costs are high, as reflected in significantly higher *expense ratios*[11] than in the US or Europe. Administrative and marketing costs are relatively high (in relation to net premium income) in the LAC region, due to market structures and business practices dominated by conventional distribution channels (brokers, agents, and field representatives). The use of newer approaches like telemarketing, mailing, and Internet access is lagging behind. Nonetheless, the major markets in Brazil and Mexico have been profitable in recent years and have shown favorable combined ratios.[12]

2.1.1 Stability and coverage

While foreign insurance companies have a strong presence in most LAC markets, they are faced with the same challenges as local insurance companies with regard to limitations in institutional structures, technical qualifications, and special insurance expertise. On the other hand, the strong international market presence also provides qualified buyers with opportunities for indirect access to the global reinsurance market and the international capital market. For example, the calamity fund Fonden, established by the Mexican government, issued the first cat-bond[13] on Mexican earthquake hazards during 2006, in cooperation with Swiss Re.

2.1.2 Price developments

The premiums on auto insurance are influenced by economic growth parameters and as such constitute 'discretionary' expenses. The current economic projections lead to short-term

[11] Ratio of *expenses* (commissions, taxes, acquisition, advertising and administration expenses, etc) to *earned premiums;* expenses do *not* include incurred losses, loss adjusting expenses and policyholder dividends.

[12] The *combined ratio* is the sum of the *loss ratio* and the *expense ratio*. The loss ratio, calculated as loss and loss adjustment expenses divided by net premium earned, measures the percentage of premium paid out in claims and associated expenses. For a definition of expense ratio, see footnote 10. A combined ratio *below* 100 indicates that premiums are sufficient to cover incurred losses and expenses.

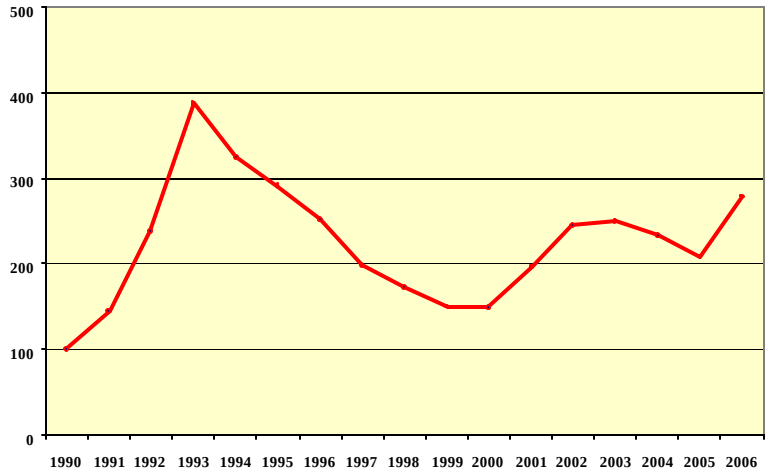
[13] Catastrophe bonds are risk-linked securities that transfer a specified set of risks from the sponsor to the investors. If the issuer (insurance or reinsurance company) suffers a loss from a particular pre-defined catastrophe, then the issuer's obligation to pay interest and/or repay the principal is either deferred or completely forgiven.

expectations of modest increases in premiums and penetration rates. In contrast, the property insurance market is highly correlated with the international property reinsurance rates that depend on developments in property catastrophe losses. The market experienced falling rates during the 1990s but is currently faced with a hardening of market conditions, marked by rising prices in 2006, which is likely to decrease the penetration rate for property insurance.

2.1.3 Sensitivity to major hazards

The property insurance premiums are correlated with global market developments, which, in turn, are affected by the realized property losses caused by large catastrophe events. Thanks to the consolidation of the insurance industry, subsequent to the devastation caused by hurricane Andrew in 1992, premiums fell. However, as the hurricane activity has intensified in the new millennium, market prices have gone up again. The development in the global market is reflected in the World ROL Index, which is based on insurance premiums in the major cat property markets (Figure 2.2).[14] There has been a general increase in global rates, in excess of 30% from 2005 to 2006, due to major catastrophe events. The property reinsurance rates differ substantially from region to region, e.g., the increase from 2005 to 2006 was 76.2 % in the United States and 129% in Mexico. The high correlation between regional market price developments is bound by the direct engagement of global reinsurance companies as they diversify their insurance portfolios across geographical markets.

Figure 2.2 Development of World ROL Index, 1990-2006



Source: Guy Carpenter, The World Catastrophe Reinsurance Market, 2006

2.2 Creating market transparency

As pointed out before, high regional expense ratios in the insurance industry reflect market inefficiencies. Low insurance penetration prevents scale economies from being realized and the existing market structure leads to excessive distribution costs that counteract increasing demand for insurance. Low insurance penetration is further related to low purchasing power and insufficient technical information that increase uncertainty and adverse selection. The quality of private property and other economic assets is inconsistent, the location of economic assets often not recorded clearly, and the loss frequency of different perils not measured and registered systematically. This points to areas where transaction costs can be reduced and opportunities for

[14] The ROL (Rate On Line) is the ratio of premium paid for reinsurance to the amount of risk transferred, expressed as a percentage. The ROL index by Guy Carpenter shows a development trend quite comparable to the global Camares index, calculated by Swiss Re based on their analysis of cat programs in the 13 largest markets.

scale economies gained. However, achieving this will require a strengthening of regulatory requirements, mandatory registration of economic assets, enforcement of building codes, etc. It also calls for improvements in economic infrastructure and industry practices to develop expertise and introduce new IT-enhanced distribution channels. Finally, there is a need to build knowledge about major perils and measure their frequencies and patterns.

2.2.1 Current practices and efforts

As highlighted above, the insurance markets of the region are generally underdeveloped and characterized by low penetration rates. They have a significant presence of international insurance companies and a substantial part of premiums are ceded in the global reinsurance market. The insurance markets are characterized by standard products distributed through conventional and costly agency channels. Hence, there is no immediate domestic market for alternative risk-transfer instruments. Conventional bank facilities are available, including committed credit facilities, but there is limited capital market capacity for securitized catastrophe risk, contingent capital instruments, etc.

Generally, there is little insurance of public sector assets across the region and only very rudimentary monitoring and control processes are in place. Initiatives taken by the Mexican government constitute a notable exception. The Mexican government established a tax-based calamity fund (Fonden) in 1996 to fund disaster reconstruction to federal agencies, state and municipal governments, who are required to insure public buildings. While the fund has received advance annual budget allocations, it would not be large enough to cover the potential financing needs of major hazard events. The costs imposed by hurricane Wilma during 2005 provided an incentive for Fonden to obtain additional cover through the issuance of a cat-bond. This has gradually converted the fund into a national insurance program, where loss layers in excess of paid-in funds are covered by various risk-transfer instruments.

2.2.2 Need for institutional strengthening

Regulated and well functioning financial markets improve resource allocation decisions by introducing effective credit intermediation and risk diversification mechanisms that ultimately contribute to the economic growth and stability. Hence, the continued efforts to institute more effective insurance markets in the region are an important element of the economic development programs. The immediate needs for the development of the financial sectors are of a rather basic nature, such as improving the institutional frameworks and, in the case of insurance, enforcing more stringent registration of economic assets and monitoring of events to reduce moral hazards. Once this is accomplished, there may be a basis for introducing more advanced financial derivatives and capital market instruments, requiring more complex and specialized financial institutions which, in turn, will raise regulatory demands.

The overall quality of financial reporting, cross-border operations, capital adequacy, and solvency requirements are deemed satisfactory.[15] However, a number of weak areas have been identified: (1) the organization of supervisory agencies, (2) corporate governance practices, (3) the enforcement of internal control systems, and (4) the handling of financial derivatives and other off-balance sheet items. These areas will require increased attention as the Bank engages in the advancement of financial market operations across the region, and represent vital elements of proactive risk management.

[15] IMF, Experience with the Insurance Core Principles Assessments Under the Financial Sector Assessment Program, August 2001.

2.2.3 Best regional practices

There is a need to develop *national* integrated, government-induced risk management programs throughout the LAC region (Freeman et al. 2003). Since central government plays such a fundamental role in post-disaster management initiatives, the active involvement of national governments is essential to ensure success. Risk management programs should focus on the *causes* of disaster losses rather than on passive and reactive disaster responses after the fact. They require, *inter alia*, comprehensive national risk management *systems* that build on an overarching mission set by senior government policy makers, in close consultation and coordination with local entities and involving the private insurance sector as well. In addition, they may require the establishment of focused insurance pools engaging specialized financial expertise.

The risk management initiatives should consider the *entire* process, including risk identification, mitigation, transfer, financing, preparedness, emergency response, rehabilitation, and post-disaster reconstruction efforts. Moreover, they should be based on a clear *national* disaster strategy that involves all key players in the disaster management process and establishes sufficient resources to accomplish the stated tasks. National risk management systems typically incorporate a National Disaster Management Office, reporting to a high-level National Disaster Council and supported by an Operations Control Group to coordinate activities (Freeman et al. 2003). It may also entail the creation of public-private insurance vehicles to secure availability of recovery funding.

2.2.4 Possible IDB actions

The low penetration of local insurance markets in the LAC region highlights the need for government involvement to establish insurance coverage for essential economic assets on a commercially viable basis. There appears to be a general need for government intervention to provide cover for these otherwise uninsurable risks. This need is also observed in developed countries with exposures to major catastrophe events.[16] Today, there is little focus on risk-transfer and risk-financing solutions among countries in LAC. Hence, it is imperative to create sustainable national natural disaster management systems for all exposed member countries in the region and the Bank can be an important catalyst in this process by promoting appropriate financing solutions. The LAC markets are not sufficiently mature to foster the immediate development of sophisticated risk-transfer instruments. Prevailing institutional uncertainties around asset management practices, deficient information on hazard events and economic exposures, and the lack of systems for loss valuation and claims settlement do not make this a viable short-term route. However, there are opportunities in *global* reinsurance and capital markets that can be exploited by national risk management systems.

2.3 Conclusions

- Insurance penetration is relatively low and local markets remain underdeveloped, with little immediate potential for advanced risk-transfer solutions.
- Registration of economic assets is inconsistent and the loss frequencies of major natural hazards are not systematically recorded.
- Public sector assets are typically not monitored and most often not insured.
- There is a need for national government-supported risk management programs.

[16] National systems to deal with catastrophe exposures are well known among exposed OECD countries, e.g., USA, Japan, New Zealand, Taiwan, UK, France, Germany, and Spain (Andersen, 2005; Freeman et al., 2001).

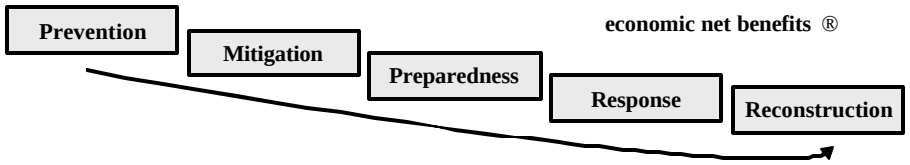
3. REDUCING REGIONAL DISASTER EXPOSURES

Given the lack of advance analyses of catastrophe risk exposures and of related mitigation and risk-transfer arrangements, the typical government response to unexpected disaster financing needs is to divert funds from the public investment budget. Incremental funding may also accrue from higher taxes, increased government debt, and international loans – including multilateral facilities and renegotiated existing IDB loans to accommodate the need to reallocate funds after a disaster. However, diversion of funds from government investment budgets disrupts development projects, with adverse longer-term economic effects (Benson and Clay, 2002). Therefore, this practice should be strongly discouraged.

3.1 IDB's role and efficacy

There is increased awareness that effective management of natural disasters involves prevention, mitigation, preparedness, emergency response, and post-disaster reconstruction (Figure 3.1). By focusing on reducing the vulnerability to natural hazards and providing faster recovery in the wake of a disaster, the economic growth associated with recovery investments will get a boost. Accordingly, the Bank has attempted to address some of the initial risk management phases to reduce the acute needs for rehabilitation and reconstruction investments after disaster strikes.

Figure 3.1 The Key Elements of Risk Management



Adapted from RE-292, Office of Evaluation and Oversight, OVE, 2004

Governments often feel obliged to fund the disaster losses that are most devastating to the electorate. To foresee these kinds of funding needs, it is imperative to determine *in advance* the type of economic assets that will compromise the government budget and extend the requirements for emergency funding. These economic assets may include private housing, small businesses, and public assets like educational institutions, health facilities, and essential infrastructure investments (roads, bridges, etc.).[17] Subsequently, due consideration should be given to how the government intends to cover these damages. While this is rarely done, the Bank has taken initiatives to provide funding for risk reduction purposes. However, comparatively little has been done to introduce and encourage the adoption of advance risk-financing solutions.

The Bank's existing loan facilities are geared towards general sector purposes but do include a number of *extended* loan facilities, in view of the periodic need for post-disaster funding. The *Immediate Response Facility* and the *Emergency Technical Cooperation* serve the latter purpose, while portfolio restructuring and reallocations from existing loans preserve the *status quo* by institutionalizing ex-post financing practices. The *Emergency Reconstruction Facility* largely plays the same role.

[17] Private housing often constitutes a significant share of the economic assets affected by natural disasters, and a category that governments feel obliged to cover (Freeman & Martin, 2003).

3.1.1 Prevention and mitigation funding

The Bank introduced the *Disaster Prevention Sector Facility (DPSF)* with the intent of supporting risk reduction by loaning funds in support of preventive investments and mitigation efforts as well as initiatives to strengthen preparedness. There has been some activity under this facility but demand for funding has been much lower than expected. Politicians have difficulty 'selling' the idea that the government should borrow money for *preventive* measures when there are other, seemingly more urgent, development needs. The Bank established a *Disaster Prevention Fund (DPF)* in 2006, with an initial capital of US$ 10 million, to encourage disaster risk prevention and mitigation initiatives in the region. The Fund will support initial efforts to reduce vulnerability, mitigate exposures, and prevent disasters.

3.1.2 Facilitating risk management initiatives

There have been some initiatives to set up an institutional structure for formal risk management through support from various investment programs, regular and regional technical cooperations, and emergency technical cooperation. A World Bank supported pilot project in Nicaragua set out to develop an index-based weather insurance product for regional peanut producers exposed to drought, excess rainfall, and excessive air humidity. This project will develop reliable time lines for major risk factors and establish reliable index contracts offered through INISER – a local insurance company. A comparable World Bank project, offered to local herders in Mongolia, has introduced an index-based insurance program for livestock. The program engages local insurance companies as providers of mortality coverage between 7% and 30% mortality levels. The herders themselves assume risk up to the 7% mortality level while the highest loss levels – from 30% up to 100% livestock mortality – are covered by a contingent loan facility provided by the World Bank.

The LAC region generally lacks reliable environmental data and information systems to develop this kind of risk-transfer instruments for the agricultural sector. Some public information systems are emerging, often through international technical cooperation in areas like agriculture, environment, and energy. For example, Honduras has created a new institutional structure to gather and consolidate information related to climate risks, where public agencies are obliged to report on a regular basis (Arias and Covarrubias, 2006). The collected information is supposed to be made publicly available and further streamlined to satisfy the requirements of the local insurance industry.

3.1.3 Managing catastrophe insurance pools

The *Turkish Catastrophe Insurance Pool (TCIP)* was the first active risk management vehicle established to deal with uninsurable catastrophe risks in an emerging economy. The World Bank established TCIP in the wake of major earthquakes in and around Istanbul in 1999. It required regulatory reforms to make catastrophe insurance mandatory for all residential properties. Local insurance companies were engaged as selling agents of the policies. The insurance pool used accumulated reserves as first cover, with higher risk layers supported by reinsurance and a credit facility with the World Bank (Gurenko, 2000). TCIP is managed professionally by Milli Re – a leading national reinsurance company. The pool covers up to US$ 20,000 per property and sets premiums according to local hazard levels and type of housing construction, to give incentives for risk prevention. Earthquake insurance was wanting in Turkey and the local market was unable to cover major catastrophe risks, with insufficient underwriting standards and risk management capabilities in place; construction standards were weak and building codes not enforced.

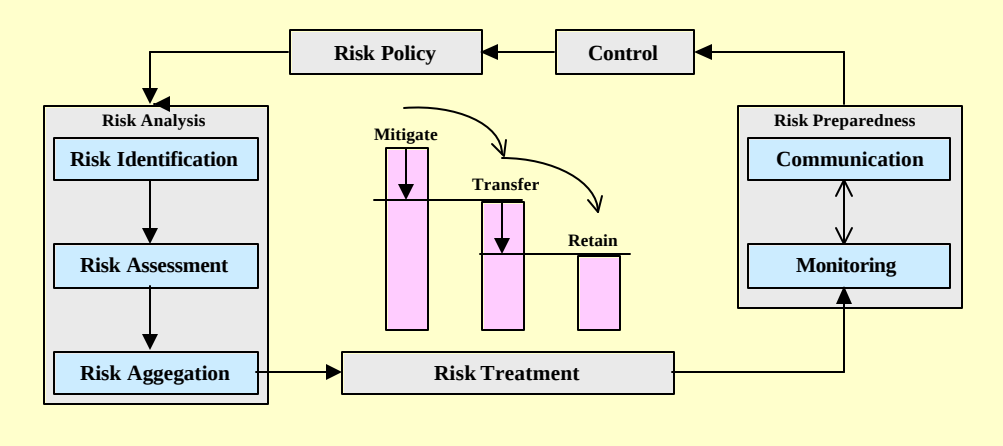
The *Taiwan Residential Earthquake Insurance Pool (TREIP)*, established in 2002, is another example and likewise requires earthquake cover by law for all homeowners. Local insurance companies and a reinsurance company cover a first loss level, while higher levels are covered by

a government guarantee and reinsurance. The Taiwanese government provides cover for excess losses and acts as insurer of last resort to the pool; the insurance policies have a coverage limit per property.

3.2 Integrating risk management and disaster financing

In most countries across the LAC region there is a need to get a more complete overview of how the potential catastrophe exposures might affect the public finances. To this end, the government should consider appropriate preparedness initiatives, risk mitigation investments, risk-transfer and risk-financing arrangements, and subsequent emergency and reconstruction efforts. This will require a formal risk management process at central government levels. That process should start with a comprehensive risk analysis to identify all the major risks, assess the vulnerability of essential economic assets to these risks, and subsequently determine the potential economic losses. Such an approach provides a basis for risk treatment and evaluation of the net effects of mitigation investments and the net benefits of alternative risk-transfer solutions (Figure 3.2). A comprehensive disaster risk management process should also incorporate risk preparedness efforts to organize and plan emergency requirements, and set up the needed early warning systems to handle potential disaster situations.

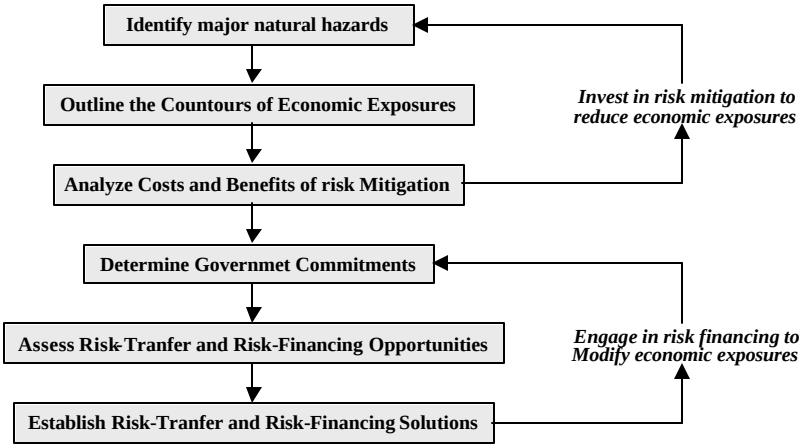
Figure 3.2 The Risk Management Process



The products and services offered by the IDB should facilitate the development of formal risk management practices and provide financial instruments that will allow governments to structure appropriate funding arrangements at the different stages of disaster management. This will principally entail funding for risk mitigation investments and support to establish *ex-ante* risk financing.

The risk mitigation process comprises a financing element as well as a cost-benefit assessment of the mitigation efforts. Similarly, the risk-transfer process may involve direct and contingent financing solutions as well as evaluations of the net benefits of alternative risk-transfer solutions in view of the *ex-post* funding needs (Figure 3.3). The Bank should offer the associated loan facilities and give advice on the implied cost-benefit analyses and economic trade-offs.

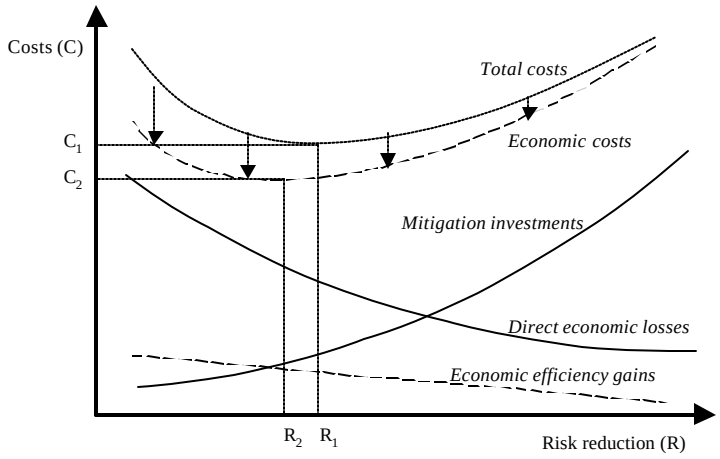
Figure 3.3 Risk Mitigation and Risk Financing in the Risk Management Cycle



Adapted from Andersen, Catastrophe Risk Analysis and Disaster Financing, 2006

In principle, the cost-benefit analysis of risk mitigation should compare the expected gains – in the form of lower direct economic losses – with the costs incurred to carry out the mitigation effort. The optimal investment level achieves the lowest overall cost position, which in economic terms corresponds to the level where the marginal investment cost equals the incremental loss savings (3.4). While this analysis can be sufficiently challenging in practice, it is further complicated when potential economic gains can be derived from installing new and more efficient production facilities. The Bank should be able to give qualified advice in these assessments.

Figure 3.4 Risk Mitigation – Cost-Benefit Trade-offs



Adapted from Miller and Keipi, Strategies and Financial Instruments for Disaster Risk Management in LAC, 2005

Similar sophistication is required to assess the viability of risk-transfer solutions and determine the appropriate level of risk retention. Simulation studies have shown that risk-transfer solutions stabilize economic growth projections up to a certain optimal level of insurance (Borensztein,

Cavallo and Valenzuela, 2007; Freeman et al. 2003).[18] However, as premiums for higher disaster risk levels increase exponentially due to higher uncertainty (Pollner, 2001), it is not economical to insure the very highest levels. That is, governments must consider the viability of insurance schemes and obtain more modest initial covers, e.g., minimum levels to ensure that the public funding capacity from increased taxes and loan facilities will not be exhausted as a consequence of major catastrophe events.

Governments could hedge to protect their long-term investment programs so exposures are assessed with a view on the public capital budget. Say the Aggregate Exceeding Probability curve (AEP) from catastrophe model simulations shows that a 100-year event (1% likelihood) could exceed 25% of the capital budget in a single year, a figure that might be considered excessively risky. This may call for an excess-of-loss (EXL) risk-transfer arrangement that reduces the potential loss to say 10-15% of the total budget. The evaluation of alternative risk-transfer mechanisms, e.g., reinsurance, cat-bonds, stand-by credit, and contingent capital, should be assessed on an *ad hoc* basis from period to period, based on a dynamic evaluation of market trends and ongoing price comparisons.[19] The Bank should be able to give advice on these issues within the context of the comprehensive risk management process.

3.2.1 Hedging the IDB's disaster risk exposures

A large part of the Bank's loan portfolio is potentially affected by climate/environmental change and major catastrophe events, although it is unlikely to pose loss or liquidity problems for the Bank. IDB loans often assume a favorable creditor position, where changes in credit standing among borrowers are less important, and the Bank's liquidity and reserve position is extremely favorable. Consequently, it does appear relevant for the Bank to engage directly in risk-transfer arrangements to cover against future disaster events. Even if the Bank is called upon to provide immediate rehabilitation and reconstruction loans, it will not constitute a problem under the current financial condition of the IDB. Alternatively, the Bank could act as an intermediary or pass-through agent for more sophisticated risk-transfer solutions available in the international capital markets.[20] However, *the major driver in the placement of catastrophe risk from LAC is not the underlying credit risk but rather the ability to diversify the global reinsurance portfolio with new, unrelated risks.* This means that there would be little advantage from credit enhancement in the form of Bank guarantees and the like.

3.2.2 Instruments for proactive risk management

The Bank has put increasing emphasis on risk prevention and mitigation to reduce the vulnerability to disasters. In contrast, there has been comparatively little focus on products and services related to risk-transfer and risk-financing solutions that are central to the risk management process, and ensure timely reconstruction after disasters. Risk identification and measurement are essential to assess the exposures and develop appropriate risk-transfer and risk-financing solutions for reconstruction (Figure 3.3.). These aspects of risk management are necessary prerequisites for higher risk transparency and effective post-disaster funding

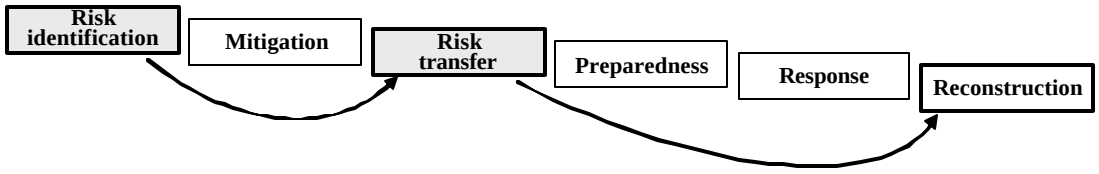
[18] The price of conventional reinsurance is typically indicated by the ROL (see also footnote 14). The ROL is usually higher than the actuarial probability of a full loss within the cover limit because the insurance industry must cover its administrative and financing costs. If these costs seem excessive, it may be viable to engage in *self-insurance* or pooled solutions based on mutual coverage. Self-insurance is a risk management method whereby an eligible risk is retained, but a calculated amount of money is set aside to compensate for the potential future loss.

[19] See, e.g., Andersen (2005), Applications of Risk Financing Techniques to Manage Economic Exposures to Natural Hazards, Inter-American Development Bank for "Comparison Between Alternative Risk Transfer and Financing Opportunities".

[20] Assuming this is possible within the confines of the Bank's current statutes.

arrangements. Thus, the products and services to be offered by the Bank should cover all aspects of risk management and guide optimal mitigation, risk-transfer, and risk-financing solutions.

Figure 3.3 Key Elements of Risk Management



Adapted from Freeman et al.., 2003

Managing the catastrophe risks of different types of economic assets in exposed countries may require different risk-transfer mechanisms. Basic economic infrastructure can be dealt with directly by the responsible government agencies and covered through the arbitration of a central risk management office. In contrast, exposures to private housing and small business operations can be managed more effectively by establishing government-sponsored insurance pools. Hence, the Bank should be in a position to give advice on the establishment of government calamity funds and specialized insurance pools to cover uninsurable risks.

3.3 Conclusions

- The LAC region needs reliable data on major perils to support the insurance industry and develop agricultural risk-transfer instruments.
- IDB products and services should facilitate formal risk management practices as well as the establishment of national calamity funds and regional insurance pools.
- The Bank should offer supportive loan facilities and give advice on risk-transfer solutions, including cost-benefit and economic trade-off analyses.
- The Bank should *not* engage in direct risk-transfer transactions and there is no basis for intermediation through the issuance of guarantees.

4. NEW INSTRUMENTS AND PRACTICES

Governments should take steps to identify and survey key risk factors that may affect economic assets in the country to deal with the challenge of catastrophe risks. Assessing potential losses is necessary to determine how exposures may be reduced through mitigation efforts and how residual exposures may be covered through alternative risk-transfer schemes. The cost of risk transfer is reduced if the vulnerability to natural catastrophes is reduced, for instance by enhancing construction quality, enforcing building codes, and imposing property registration. Various hedging solutions display proportionality between potential losses and required premiums. Therefore, governments themselves have an interest in reducing economic vulnerability to natural catastrophes.

The Bank has introduced a number of loan facilities to reduce vulnerability and enhance preparedness but has comparatively few risk-transfer and risk-financing products. Existing offers have typically been promoted as independent products and services, without a cohesive risk management strategy for the recipient, where the range of IDB products and services should address all aspects of risk management and support *cohesive* practices. For this to succeed, all

member countries will have to agree on the appropriateness of proactive risk management to eliminate moral hazards.[21]

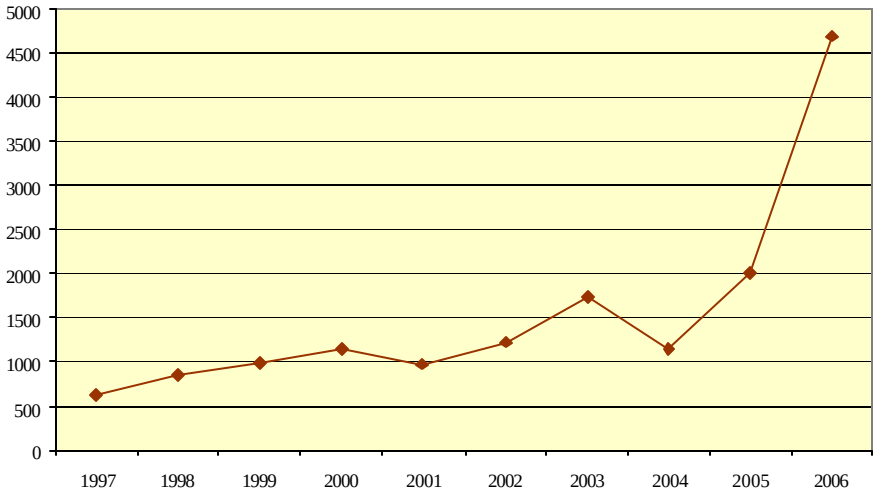
4.1 Alternative risk-transfer and risk-financing instruments

Bank offerings have typically been developed within the confines of the founding agreement, which emphasizes lending and technical advice. Insurance products have never been part of the product scope even though these financial services are relevant in view of the catastrophe exposures that permeate the LAC region. While there are limitations to the range of products that may be offered by the Bank, it seems clear that new offerings must be introduced with an eye to the entire risk management process. To this end, the following provides an overview of recent developments in the global risk-transfer and capital markets.

4.1.1 Derivative instruments

The new issuance activity in the *cat-bond* market reached an all-time high in 2006, with total issuance of US$ 4.7 billion, almost 2½ times the activity level during 2005 (Figure 4.1). Total risk outstanding by year-end 2006 amounted to US$ 8.5 billion, compared to US$ 4.9 billion the year before. Since the beginning of the cat-bond market in 1997, a total of 89 transactions worth US$ 15.4 billion have been completed. There were 10 new cat-bond transactions during 2006, two of which were issued by *non-insurance* entities – the Mexican Fonden[22] and Dominion Resources, a U.S. based energy company. The Fonden transaction was the first cat-bond providing cover against a disaster risk within the LAC region.

Figure 4.1 The Development in Catastrophe Bond Issuance 1970-2006 (US$ Millions)



Source: MMC Securities, The Catastrophe Bond Market at Year-End 2006

[21] Pettersen et al., 2005.

[22] Fonden, the calamity fund created by the government of Mexico, sponsored a US$ 160 million transaction for a vehicle called CAT-Mex Ltd. , designed to provide government funding for immediate response requirements in the case of qualifying earthquake events of certain predefined magnitudes in specified regions of Mexico. Given the previous absence of Mexican earthquake risk in the market, the issue was valued by investors as an opportunity to diversify their invested portfolios. It was the first securitization of Mexican earthquake risk and the first governmental issuer.

The market saw new natural perils introduced, such as, Australian typhoon and earthquake, U.S. tornado and hail, Mexican earthquake and new, so-called *hybrid triggers*, which combine two or more triggers to reduce the underlying *basis risk*.[23] The established triggers include indemnity, parametric, loss-index, and modeled-loss. Indemnity is not so popular, as it entails higher moral hazards, while the remainder imposes basis risk on the sponsors. Several new bond structures extended our product vocabulary, such as, Cat Notes, Cat CDOs[24], and Event Loss Swaps (ELSs).[25]

Cat-bond investors balance their portfolios with different perils and geographical regions to gain diversification advantages. Consequently, they have been reluctant to assume additional U.S. wind exposures to the extent that some peak peril transactions were under-subscribed. However, the market benefited from increasing interest from new hedge fund investors. Practices in the cat-bond market continue to become more standardized as transaction parties, i.e., sponsors, investment banks, modeling firms, legal advisors, rating agencies, and institutional investors, are becoming increasingly skilled in their specific roles. Market volume remains dominated by U.S. earthquake and hurricane, European windstorm, and Japanese earthquake risks. However, other perils and geographies are likewise offered a good reception. So far, no transactions have incorporated gradually developing perils, like drought and floods. While insurance and reinsurance companies continue to dominate as sponsors, corporate and government entities have completed 5 of the 89 transactions. The market volume is now split more or less evenly between single- and multiple-peril transactions. Ceding entities prefer to cover multiple perils in order to gain diversification and transaction cost advantages, whereas investors prefer single-peril instruments that give more flexibility in managing investment portfolios.

Average transaction size shows a somewhat erratic but generally increasing trend. The average deal in 2006 amounted to US$ 235 million, with maturities ranging between one and five years, 3-years being the most common. The credit rating of various cat-bonds ranges between B and AAA, BB being the most common. On average, the returns offered on cat-bonds increased during 2006, with corporate spreads of comparable credit rating falling slightly. The intense storm activity during 2005 affected the otherwise growing confidence in the predictive capability of existing catastrophe models, and had a significant negative impact on the reserves in the reinsurance industry. These factors caused spreads in the cat-bond market to increase and cat-bonds with exposures to U.S. wind perils now provide estimates based on increasing storm frequency.[26] There has been a significant expansion of the markets for catastrophe securitization with the rise of so-called 'sidecars', 'Industry Loss Warranties (ILWs)', and other vehicles. Cat-bonds and ILWs are vehicles for transfer of tail risks, whereas sidecars give access to lower-layer exposures focused on specific risks.

Sidecars are special purpose entities, like cat-bonds, formed to create additional retrocession capacity to the reinsurance industry. They are typically structured as class 3 Bermuda re-insurers that enter into quota-share agreements on property and catastrophe risk. The vehicle is capitalized with funds from outside equity and debt investors committing funds for one to two years. The risk

[23] The possibility of loss from imperfectly matched risk-offsetting positions in two related but not identical markets.
[24] Collateralized Debt Obligations (CDOs).
[25] A new derivative contract offered by international banks. A buyer of ELS protection pays an upfront premium in exchange for a payout of the contract's notional value when a wind or earthquake event in a specific country results in reported industry-wide insured losses that exceed a pre-agreed threshold level or based on another standard industry loss trigger. A seller of ELS protection is paid a premium at the contract's inception, but is obliged to pay the buyer the notional amount of the contract when a qualifying loss event occurs.
[26] The year 2005 was also the first time the cat-bond market experienced a total loss, to the KAMP Re Ltd. issuance, as a consequence of hurricanes Katrina and Rita (Lane and Beckwith, 2006).

of the ceded insurance portfolio is shared between the sponsor and the sidecar in a proportional reinsurance arrangement, a quota-share arrangement, where premiums, risks, and losses are split in a predetermined ratio. The sidecar companies typically comprise an operating company that engages with the sponsor, which cedes the insurance portfolio and pays periodic insurance premiums, and bond investors, who provide initial funding and receive periodic coupons. The operating sidecar company may, in turn, be owned through equity investments by a sidecar holding company funded by equity investors. Typical transactions represent collateralized quota-share insurance with maturities of less than two years. They allow a sponsor to quickly and efficiently increase its underwriting capacity while investors get access to special insurance lines, natural perils, and geographical regions in large cost-effective amounts. Sidecars have become popular and make up a significant market segment with allegedly more than US$ 4 billion worth of transactions placed during 2006.

ILWs comprise a diversity of contracts, sometimes referred to as Original Loss Warranties (OLWs) and Market Loss Warranties (MLWs). They cover losses from events when industry-wide losses exceed a given threshold level (McDonnell, 2002). Some contracts can offer pay-off on the joint occurrence of multiple events such as Florida hurricane and an economic event, e.g., an increase in general interest rate levels that would affect capital reserves adversely if bonds must be liquidated to fund claims payments. ILWs differ in trigger levels, perils, and geographic scope[27] but the ILW property catastrophe market is the largest segment. Transaction costs and pricing risk are relatively low and there is lower information asymmetry between cedent and insurer/investor. Recent transactions provide cover against second and third event losses – generally with triggers in excess of US$ 2 billion.

The ILW market has grown steadily over the past decades and expanded significantly in the wake of the 2004 and 2005 wind seasons. Most of the world's reinsurers are involved in the ILW market as a complement to traditional reinsurance programs. ILWs are usually structured as binary options, where the payoff depends on two triggers, i.e., they are hybrids of financial contracts and reinsurance. The first trigger relates to the buyer's losses and the second trigger is based on industry losses, e.g., based on an industry loss index.[28] While the underlying industry loss index is the index driving the contract, the first trigger is included to qualify as an insurance contract. The ILWs can also be issued based on the industry loss trigger alone, when placed among non-insurance investors.[29] The ILWs are usually documented as reinsurance contracts between parties that entail a counterparty risk, and are now often written on the basis of standard ISDA documentation to make them more compatible with the general requirements and practices in the capital market.

4.1.2 Potential IDB instruments and risk management vehicles

Based on the foregoing, the Bank should focus on promoting the adoption of formal risk management processes among exposed member countries, and offer a full palette of products and services to support these processes. Currently there is a shortfall of products covering risk-transfer and *ex-ante* risk-financing solutions. Formal risk management organizations must be established in the exposed countries so the Bank will have qualified counterparts dealing with national catastrophe exposures. While the Bank cannot offer *pure* insurance products, it may facilitate risk-transfer opportunities in the international capital markets, and complement with relevant risk-financing products. The Bank should also be able to support the implementation of government-sponsored risk management offices and related institutional structures to make the

[27] For example, hurricane related industry-wide losses above US$ 15 billion and below US$ 25 billion or earthquake related industry-wide global losses in excess of US$ 35 billion, and so forth.
[28] This could, for example, be the PCS (Property Claims Services) Index of catastrophe wind losses in the U.S.
[29] In this case, they become pure derivative instruments.

proactive risk management process operational. An essential part of this effort includes the development of data gathering systems to create reliable information about natural hazard exposures and reduce the level of uncertainty around disaster risks. This is a prerequisite for effective risk assessment and monitoring, and also serves to reduce the premiums of associated catastrophe insurance arrangements.

The effective implementation of risk management processes requires coordination with third-party entities, including government agencies, municipalities, regional disaster agencies, NGOs, and multilaterals. The successful promotion of risk-financing products and services offered by the Bank also depends on the establishment of government-backed national risk management organizations and associated risk transfer vehicles. Hence, the Bank products and services should cater to the development and operationalization of government risk management offices and risk-transfer vehicles that can deal with disaster exposures on an *ex-ante* basis.

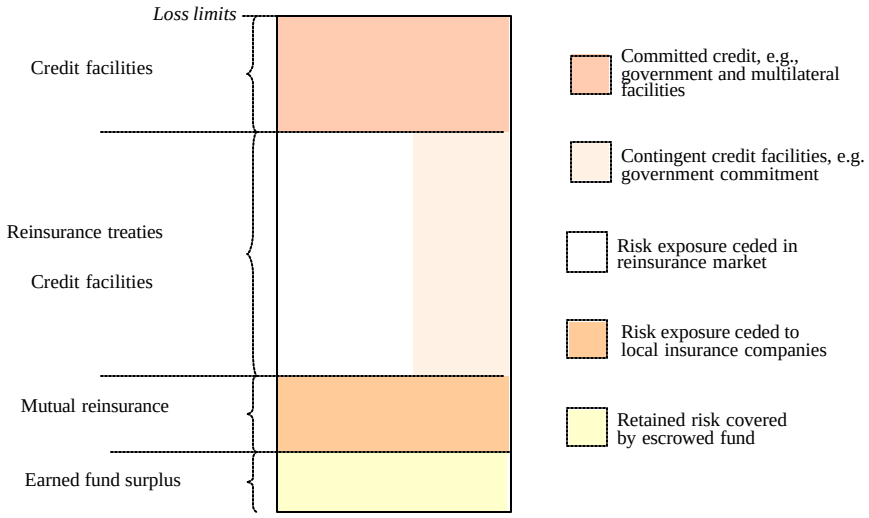
In addition to the existing range of products and services in support of risk mitigation, the Bank may consider different types of contingent loans that provide funding *under predefined disaster scenarios*, provided a minimum set of risk management criteria are fulfilled as stipulated in the loan covenants. These could constitute stand-by credit facilities or Guarantee Disbursement Loans (GDL) that would provide the recipient with a kind of 'liquidity insurance', even though they are loan products. These credit facilities could be offered to the professional risk management entities organized as government agencies and special risk-transfer vehicles. The Bank may offer its loan facilities in conjunction with general advice on and intermediation of complementary risk-transfer instruments offered in the global reinsurance and international capital markets. It may also introduce long-dated rollover facilities that may extend favorably priced loans to relevant risk-transfer vehicles that, in turn, could place the proceeds in high-quality liquid instruments as reserves for payout to potential catastrophe losses.

Current developments in the markets for alternative risk-transfer instruments provide ample opportunities to exploit the increased interest in securitized catastrophe risks from new geographical regions. This allows the IDB to be creative with risk- financing structures, for example, by offering loan facilities to cover 1st events while obtaining external risk-transfer solutions using securitized capital market instruments to cover 2nd and 3rd events.

The risk-transfer market is driven by risk diversification advantages, so there is no role for the Bank as a direct credit enhancer, e.g., by acting as a guarantor of cat-bond issues. However, there may be a potential advantage from name association, where IDB's involvement in the structuring of transactions can provide needed market credibility. There may be additional opportunities for placing contingent capital instruments among international investors as the market currently is seeking alternative returns in a softening corporate bond market.

Since major natural phenomena reach across several member countries and cause related catastrophe events, e.g., windstorms in the Caribbean, windstorms and floods in Central America, floods and drought in South America, there may be potential advantages from regional risk management vehicles to deal with these specific hazards. The Bank should be in a position to give advice on the development of related government disaster funds and regional insurance pools (Figure 4.2).

Figure 4.2 Insurance Pools with Government and Multilateral Support – Example



Adapted from Andersen, Applications of Risk Financing Techniques to Manage Economic Exposures, 2005

Once these are established, they will become essential counterparts in the efforts to address the regional natural catastrophes.[30] By pooling *regional risk exposures* through establishment of focused insurance vehicles, part of the diversification advantage is retained within the pool. This means that reinsurance contracts and other risk-transfer instruments for the pool will be more favorably priced, due to the gentler risk exposure of the pooled risks. The potential diversification advantages can also be derived from the pooling of *different natural hazard exposures* across larger affected regions. However, there is a limit to how widely a pool can extend its focus and achieve economic efficiencies through specialized expertise. Also, government-sponsored solutions are more likely to gain public support if they are tailored to specific catastrophe exposures (Nutter, 2006). Hence, there is a trade-off between efficiencies gained from focused activities and wider diversification advantages.

4.1.3 Related lending rules for managing catastrophe risks

The products offered by the Bank should have built-in financial incentives that encourage borrowers to engage in optimal risk mitigation and risk-transfer solutions. It may be difficult to propose differential pricing, e.g., imposing lower margins on loans used for risk reduction purposes, as this is "not a political option in a 'cooperative' organizational setup like IDB".[31] However, introducing subsidized initiatives to enhance risk management practices is possible, as shown by demand for grant-funded technical cooperation to facilitate risk reduction initiatives. It may also be possible to impose minimum risk management requirements in the loan covenants reflecting loyal behavior among member countries towards the common good of the region. It should also be possible to introduce risk-adjusted pricing, i.e., pricing *ex-ante* funding structures for the countries, including loans in support of development projects, more favorably because this will benefit the Bank's overall exposure. In the end, this becomes a governance issue that must be addressed up front by the Executive Board. The logic is simple – there is a need to address the

[30] There are potential advantages associated with pooling of risks across geographical regions. For example, a windstorm exposure of a single smaller country may be exhausted in the case of an extreme event but such a complete strike of a natural hazard will not affect the larger region with the same magnitude. Over a larger geographical area, the distribution of expected losses will be less pronounced, which reflects the advantage from diversification that constitutes the basic principle of reinsurance.

[31] Quote from RE-292, Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters, Office of Evaluation and Oversight, OVE, April 2004.

mounting catastrophe exposures *proactively*, which requires that exposed member countries institute effective risk management practices. The Bank, in turn, must be committed to support this process by allocating sufficient resources for its implementation.

As far as specific Bank products are concerned, there is no silver bullet as to how they should be structured, but the introduction of concrete offerings requires creative thinking. Incentive structures must encourage borrowers to engage in proactive risk management by aligning the motives of the risk bearers, e.g., the lender, investor, or insurance company, with the entity engaging in risk mitigation. That is, it should pay off to reduce risk vulnerability and adopt systematic risk management practices. This means that commitment fees and insurance premiums should be differentiated based on objective risk assessments.[32] If the risk-transfer premiums are not risk-based, the affected entities will be less inclined to engage in self-insurance (Kleffner and Kelly, 2001). Enforcement of these principles requires strong governance, i.e., *ex-post* catastrophe funding arrangements should not assume favored status. Instead, *ex-ante* mitigation and financing arrangements should be encouraged, possibly through subsidized servicing costs and most favored borrowing conditions.

It is necessary to address the underlying *causes* of the disaster losses to achieve long-term risk management effectiveness. National governments must be active participants in the proactive risk management practices by engaging senior government policy makers and establishing supportive institutional frameworks. The success of this approach may also depend on the understanding among donor countries that they should commit to the development of proactive risk management rather than providing relief funding. The availability of unconditional disaster relief from governments and international donors distorts the incentives to mitigate catastrophe exposures (Kaplow, 1991) as the affected entities no longer bear the burden of the losses inflicted by passive behavior.

4.2 Instruments in relation to IDB policies

The current Bank instruments dealing with natural disasters have been introduced in the context of OP-704 and the Action Plan[33] aimed at prevention and mitigation. The new Policy on Disaster Risk Management[34] advocates increased focus on risk prevention and mitigation as well as financial protection and risk-transfer as engrained elements of public governance. It seeks to promote meaningful engagement of civil society in these efforts and recommends that products and services be offered on the basis of a dialogue with member countries. It is also conscious of incentive structures that may engage governments and private enterprises towards these ends, all of which appear consistent with the proposals discussed above.

4.2.1 Current policies

The risk prevention and mitigation aims of OP-704 were enhanced by the introduction of the *Disaster Prevention Sector Facility (DPSF)* in 2001. The DPSF intended to reduce hazard risks through support for preparedness, mitigation, and risk reduction systems. The *Disaster Prevention Fund* and *Multi-donor Disaster Prevention Trust Fund* were established in 2006, to facilitate disaster prevention investments through eligible donations. Preparedness and prevention investments may also be supported through sector investment, technical cooperation, and policy-based loans (Figure 4.3). Once a natural event has caused a disaster situation to arise, the Bank

[32] For example, risk mitigation efforts are encouraged when insurance premiums are differentiated according to different structural qualities of the insured buildings.

[33] This refers to the Bank's Operational Policy on Natural and Unexpected Disasters (OP-704), approved in 1998, and the IDB Action Plan on Natural Disasters (GN-2339) of 2005.

[34] The Disaster Risk Management Policy (document GN-2354-5) was favorably reviewed by the IDB Board of executive Directors on February 28, 2007.

can offer urgent disaster funding by drawing on the *Immediate Response Facility*[35] to support restoration of basic services and prepare reconstruction. *Emergency Technical Cooperation* (GN-1862-5 and AT-986) can provide additional support for humanitarian investment needs. The bulk of the funding needed for immediate response, rehabilitation, and reconstruction purposes after a disaster derive from restructuring of existing loans, so funds are reallocated for other usage than initially intended. The reconstruction efforts can also be supported by additional sector investment loans where applicable.

Figure 4.3 Risk Management Instruments by Disaster Phase

Before	**-Disaster Prevention Facility loans (GN-2085-5)** **-Disaster Prevention Fund (GN-2405-3)** **-Multidonor Disaster Prevention Trust Fund (GN-2427)** **-Sector investment loans** **-Technical cooperation loans** **-Policy-based loans**
During	**-Immediate Response Facility loans (GN-2038-12)** **-Portfolio restructuring and reallocation** **-Technical cooperation loans**
After	**-Portfolio restructuring and reallocation** **-Sector investment loans**

Source: Form Disaster Response to Prevention: Companion Paper Disaster Risk Management Policy (Publication ENV-150), Inter-American Development Bank, 2007

In their review of Bank practice in relation to natural disasters, OVE investigated 70 out of 665 loans (11%) that were granted for natural disaster purposes, corresponding to total commitments of US$ 3.8 billion, and found that the loan portfolio did not show a meaningful monitoring of progress and the effects of loan proceeds. While they noticed more evaluation by the time of approval, there was little *ex-post* follow-up on activity, i.e., the project monitoring system was not deemed sufficient and there were serious doubts as to how the Bank was fulfilling its aims.[36] Hence, while there is evidence that the Bank has been covering aspects of prevention, emergency response, and rehabilitation, it has largely followed a post-disaster loan strategy, with less attention for risk reduction, which calls for more proactive risk management products and services.

4.2.2 Efficacy of instruments

The existing products have arguable attempted to favor *ex-post* funding scenarios and while the DPSF was aimed at risk prevention and mitigation, the Facility has been underutilized, reflecting significantly lower demand than expected. Hence, even though prevention should lower the cost of risk-transfer, the lack of *ex-ante* financing considerations has put this potential mechanism out play. The Bank has experimented with new structures for faster disbursement of funds in disaster emergencies. In this context the IDB established the Emergency Liquidity Facility (ELF), which provides qualifying micro-finance institutions across LAC with resources that can be readily drawn down in regional emergency situations. The funding is triggered by an emergency declaration issued by the government in question, and has so far provided assistance in Bolivia, Central America, and Mexico.

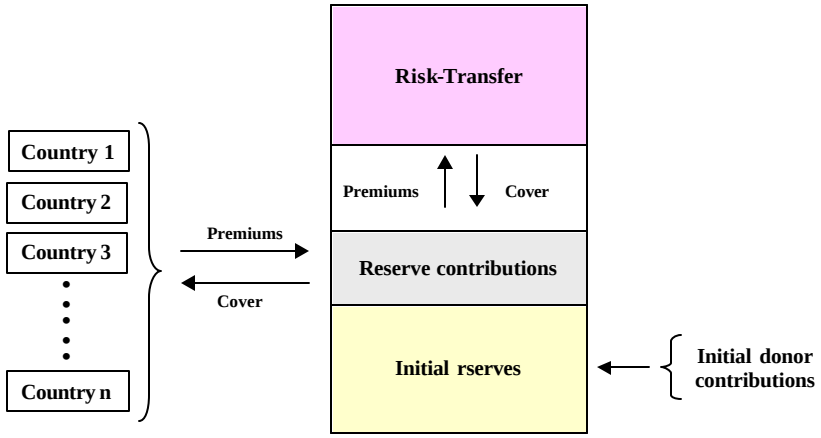
[35] Previously the Emergency Reconstruction facility (ERF)

[36] In the past the credit approval process and the subsequent monitoring tasks were disconnected and carried out by different Bank officers.

4.2.3 Participation in other facilities

Considerable efforts have been devoted to study the possible pooling of hurricane risks across the Caribbean (Pollner, 2000, 2001, 2002) and these ideas eventually materialized in the establishment of a regional insurance pool sponsored by the World Bank. The *Caribbean Catastrophe Risk Insurance Initiative (CCRII)*[37] allows CARICOM governments to buy insurance cover for immediate financial needs in the wake of major earthquake and hurricane events. The premiums charged by the pool are determined on the basis of the country-specific exposures. The insurance vehicle has benefited from an initial grant donated by the government of Japan. It is organized as an independent legal entity incorporated in the Cayman Islands and owned by a multi-donor trust fund that provides the initial reserves (Figure 4.4). The resilience of the pool will be extended gradually, as premium payments contribute to the accumulation of reserves. The pool uses parametric scales to calculate wind and earthquake damages, based on data collected by the U.S. National Hurricane Center and the U.S. Geological Services. In the case of qualifying events, the insurance pool will cover a portion of the estimated government losses within given *attachment and exhaustion points*.[38]

Figure 4.4 Pooling Structure of the Caribbean Catastrophe Risk Insurance Facility



Adapted from CCRII Background Document, World Bank, February 5, 2007

It is clearly relevant for the IDB to consider cooperating with other multilateral institutions, including the World Bank, that have specialized reinsurance and pooling expertise. Engaging in joint actions with other financial institutions and supra-national disaster organizations may also provide a wider base of potential donors to institute new important risk management practices and regional risk-transfer vehicles.

4.2.4 Implications for IDB role

Developments in the international capital markets offer new and favorable catastrophe risk-transfer and risk-financing opportunities. However, these new market initiatives can only be exploited by professional risk management organizations as they consider alternative risk-instruments in the context of defined disaster exposures. Therefore, exploitation of market opportunities requires that exposed countries establish professional risk management entities and

[37] Background Document, Results of Preparation Work on the Design of a Caribbean Catastrophe Risk Insurance Facility, World Bank, February 5, 2007.

[38] A claim is paid out if the loss amount or the index value reaches or exceeds a predefined level (the *attachment point*) but does not surpass a certain predefined upper limit (the *exhaustion point*).

take initiatives to establish regional insurance pools to handle identified exposures. Hence, the IDB should be positioned to give advice on new market developments while setting up supportive financing solutions.

4.3 Conclusions

- The international risk-transfer markets offer opportunities for professional counterparts that are favorable to sponsors in the LAC region.
- The Bank should promote formal risk management processes among exposed member countries and offer a range of products and services to support this.
- The Bank should provide advice on the establishment of government-sponsored risk management offices and regional insurance pools.
- The Bank may facilitate international risk-transfer opportunities and complement with risk-financing products, such as, stand-by facilities and contingent credit loans.
- Incentive structures must encourage proactive risk management behaviors, e.g., by setting minimum requirements for risk management processes in loan covenants and practicing risk-adjusted pricing.
- The IDB should cooperate with other multilateral institutions, such as the World Bank, that possess specialized insurance expertise.

5. ORGANIZATIONAL STRUCTURE AND RESOURCES

The following considers the resources required by the IDB to accomplish the suggested risk-financing policies. It does not entail a comprehensive structural analysis but does operate within the confines of the new organizational structure.

5.1 Internal human and financial resources

The primary resource requirements relate to the Bank's contribution to mainstream the envisioned country dialogue and programming efforts and implement related catastrophe risk management practices dealing with natural catastrophes on an *ex-ante* basis, through appropriate mitigation and financing initiatives. The IDB should position itself to actively promote these efforts with supporting financing products and advisory services.

5.1.1 Organization and procedures

The effective handling of catastrophe exposures will make a significant difference to the economic development potential of the entire LAC region. The exposures to natural hazards are related to other country risks, such as political and institutional risk, macroeconomic risk, and environmental risks. The risk-transfer capacity in local markets depends on socio-economic stability and reliable institutional structures, while environmental degradation may increase the economic vulnerability to natural hazards. All the while, disasters and unprepared catastrophe situations have adverse economic effects and erode institutional effectiveness. This highlights the need to adopt an integrative risk management approach to consider all risk aspects at the highest government levels. Risk management considerations must incorporate environmental degradation, catastrophe exposures, building codes and structural requirements, business development, economic growth, financial sector stability, policy implementation, supervision, and enforcement. Hence, the IDB must possess expertise in all of these areas and the managerial capacity to develop and coordinate the associated capabilities in comprehensive country risk assessments. This entails environmental expertise, knowledge of natural catastrophe exposures, and various sector-related activities as they pertain to different development activities.[39] The

[39] The environmental expertise and knowledge about catastrophe exposures reside with the Infrastructure and Environment Division, financial market expertise resides with the Institutional Capacity and Finance Division while

challenge has two dimensions, namely, to hone the necessary expertise and develop coordination capabilities for effective execution.[40]

5.1.2 Management requirements

Achieving a more proactive risk management approach requires support from the highest levels of the Bank. This means that the members of the Executive Board, as representatives of borrowing and non-borrowing member countries alike, should unequivocally support the new risk management policy and be willing to enforce it. Furthermore, the Bank should provide the necessary resources to implement this strategic change and adopt internal incentive systems that favor its implementation.[41] This may also warrant a more concrete outline of strategic milestones to be achieved over the coming five-year period and instituting regular monitoring and evaluation of progress made.[42]

5.1.3 Resource needs

The Bank should identify, engage, and establish in-house expertise to cover relevant aspects of setting up integrative risk management functions in cooperation with borrowing member countries. There is a need for specialized expertise in establishing effective national risk management systems that address all stages of risk management. This entails the development of information systems and risk models, and the creation of risk management vehicles to pool different geographical and peril risks, while maintaining existing sector and financial management expertise. The implementation of a new proactive risk management policy may require one-time expenses for awareness raising and training of personnel as well as permanent intro seminars for new Bank employees.

5.2 Evaluation of mission risk

The above efforts must be seen in the context of the overarching goal to enhance the economic development of individual countries and the region as a whole. Since environmental risks and natural catastrophes constitute significant impediments to long-term economic growth, any efforts to manage the catastrophe exposures proactively are essential to fulfilling the Bank's development mission.

5.2.1 Accomplishment of IDB mission

The stated purpose of the Bank is "to contribute to the acceleration of the process of economic and social development of the regional developing member countries, individually and collectively".[43] Hence, the new policy aim of integrating country risk management perspectives into an overall lending approach is consistent with the overarching IDB mission. The Bank mission also envisions cooperative structures among member countries to address specific development issues, for example, in dealing with common catastrophe exposures by establishing common insurance pools.

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detailed market insights reside with the Country Offices, all of which must be coordinated through the instigation of the Risk Management Office to underscore the executive commitment to the proactive risk management focus.

[40] The coordination may be achieved by adopting a matrix organization that combines sector expertise with local country insights, possibly through the oversight of a risk management office. A matrix structure can combine specific focal areas at the center with local adaptability as efforts are enacted through team-based cooperation. Further analysis of this approach is beyond the scope of this report.

[41] In practice, this means that sector heads, line managers, and functional experts are all encouraged to accomplish these conjoint efforts by introducing compensation, reward, promotion and other means of recognition towards successful implementation of the overarching policy aims.

[42] This strategic control process may be anchored in the Strategic Planning and Development Effectiveness Office.

[43] Quoted from the Agreement Establishing the Inter-American Development Bank, Article I, Section 1. Purpose – January 1996 reprint.

The Bank may make or guarantee loans to any member, or any agency or political subdivision thereof by making direct loans and by guaranteeing loans[44]. Hence, guarantees to 'assure another party the enjoyment or possession of something'[45], e.g., providing committed credit facilities that assure access to future funding, can be part of the Bank's product repertoire. These facilities may be relevant to regional insurance pools, government agencies, and commercial enterprises in the region that engage in risk management activities. It also allows for technical advice and assistance to establish regional risk-transfer vehicles.

5.2.2 IDB's potential role

The IDB must be dressed to assume several functions as an advisor to establish and service professional risk management organizations in exposed member countries. More specifically, the Bank must be able to offer relevant financing products to these institutions and act as a facilitator of international risk-transfer opportunities. On the other hand, there is little relevance for the Bank to act as direct issuer or guarantor of risk-linked instruments.

5.3 Conclusions

- There is a need for an integrative risk management approach to consider all national risk aspects, including environmental degradation, catastrophe exposures, institutional requirements, and economic stability.
- The Bank must have specialized expertise in all risk areas and the managerial capacity to coordinate comprehensive country risk assessments.
- Achieving a proactive risk management policy requires support from the Board of Directors and the willingness of Bank Management to enforce the policy.
- The Bank should provide the resources necessary for implementing the policy and adopt supportive internal incentives.
- The Bank must have in-house expertise on how to organize risk management functions and processes in exposed member countries.

6. RECOMMENDATIONS

The Bank should engage actively to move borrowing member countries from the predominantly reactive handling of catastrophe events towards *proactive* management of catastrophe risk exposures. This requires the creation of a governance and policy framework that supports the overarching risk management strategies of borrowing member countries and establishes consistent incentives to induce supportive behaviors. The Bank should introduce applicable financial products and services to complement this proactive risk management strategy. It entails development of general mission awareness and an organizational environment that is conducive to achieving the stated risk management outcomes.

6.1 Recommendations for IDB

The risk-financing and advisory services offered by the IDB should be construed within the confines of the new disaster risk management policy – aimed at promoting and facilitating more proactive risk management approaches across the region. This will require coordinated actions within the various risk management areas of the Bank, including specialized sectors and functional entities, in the country programming discussions focused on risk management strategies. It may also entail cooperation with other multilateral institutions and regional disaster agencies.

[44] Extracted from the Agreement Establishing the Inter-American Development Bank, Article III – Operations, Section 4. Methods of Making or Guaranteeing Loans.
[45] A common definition extracted from English dictionaries.

6.1.1 Proactive disaster risk management initiatives

The Bank should engage in activities that promote proactive risk management practices among all member countries, including the establishment of national risk management organizations and specialized risk-transfer vehicles. Government risk management functions should be supported in their efforts to recognize and prioritize public risk management responsibilities, in regards to private housing, small business facilities, public sector assets, and essential economic infrastructure, and to set up appropriate risk mitigation and financing solutions. This requires supportive governance and economic incentives that encourage member countries to operate in line with the risk management policy. There must be unequivocal agreement among the executive directors and the countries they represent on the adoption of a proactive risk management approach.[46] Introducing proactive risk management practices may require that certain behaviors be considered mandatory or, at least, that incentives be aligned with the intended risk management outcomes. This means, for example, that financing solutions may be priced according to economic asset quality and risk management conditions to favor mitigation and *ex-ante* considerations. It may also be possible to subsidize mitigation efforts and differentiate terms according to prevalent risk management practices.

6.1.2 IDB instruments and practices

The Bank should be in a position to facilitate the development of national risk management systems and regional insurance pools. Existing loans and technical cooperation should be deployed within the confines of the proactive risk management strategy and national programming discussions. The IDB products and services should be geared to support all elements of the risk management process, including prevention, mitigation, risk transfer, risk financing, preparedness, rehabilitation, and reconstruction. While the Bank has facilities in place for prevention and mitigation purposes, these have been underutilized due to moral hazard issues. However, the Bank lacks risk-financing facilities that promote *ex-ante* funding of post-disaster reconstruction and related risk-transfer solutions. Efforts to create public information systems on major natural hazards will support the introduction of more efficient risk-transfer solutions and reduce the level of uncertainty surrounding the disaster exposures. The Bank cannot provide insurance products but should act in a facilitating advisory capacity. It is possible to introduce contingent credit structures in support of professional risk management solutions.

6.1.3 Institutional requirements

The Bank should be able to coordinate tasks and integrate relevant sector expertise in the execution of the proactive risk management policy. Incentives for sector executives, line managers, and functional specialists should be aligned with the overarching policy aims. Integrative teams for country programming efforts should be established and the needed expertise honed throughout the organization. Performance according to stipulated achievements and operational benchmarks should be monitored on an ongoing basis. Successful Bank intervention requires that moral hazard issues be eliminated and economic incentives of member countries be aligned with the overarching policy aims.

[46] It would be beneficial if a general consensus emerged among donor countries at large to support proactive risk management practices as opposed to rewarding the previous *laissez-faire* situation, brought about by unconditional *ex-post* catastrophe donations.

APPENDIX

Disaster-Linked Financial Products and Services

Contingent loan arrangements

- Stand-by facilities
- Guarantee Disbursement Loans
- Committed credit facilities
- Long-dated rollover facilities

The Bank is well positioned to finance calamity funds and insurance pools with different types of favorably priced loan structures to ensure availability of funds for emergencies and reconstruction after disasters. The loans could include both medium-term standby facilities and long-term renewable loan commitments.

Risk-transfer arrangements

- Reinsurance contracts
- Catastrophe bonds
- Sidecars, ILWs, etc.

The Bank cannot offer insurance products but may act as a facilitator and advisor on favorable opportunities in the international risk-transfer markets while providing name recognition and support in connection with major transactions for institutions located in member countries.

Risk information systems [*]

- Perform comprehensive risk identification studies
- Establish public data banks on perils and loss frequencies
- Study possibilities for local risk-transfer mechanisms

The Bank can play a major role as central catalyst in the development of local risk management systems by providing needed funding for these initiatives and guiding the projects towards successful completion.

Advice on risk management organization[*]

- Establish government risk management offices
- Establish national government-backed calamity funds
- Establish regional government-backed insurance pools

The Bank must ensure that governments in exposed member countries establish national risk management organizations and professional risk management entities to handle catastrophe exposures by advising on needed structure, processes, and management systems.

Advice on risk management process[*]

- Risk identification and assessment of exposures
- Analyses of risk mitigation, transfer, and financing decisions
- Managerial supervision of ongoing operations

The Bank should provide advisory services on all aspects of the risk management process and monitor developments in the international financial markets for the benefit of the risk management entities.

Develop local insurance markets

- Hone practices and expertise to increase efficiency
- Improve systematic registration of economic assets
- Enhance supervision and governance practices

In the long run, the Bank should work to improve the efficiency of local insurance markets and develop market and regulatory expertise around alternative risk-transfer instruments.

[*] Many of these activities can be pursued in cooperation with industry specialists in public-private partnerships.

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