

Fiscal Risk Assessment of Contingent Liabilities Associated with Natural Disasters: The Colombian Experience

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List of Acronyms

CONPES	National Council for Economic and Social Policy
COP	Colombian Pesos
GDCT	General Directorate of Public Credit and the National Treasury
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GoC	Government of Colombia
IADB	Inter-American Development Bank
MHCP	Ministry of Finance and Public Credit
PNPAD	National Plan for Disaster Prevention and Assistance
SECO	State Secretariat for Economic Affairs of Switzerland
SNPAD	System of Disaster Prevention and Assistance

Fiscal risk assessment of contingent liabilities associated with natural disasters: The Colombian experience

Considerable progress has been made in the fiscal accounting and management of contingent liabilities as an integral part of fiscal policy in Colombia. This note builds on the report “Contingent Liabilities: The Colombian Experience,” published by the Colombian Ministry of Finance and Public Credit. It focuses on the fiscal assessment of natural disasters- a major source of contingent liabilities in Colombia.

The Law 448 of 1998 dictates that the National government, territorial entities, and other decentralized entities should include in their public management the necessary appropriations to cover possible losses arising from contingent liabilities.

The law also mandates:

- The National Government to develop and enforce the methodology for estimating contingent liabilities.
- The General Directorate of Public Credit and the National Treasury of the MHCP are to have oversight over estimation and management of contingencies.
- The formation of the “Fund for Contingencies of Government Entities.”
- The Federal Government to determine types of risk to be covered by the fund.

The report titled “Contingent Liabilities: The Colombian Experience,” is the first publication on the management of contingent liabilities in Colombia. Published by the Ministry of Finance and Public Credit (MHCP), the report highlights technical and normative efforts and policy reforms on the management of contingent liabilities implemented by the Colombian Government. Policy reforms disclosed in the report pertain to the management of contingent liabilities borne by the Government from four different sources, namely public credit operations, contractual public-private partnerships on infrastructure development, legal actions against the Colombian Government, and contingencies resulting from natural disasters. Importantly, although natural disasters are the second most important source of contingent liabilities faced by the Colombian Government, most formal policy reforms have been directed to the institutionalization of managing the first three sources of contingencies, while legal reforms for the explicit accounting of natural disasters is an ongoing effort in Colombia.

Policy reforms laying out the legal platform for a better accounting and management of contingencies comprise a series of constitutional laws, sanctions, enactments, acts, and CONPES¹ documents aiming at institutionalizing the management of contingencies within the country’s fiscal policy framework (See Annex 1). The process of identifying, assessing, and managing different sources of contingent liabilities in Colombia started with the formation of the Risk Unit of MHCP in 1998. The law 448 of 1998 establishes that Government entities, state, and local governments should include in their debt service budgets, the necessary funds to

¹ The National Council for Economic and Social Policy CONPES is the highest national policy planning body in Colombia. CONPES functions as an advisory agency for the government in economic development and social policies. As such, CONPES coordinates and guides economic policy government ministries and bureaus through the analysis and approval of economic policies. Thus, approved CONPES documents contain authorized economic and/or social policies intended to be developed and/or implemented.

cover possible losses experienced from unforeseen events. The “Fund for Contingencies of Government Entities,” was established to manage contingent liabilities and risks faced by local governments, as determined by Government of Colombia (GoC). In 2003, the Republic of Colombia became an example in the region for passing the Law 819, which includes constitutional laws related to budgeting, fiscal discipline and transparency².

Contingent liabilities from public credit operations were first estimated and reported in 2003. A process of technical assistance and training - focused on developing a model to estimate public credit contingencies - was put in place after the 1998 law. This model was used for contingency estimation from 2003 through 2009 and improved by the MHCP Deputy Directorate of Risk for the estimation of contingencies in 2010 and 2011³. As of April 2011, the Government of Colombia faced an exposure of COP\$ 4.13 trillion (US\$ 2 billion) due to credit guarantees offered in public credit operations. Taking into account the probability of default of payment (the probability that indebted institutions do not repay their debt), estimated contingent liabilities from public credit operations total COP\$ 1.22 trillion (US\$ 0.6 billion) for a medium-term fiscal period (2011-2021). On average, the Government of Colombia faces annual expected contingent liabilities from credit operations of around COP\$ 122 billion (US\$ 56 million) for the next 10 years⁴, representing a modest 0.02% of the country’s GDP (See Table 2).

The methodology to assess contingent liabilities arising from infrastructure development projects under PPP was developed and improved from 1998 through 2010. For the first time in 2010 the Deputy Directorate of Risk of the MHCP assessed the liabilities. A methodology based on the identification, assessment, management and oversight of the risk factors that can affect economic results of infrastructure development projects is used to estimate related contingent liabilities. Estimated contingent liabilities to infrastructure projects total COP\$ 575 billion (US\$ 289 million) for the medium-term fiscal period (2011-2021). Estimated annual expected liabilities arising from this source of contingency amount to COP\$ 57 billion (US\$ 26 million), less than 0.01% of the country’s GDP in 2010 (See Table 2).

The first estimation of contingent liabilities related to legal actions was completed in 2004. But it was not until 2009 and 2010 that these contingencies were estimated and reported. The estimation of these contingencies was only possible after the establishment of LITIGOB, a unique data collection and information system managing data and documentation related to national and international legal processes involving the GoC. Contingent liabilities to legal actions against the Colombian Government totaled COP\$ 408.1 trillion (US\$ 205 billion) for the fiscal period 2011-2021. Annual expected liabilities to legal actions are estimated at around COP\$ 37 trillion (US\$ 18 billion) for the next 10 years. This

² It is important to point out that neither Law 448 of 1998, nor Law 819 of 2003 define natural disasters as explicit sources of contingent liabilities.

³ Following U.S. methodology, one billion is a thousand millions and one trillion is a million of millions (1 billion = 1,000 million; 1 trillion = 1,000,000 million).

⁴ Total contingent expected liabilities were estimated for a medium-term fiscal period of 10 years (2011-2021). In this case, estimated contingent liabilities represent total expected losses faced by the Colombian government over the medium-term fiscal period 2011-2021. Annual figures representing annual expected contingent liabilities are computed by dividing total expected liabilities for the period by the number of years.

represents 7.46% of the country's GDP, which places legal actions against the GoC as the most important source of contingent liabilities (See Table 2).

Policy Reform for a Sovereign Disaster Risk Financing Strategy

The fiscal risk management strategy against natural disasters is currently under development. The Government of Colombia has institutionalized the management of contingent liabilities arising from public credit operations, contractual public-private partnerships on infrastructure development, and contingent liabilities resulting from legal actions against the Colombian Government. Important advances have been undertaken towards the formulation of an ex-ante natural disaster risk financing strategy in Colombia. Focusing on sovereign disaster risk financing, the contingent liability of the Government associated with natural disasters has been assessed and an integrated disaster risk financing strategy, relying on risk retention and risk transfer mechanisms, is being developed.

Estimated direct economic losses caused by natural disasters in Colombia totaled US\$4.5 billion for the period 1970-2000. During that period, Colombia was affected by high-intensity, low frequency natural events such as earthquakes, tsunamis, volcano eruption, seismic activity, and landslides, resulting in 28,258 deaths, 395,347 people affected, and US\$2.3 billion in economic damages. Likewise, high-frequency, low-to-medium impact natural disasters, such as floods and landslides, among others, have had a toll of 9,954 deaths, 14.8 million affected people, and estimated economic losses of US\$2.2 billion (See Table 1)

The development of a disaster risk management strategy in Colombia starts with Popayán's earthquake of 1983, and its necessity is reinforced by the Nevado del Ruiz's volcanic eruption of 1985. After the 1983 earthquake, the Government of Colombia realized the importance of creating a system for the management of natural disaster risks. Risk mitigation strategies were formulated and adopted through the development and enforcement of a seismic-resistant construction code. The National Disaster Fund (*Fondo Nacional de Calamidades*) was enacted in 1984 as a starting point for a disaster risk management strategy. The System of Disaster Prevention and Assistance (SNPAD) was created in 1989, together with the legislation of a territorial zoning plan (POT) and sector development plans (PDS) as part of a disaster risk mitigation mechanism.

The National Plan for Disaster Prevention and Assistance (PNPAD) was enacted in 1998. The PNPAD comprised four strategic lines: 1) risk identification and monitoring, 2) risk reduction, 3) institutional strengthening, and 4) outreach and training of natural disaster risk mitigation and assistance efforts.

In 2001, constitutional laws directing resources to the prevention and assistance of natural disasters were adopted. As a result, municipalities and departments were able to prevent and assist natural disasters occurring in their jurisdiction, provide risk mitigation training for urban and rural high-risk areas, as well as to relocate communities in times of emergency.

Table 1. Natural Disaster Risk Statistics (1970-2000)

Intensity/Impact	Disaster	Number of deaths	Number of structures destroyed or affected	Number of affected people	Economic damage*
High-Impact events	Tsunami at the Nariñense coast (1979)	672	3,081 (D)	1,011	17
			2,119 (A)		
	Seismic activity in Popayan (1983)	300	2,470 (D)	20,000	378
			11,722 (A)		
	Del Ruiz's Volcanic eruption and Armero Landslide (1985)	23,500-28,000	4,700(D)	200,000	246
			5,150(A)		
	Seismic activity and landslide in Cauca - Páez river (194)	1,100	N/A	8,000	150
			N/A		
	Earthquake in the coffee-belt (1999)	1,186	35,949 (D)	166,336	1,558
			43,422 (A)		
Subtotal	28,258	89,337 (D)	395,347	2,349	
		62, 143 (A)			
Low-to-medium impact events	Cumulative landslides, floods, and other events (1970-2000)	9,954	89,337 (D)	14.8 million	2,227
			185, 365 (A)		
Total	Low, medium and high impact events	38,212	135,537 (D)	15,195,347	4,576
			247,777 (A)		

Source: National System for Disaster Prevention and Assistance

Note: A: Affected. D: Destroyed.

* Damages in US\$ millions

Interest on disaster risk assessment and management, as well as a paradigm shift from ex-post disaster assistance to an ex-ante disaster risk management gained momentum among Colombia's authorities. A series of studies on ex-post government responsibilities, economic assessment of natural disasters, risk transfer mechanisms, insurance of public goods and fiscal discipline were contracted by the Government. The 2004 study titled, "Natural disasters in Colombia: Loss assessment, ex-post government responsibilities: The Colombian Case and International Experience," concludes that the institutional setting in Colombia was designed for ex-post assistance of natural disasters, and not for ex-

ante disaster risk management. As a result, a paradigm shift focused on understanding risk and risk management, gains momentum in Colombia's governmental system.

In 2004, a CONPES document facilitated resources for the implementation of a project to reduce fiscal vulnerability to natural disasters. An external credit line with multilateral banks was authorized for an amount of US\$260 million to partially finance a program for the reduction of fiscal vulnerability to natural disasters over a period of 10 years, starting in 2005.

As part of the program to mitigate fiscal vulnerability, the risk transfer and retention component seeks to design public policies that promote the development of insurance markets against natural disasters. To that end, this component aims to develop three important areas: 1) policies to transfer the government's medium and high layers of risk; 2) support for ministries and municipalities in the development of insurance mechanisms, and 3) development of a possible "pool" of reserves for the reinsurance of catastrophic risks.

Government responsibilities in the aftermath of disasters have been identified, fiscal exposure to natural disasters has been assessed, and risk transfer mechanisms for higher levels of risks have been analyzed in different consulting reports for the Government of Colombia. Public asset losses arising from natural disasters are the governments' direct responsibility. Further, based on historical events, losses arising from private dwellings of low income households (strata 1 and 2 as per the property tax system) are assumed by the National Government given the incapacity of territorial entities (municipal, departmental) to cover such losses, and the government's social responsibility.

The expected direct loss from adverse natural events in Colombia is estimated at US\$ 490 million per year. According to ERN (2011), the total value of public assets and low-income housing exposed is equivalent to US\$ 173.2 billion. This includes estimated exposure of public assets at the national, departmental, and municipal levels, as well as private dwellings of low income households in Colombia. The fiscal value at risk is then computed by adjusting the value at risk with the probability of a disaster event. Table 2 presents annual expected liabilities arising from natural disaster, infrastructure development projects, legal actions, and public credit operations. Probable maximum losses (PMLs) measuring the likely loss for various return periods are also presented⁵.

Three points are important to consider when comparing liabilities from natural disasters with other contingent liabilities.

- **Fiscal shocks caused by natural disasters are highly variable.** Hence the AEL may not be the right risk metric to reflect the possible fiscal shocks caused by natural disasters. Probable maximum losses should also be considered;

⁵ Figures are based on study prepared by Natural Risk Evaluation (ERN) in 2011, which contains probabilistic modeling of natural hazards for Colombia and Mexico.

- **Fiscal loss estimates should also capture indirect impacts.** Natural disaster loss estimates reported in Table 2 only capture the physical damage. Indirect losses, such as loss in tax revenues, should also be captured, as they will create additional fiscal burden.
- **Immediate liquidity is required in the aftermath of a disaster.** The immediate financial response capacity of the government in the aftermath of a disaster is critical to meet the emergency needs of the affected population and the quick recovery and reconstruction of lifeline assets.

Table 2. Estimated Annual Expected Contingent Liability by Category and Probable Maximum Loss from Natural Disasters

Contingent Liability*	COP \$ Millions	US\$ Millions	% of GDP
Annual Expected Liability			
Infrastructure Projects	57,460	26	0.01
Legal Actions	40,812,000	18,642	7.46
Public Credit Operations	122,000	56	0.02
Natural Disasters	1,072,725	490	0.20
Natural Disasters Probable Maximum Loss**			
PML 100-yr	6,515,158	2,976	1.19
PML 250-yr	9,669,843	4,417	1.77
PML 500-yr	12,380,114	5,655	2.26

Source: MHCP (2011) and ERN (2011)

*World Bank estimates based on MHCP (2011) and ERN (2011). Contingent liabilities from infrastructure development, legal actions, and public credit operations are reported for a medium-term fiscal period of 10 years, and represent the period expected loss of the stock of contingencies in the present. Annualized expected liabilities for these sources of risk are estimated by dividing total expected loss by the number of years. AEL from natural disasters is the “Hybrid AEL” reported in ERN 2011. Real 2010 GDP base of COP\$ 546,951,000 million and exchange rate as of December 2010 is used to compute figures.

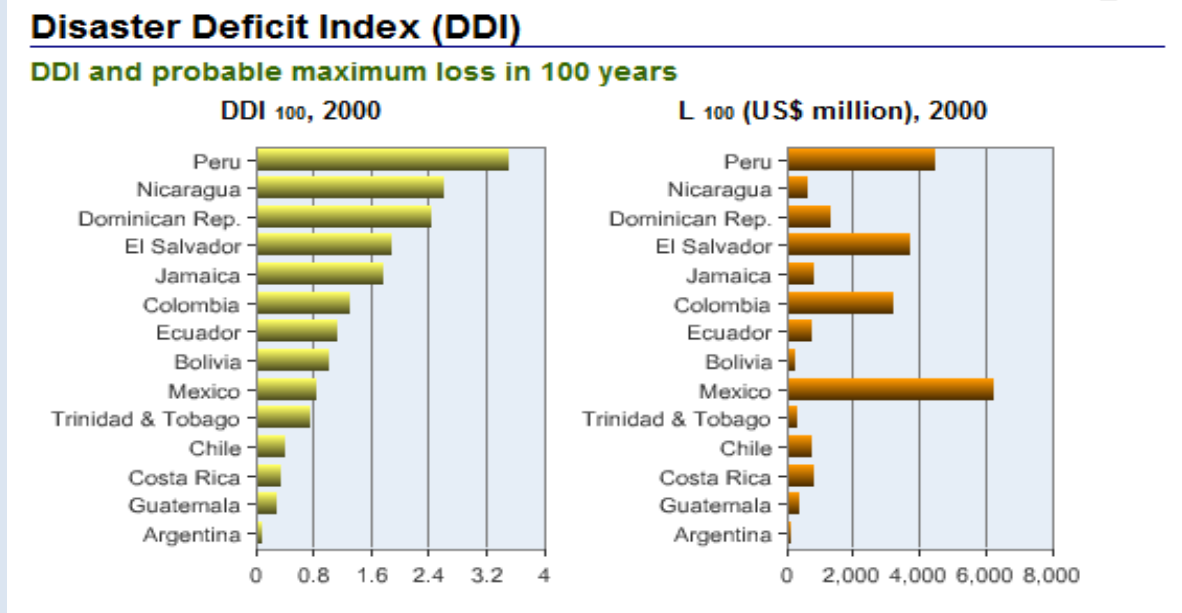
**Probable Maximum Losses were retrieved from ERN 2011’s probabilistic risk assessment of seismic risks in Colombia. While reported AEL reflects expected losses arising from high-frequency, low impact events (e.g. landslides, volcanic activity, etc), PMLs correspond to maximum losses associated to low-frequency, high-impact earthquakes.

The Government of Colombia may not have sufficient economic resilience to meet contingent liabilities to natural disasters. The fiscal deficit index for natural disasters, DDI, for Colombia is 1.28 for a 100-year loss, 2.07 for a 1000-year loss and 2.53 for a 1,500 year-loss. The DDI is computed as the ratio between a given return period PML and the sum of internal capacity and external funds available to the government to face disasters (its economic resilience); the Colombian Government’s DDI higher than one indicates its insufficient economic resilience to adequately respond to disasters (See Box 1) .

Box 1. Disaster Deficit Index (DDI)

The Inter-American Development Bank (IADB) Disaster Deficit Index (DDI) captures the relationship between the demand for economic resources to cover losses that a government would have to assume and the nation's economic resilience, that is, its ability to generate internal and external funds to replace the affected infrastructure and goods. A DDI greater than 1.0 reflects the country's inability to cope with major disasters, even by going into as much debt as possible. The greater the DDI is, the greater the gap between losses and the country's ability to face them. Government responsibility was restricted to the sum of losses associated with public sector buildings and housing for the lowest income population.

The left side of the figure below shows the DDI calculated in 2000 for a Maximum Considered event (MCE) with 100 years of return period (five percent probability of occurrence in ten years). The right side of the figure shows the maximum loss, L, for the government during the same period. The table shows that access to external resources would be critical for eight of the fourteen countries studied. Peru, with a DDI of 3.5, is in the most critical situation, with the loss of a 1-in-100 year event estimated at more than US\$4 billion.



Source: Ghesquiere and Mahul (2010) and IADB (2000).

Natural disasters are the second most important source of contingent liabilities for the Government of Colombia. Contingent liabilities associated with legal actions are the largest by far, with an annual expected value of US\$ 18.6 billion for the medium-term fiscal period 2011-2021, or 7.46 percent of Colombia's GDP (See Table 2).⁶ Annual expected losses arising from natural disasters, at COP\$ 1.07 trillion (US\$ 490 million), 0.20% of 2010 GDP, represent the second largest contingent liability in Colombia. Estimated maximum losses from low-frequency high-impact seismic events for 100-year and

⁶ The majority of these legal contingencies (82.75%) is accounted for by a single legal action against INCORA, the Colombian Institute for Agrarian Reform, due to the presumptuous impossibility of exploiting coalfields in the Venecia municipality, Antioquia. The case is currently handled by the Ministry of Agriculture and Rural development.

500-year return periods are US\$2.9 and US\$5.6 billion, which represent as much as 1.17% and 2.26% of GDP, respectively. In contrast, annual expected contingencies as a result of infrastructure development projects and public credit operations represent less than 0.01% and 0.02% of GDP, respectively.

A challenge for the assessment of contingent liabilities is the collection and management of data necessary to estimate the value of contingencies. Another important challenge is the dynamic nature of risks, and the possible benefits that could arise from accounting for the correlation of risks across different sources of contingency. In spite of these challenges, the Government of Colombia has made significant progress for the fiscal accounting of contingencies.

Future Steps towards a Sovereign Disaster Risk Financing and Insurance Strategy

The design of a risk financing strategy to reduce fiscal vulnerability to natural disasters is a priority for Colombia’s MHCP. The Government of Colombia, with technical assistance from the World Bank in partnership with Switzerland’s State Secretariat for Economic Affairs (SECO) and the Global Facility for Disaster Reduction and Recovery (GFDRR), has developed a formal agenda towards the formulation of a sovereign disaster risk and insurance strategy. This strategy relies on four main activities:

- Further assess the contingent liability of GoC using catastrophe risk modeling tools, particularly for public assets and low-income housing;
- Design of a sovereign disaster risk financing strategy, relying on risk retention and risk transfer, to stabilize the budget against natural disasters;
- Develop a catastrophe risk insurance program for public assets;
- Promote the development of property catastrophe risk insurance for private dwellings.

The outputs of this partnership are summarized in the table below.

Table 3. Agenda for a Sovereign Disaster Risk and Insurance Strategy in Colombia

Expected outputs	Timeline
Draft national disaster risk financing policy note	By end 2011
Financial and actuarial risk assessment tool Fiscal risk assessment of natural disasters	By mid 2012
Feasibility study of index-based risk transfer solutions Possible Implementation of a Pilot	By mid 2012
Standard terms and conditions of property cat insurance policy of public buildings	By mid 2012
Inventory of Infrastructure Risk assessment of major infrastructure	By end 2012
Design of property cat insurance policies of major infrastructure	By end 2012

Placement of group insurance policies of key infrastructure	By end 2013
Risk pooling mechanism of public assets	By end 2014
Expansion of the risk pooling mechanism to private assets	By end 2015

Annex 1. Legal Framework for Contingent Liabilities

Contingent Liability	Legal Framework for Contingent Liabilities						
	Laws	Enactments	Acts	CONPES	Others	Report	
Infrastructure development projects through PPP schemes	185 of 1995, 448 of 1998, 819 of 2003	423 of 2001	2080 of 2008, 6128 of 2008, 446 of 2010	3045 of 1999, 3107 of 2001, 3133 of 2001, 3186 of 2002, 3249 of 2003, 3413 of 2006, 3535 of 2008		Analysis and valuation	
Public credit operations				2818 of 2005, 3045 of 2006, 4291 of 2007			Analysis and valuation
Legal actions					3250 of 2003	Presidential Directorate, January, 2004	Analysis and valuation
Natural Disasters		448 of 1998, 715 of 2001	919 of 1989, 93 of 1998		3146 of 2001, 3318 of 2004		

References:

ERN (2011). *Global Assessment Report on Disaster Risk Reduction, Probabilistic Modeling of Natural Risks at the Global Level, Phase 1A, Development of Methodology and Case Studies.*