A semantic network is a directed graph consisting of nodes, which represent concepts and edges. A semantic network is a way of representing relationships between concepts and meanings, in which each element is represented by a word or set of words. As it based on research in artificial intelligence, cognitive psychology, learning theory and others, and has been independently proven to be significantly more effective in the transfer of knowledge.

The integration of Pattern recognition and Semantic network will reduce complicated mathematical analysis and processing resources, and provide later binding rules for classification and more realistic and concrete results compare to traditional pattern recognition analysis.

For example, in case of Mongolia the herders' indigenous knowledge of facts related to their living natural environment and animals, herding, surviving and adaptation skills, traditional rules to live in harmony with nature and best practices represented in Cognitive Semantic Network and processed with Pattern Recognition Tools would provide qualitative and purposeful prediction and optimal solution options for decision making and be capable to provide sensing, segmentation, feature extracting, and classification and solutions towards integrate, assess, predict economic, environmental and social systems.

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Disaster Risk since a Macroeconomic Perspective: A Metric for Fiscal Vulnerability Evaluation

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Keywords: Contingent liabilities disaster deficit, financial vulnerability, fiscal sustainability.

Introduction

The various planning agencies dealing with the economy, the environment, housing, infrastructure, agriculture, or health, to mention but a few relevant areas, must be made aware of the risks that each sector faces. In addition, the concerns of different levels of government should be addressed in a meaningful way. If risk is not presented and explained in a way that attracts stakeholders' attention and concern, it will not be possible to make progress in reducing the impact of disasters. This means that appropriate evaluation tools are necessary to make it easy to understand the problem and guide the decision-making process, using the language of the policy makers and stakeholders. In this framework the Disaster Deficit Index (DDI) was developed, thinking in the need to have an appropriate figure to measure risk from macroeconomic and financial perspective and to evaluate the contingent liabilities that a potential extreme disaster may represent for the fiscal sustainability of a country. This extended abstract presents the model of the DDI and the results for fourteen countries of the Americas to express risk in the language of the finance decision makers and to guide the governmental investment for risk reduction, retention and transfer.

Disaster deficit index

The DDI measures country risk from a macroeconomic and financial perspective according to possible catastrophic events. It requires the estimation of critical impacts during a given period of exposure, as well as the country's financial ability to cope with the situation. This index measures the economic loss that a particular country could suffer when a catastrophic event takes place, and the implications in terms of resources needed to address the situation. The DDI captures the relationship between the demand for contingent resources to cover the losses, $L_R{}^P$, caused by the Maximum Considered Event (MCE), and the public sector's economic resilience, $R_E{}^P$, that is, the availability of internal and external funds for restoring affected inventories.

$$DDI = \frac{L_R{}^P}{R_E{}^P} \qquad (1)$$

where,

$$L_R^p = \text{j } L_R \qquad (2)$$

$L_R{}^P$ represents the maximum direct economic impact in probabilistic terms on public and private stocks that are governments' responsibility. The value of public sector capital inventory losses is a fraction φ of the loss of all affected goods, L_R, which is associated with an MCE of intensity I_R, and whose annual exceedance rate (or return period, R) is defined in the same way for all countries (i.e. return periods of 50, 100 and 500 years, whose probability during any 10 years exposure period is 18 percent, 10 percent and 2 percent, respectively).

Estimating probable losses

The computation of losses during future natural hazard events is always a very complex problem. Due to the uncertainties of this process, losses must be regarded as random variables, which can only be known in a probabilistic sense, i.e. through their probability distributions. Consequently, this approach has been adopted in this model (Ordaz and Santa-Cruz, 2003). Given existing knowledge, it is clearly theoretically impossible to predict the times of occurrence and magnitudes of all future natural hazard events. In view of the uncertain nature of the processes involved, our second best choice is to estimate the probability distribution of the times of occurrence and impacts of all future disasters. A convenient way of describing the required probability distributions (those of the occurrence times and the sizes of the physical impact) is the use of the exceedance rate curve of the physical losses or Loss Exceedence Curve (LEC). This curve relates the loss value with the annual frequency with which this loss value is exceeded; the inverse of the exceedance rate is the return period. The Probable Maximum Loss (PML) curve is equivalent to the LEC (Figure 1).

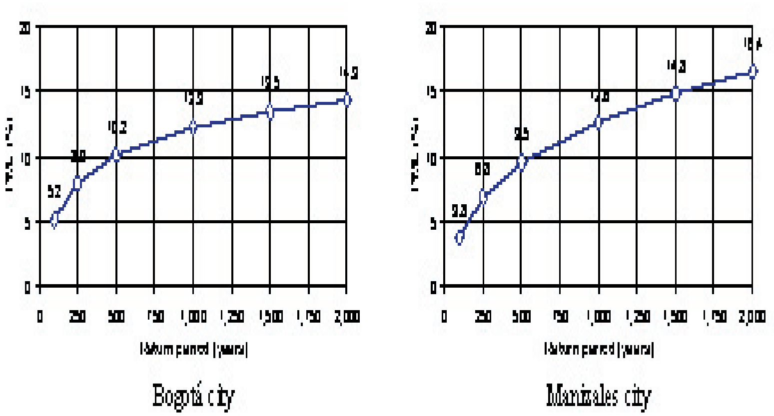

Fig. 1: Example of a PML curve with the results for several return periods

Resources potentially available

Economic resilience, R_E^P, represents internal and external resources that were available to the government when the evaluation was undertaken. In this evaluation the following aspects have been taken into account: the *insurance and reinsurance payments* that the country would approximately receive for goods and infrastructure insured by government; the *reserve funds for disasters* that the country has available during the evaluation year; the funds that may be received as *aid and donations*, public or private, national or international; the possible value of *new taxes* that the country could collect in case of disasters; the *margin for budgetary reallocations* of the country, which usually corresponds to the margin of discretional expenses available to government; the feasible value of *external credit* that the country could obtain from multilateral organisms and in the external capital market; and the *internal credit* the country may obtain from commercial and, at times, the Central Bank, when this is legal, signifying immediate liquidity. IDEA (2005) presents a method for estimating taxes on financial transaction and a model for calculating the external financial situation of a country and the access to internal credit taking into account the associated uncertainties. It is important to indicate that this estimation is proposed considering restrictions or feasible values and without considering possible associated costs of access to some of these funds and opportunity costs which could be important.

Results

This methodology has been applied to 14 countries in the Latin America and Caribbean Region; Figure 2 present the application results for events with 500 years return period (DDI and losses by country for 2000). Figure 3 shows the DDI in terms of the percentage of the Capital Expenditure (DDI_{CE}) and Annual Probable Loss. The DDI is one of the four composite indicators proposed and applied in the framework of the Program of Indicators for Disaster Risk and Risk Management for the Americas developed for the Inter-American Development Bank. Details of its fundamentals are available in the web page: http://idea.unalmzl.edu.co (Carreño et al., 2005; IDEA, 2005).

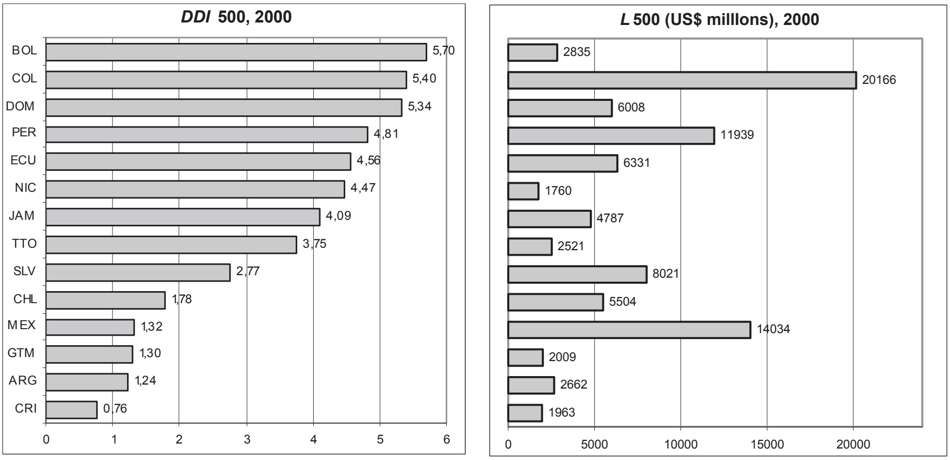

Fig. 2: DDI and Probable Maximum Loss for 500 years return period

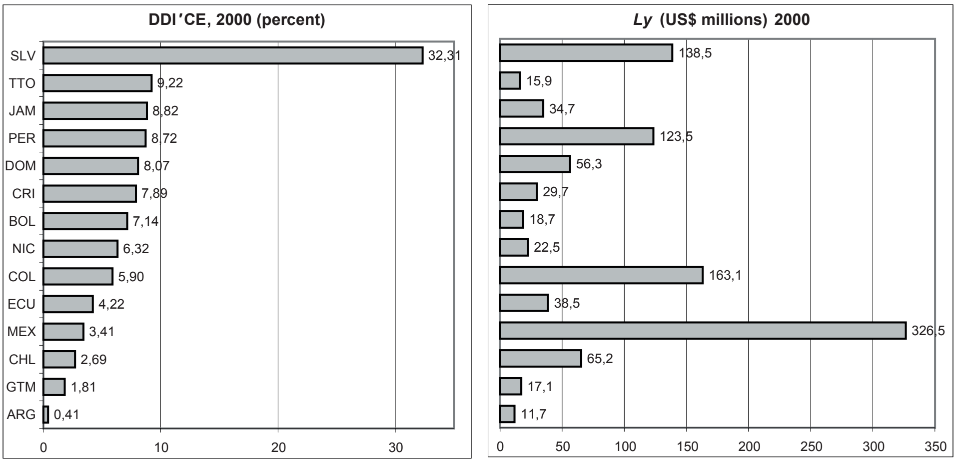

Fig. 3: DDICE and Annual Probable Loss

Conclusions

These indicators provide a simple way of measuring a country's fiscal exposure or vulnerability and the implicit contingency liabilities for the sovereign states in case of extreme disasters. They allow national decision makers to measure the budgetary implications of hazard extreme events and highlight the importance of including this type of information in financial and budgetary processes. These results substantiate the need to identify and propose effective policies and actions such as, for example, using insurance and reinsurance to protect government resources or establishing reserves based on adequate loss estimation criteria. Other such actions include contracting contingency credits and, in particular, the need to invest in structural retrofitting and rehabilitation, and nonstructural prevention and mitigation, to reduce potential damage and losses as well as the potential economic impact of disasters.

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The Livestock Emergency Guidelines and Standards: Promoting Public-Private Partnerships for Livestock Interventions in Disasters

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Keywords: Disasters, livestock, public-private partnership, sphere, standards.

Introduction

It is widely recognized that livestock are a key asset for rural and urban communities throughout the developing world, and that disaster response has often included efforts to protect livestock assets as a means to safeguard livelihoods. Livestock interventions have been used most commonly in drought response, but have also been part of humanitarian assistance following rapid onset emergencies such as floods and earthquakes, and during complex emergencies.

In the late 1990s livestock and humanitarian experts became concerned about the variable quality of livestock programming in emergencies. Among the concerns was the frequent provision of livestock inputs which undermined existing private sector service providers. This contradicted a livelihoods-based approach, in which support to local services and markets is seen as important for assisting recovery post-disaster.

In 2006 a coalition of agencies and individuals joined together to start the development of the global Livestock Emergency Guidelines and Standards (LEGS), as a complementary set of standards to the Sphere Project. This paper describes some of the key elements of LEGS in terms of both process and content, and also presents two successful examples from the field of livestock interventions which were specified designed to work with private sector actors.

The livestock emergency guidelines and standards

The LEGS process: The process for developing LEGS mirrored the Sphere process. It was a broad collaborative effort involving an extensive network of agencies worldwide, and on-line consultations and field testing. A first draft of LEGS was produced and hosted on the LEGS