



**GFDRR**  
Global Facility for Disaster Reduction and Recovery



**WORLD BANK GROUP**



## **Workshop / Atelier**

### **Disaster Risk Financing and Insurance (DRFI) *Financement et Assurance des Risques de Désastres Naturels***

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#### **The Fiscal Implications of Hurricane Strikes in the Caribbean**

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E. Strobl, Ecole Polytechnique  
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S. Yearwood, Caribbean Catastrophe Risk Insurance Facility





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Worryingly losses associated with tropical storms have risen considerably over the last few decades and are currently estimated to be about \$US 26 billion a year. Moreover, some predict that the intensity of these phenomena may increase with climate change. In this regard, arguably the small disaster prone island economies in the Caribbean are particularly vulnerable, as their limited budgetary capacity prevents them from establishing sufficient financial reserves to absorb such potentially large negative shocks. Added to this, their high level of debt restricts their ability to access credit in the aftermath of a natural disaster, while high transaction costs associated with the relatively small market restricts access to private catastrophe insurance covering potential losses. International aid also does not provide a solution since, when it comes, it is often too little and too late.

A demonstrative example of the consequences of such financial shortfalls in the Caribbean was the case of Hurricane Ivan, which struck Grenada in 2004 causing losses twice the size of the island's GDP. In the immediate aftermath the country was no longer able to finance its public service bill, but had had no budget contingency in place or access to the private insurance given the relatively small market. It was thus forced to introduce a number of revenue enhancing measures and delay efforts of recovery and reconstruction in

order to address the fiscal shortfall, thus likely further amplifying the long term effects of the hurricane. In fact it is in response to such fiscal vulnerability to natural disasters that in 2007 a number of Caribbean economies established the Caribbean Catastrophe Risk Insurance Facility (CCRIF), a multi-country risk pooling scheme that can provide members with almost immediate fiscal relief when a natural disaster occurs. As a matter of fact, since its inception the CCRIF has issued over US\$ 23 million as a consequence of 4 tropical storm events alone.

Payouts to participating members under the CCRIF as a consequence of a tropical storm are made according to the storm's physical characteristics, predicted losses, a country's risk profile, and a country's loss coverage, the latter being the only choice parameter of a country. Ultimately the country's chosen coverage will, however, depend on its expectations with respect to the impact of a tropical storm event on its fiscal sector. In this regard, there are only a handful of statistically based studies which can provide quantitative indication as to the actual short-term fiscal shortfalls in response to a natural disaster event, and these provide mixed evidence of an impact on the fiscal gap of countries. However, all existing studies only look at the impact of natural disasters events in terms of annual data. One suspects in this regard that much of the true short-term fiscal reaction is likely 'netted out' in annual terms, and thus can only provide limited insight into how severe such fiscal shortages in reality are likely to be.

In this study we address the limitations of the current literature by explicitly examining higher frequency, i.e., monthly, fiscal reactions to natural disaster events. Additionally, and unlike previous studies, we also provide estimates of return periods of fiscal shortages in an extreme value theory framework. To these ends, we compile a data set of monthly potential

hurricane losses and fiscal expenditure and revenue over the 2000-2012 period for a set of Caribbean countries. We combine these data with destruction estimates derived from actual hurricane tracks and a detailed spatial distribution of assets. Our econometric analysis on this data shows that government revenue drops immediately after a shock, while there is no discerning significant effect on total public expenditure. Examining the main components of expenditure, however, we discover that current expenditure increases temporarily two months following the shock. Overall, we find that there is an immediate and sizable impact on Caribbean economies' monthly budget deficit. Using our estimates and extreme value modeling we that return periods of significant fiscal impacts may be considerable for many of the island economies in the Caribbean.