# *Closing the Climate Resilience Gap: Perspective of a Global Insurer*

14 December 2012

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# *Building Climate Resilience Amidst Competing Priorities*

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***Source: KAL's Cartoon from Dec. 8, 2012 Economist print edition***



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# Sandy Impacts / Losses Illustrate The Climate Resilience Gap

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NY Sandy losses estimated at over $50 billion.

NY GDP was $1,016,350 million [1.016 trillion] in 2011.
Thus losses are 4.9% of state GDP* (based on US BEA statistics).

NJ Sandy losses estimated at over $39 billion.

NJ GDP was $426,765 million [426.7 billion] in 2011; thus losses are over 9% of state GDP* (based on US BEA statistics).

***Photos – © NY Daily News***



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# *The Climate Resilience Gap*

How do we get from "current state" given:

- Increasing frequency and / or severity of climatic events
- Building code / zoning / rebuild requirements in state and/or federal regulations
- Insufficient or aging infrastructure
- Uninsured or underinsured assets
- Overwhelmed state nat cat funds / insurance pools
- State / federal programs that may not encourage private insurance market or incentivize improvements in resilience by asset owner
- Taxpayer burdens

To "resilient state":

- Assuring economic sustainability and resilience in the face of climate change
- E.g., reduce coastal and river vulnerabilities

***See, e.g.***, GAO, ***Natural Catastrophe Insurance Coverage Remains a Challenge for State Programs*** (2010)

# What is Climate Resilience and How Do We Bridge the Gap?

- ***Resilience***
  - "The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change."
    - IPCC Fourth Assessment, Working Group 2
  - Many definitions from policy and ecology literature.

- ***Bridging the Climate Resilience Gap***
  - Investment in adaptation
  - Incentivizing risk reduction
  - Requiring risk-based land use management
  - Fostering asset investment
  - Encouraging correct price signals

# *Insurance Is Part of the Solution to Bridging the Climate Gap*

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BIS Working PapersNo 394
Unmitigated disasters?
New evidence on the
macroeconomic cost of
natural catastrophes

by Goetz von Peter, Sebastian von Dahlen, Sweta Saxena

Monetary and Economic Department
December 2012

JEL classification: G22, O11, O44, Q54.

Keywords: Natural catastrophes, disasters, economic growth, insurance, risk transfer, reinsurance, recovery, development.

"Abstract
This paper presents a large panel study on the macroeconomic consequences of natural catastrophes and analyzes the extent to which risk transfer to insurance markets facilitates economic recovery. ***Our main results are that major natural catastrophes have large and significant negative effects on economic activity, both on impact and over the longer run. However, it is mainly the uninsured losses that drive the subsequent macroeconomic cost, whereas sufficiently insured events are inconsequential in terms of foregone output.*** This result helps to disentangle conflicting findings in the literature, and puts the focus on risk transfer mechanisms to help mitigate the macroeconomic costs of natural catastrophes." (emphasis added)

# Features of Natural Catastrophe

Table 1 – Features of Natural Catastrophes

| | Properties | All types | Weather-related events | | | |
|---|---|---|---|---|---|---|
| | | | Geophysical [A] | Meteorological [B] | Hydrological [C] | Climatological [D] |
| Frequency | *# Events overall (types in %)* | *21768* | *12%* | *42%* | *34%* | *12%* |
| | # Events category 4+ | 2,476 | 212 | 980 | 739 | 545 |
| | Africa | 240 | 10 | 20 | 49 | 161 |
| | Asia | 949 | 114 | 284 | 418 | 133 |
| | Europe | 364 | 33 | 125 | 110 | 96 |
| | Latin America & Caribbean | 307 | 36 | 110 | 103 | 58 |
| | North America | 539 | 9 | 413 | 41 | 76 |
| | Pacific | 77 | 10 | 28 | 18 | 21 |
| Severity | *Maximum fatalities* | *300,000* | *242,769* | *300,000* | *26,000* | *300,000* |
| | *Mean fatalities* | *1,275* | *6,056* | *833* | *359* | *1,362* |
| | *Median fatalities* | *22* | *246* | *10* | *117* | *0* |
| | Maximum loss ($ mn) | 210,000 | 210,000 | 144,201 | 43,000 | 28,567 |
| | Mean loss ($ mn) | 1,420 | 4,661 | 1,346 | 1,066 | 774 |
| | per land area ($ /km²) | 34,367 | 56,800 | 70,734 | 2,567 | 3,365 |
| | per head ($ /capita) | 190 | 652 | 305 | 20.9 | 36.2 |
| | per unit income (% of GDP) | 2.5 | 7.5 | 3.1 | 1.0 | 1.7 |
| | Median loss ($ mn) | 338 | 454 | 474 | 239 | 89 |
| | Coefficient of variation ($ mn) | 4.9 | 4.2 | 3.9 | 3.3 | 2.9 |
| Risk transfer | Uninsured events (%) | 57.7 | 59.4 | 29.0 | 75.4 | 84.6 |
| | Median coverage (if >0) | 50.0 | 6.6 | 58.3 | 19.3 | 47.4 |
| | High income countries | 55.0 | 8.7 | 62.5 | 30.0 | 49.5 |
| | Low & middle income c. | 6.9 | 5.0 | 10.0 | 5.0 | 25.0 |
| | Mean coverage (if >0) | 44.3 | 15.2 | 52.2 | 28.4 | 42.8 |
| | High income countries | 50.2 | 19.5 | 56.5 | 34.1 | 44.0 |
| | Low & middle income c. | 16.3 | 11.0 | 19.3 | 13.7 | 32.3 |

*Notes:* The table shows summary statistics on natural catastrophes between 1960 and 2011. Apart from the first row, the numbers relate to catastrophes of category 4 and above, defined as events causing major property, infrastructure and structural damage with total losses exceeding $250 million in constant 2011 US dollars and/or more than 100 fatalities. Coverage is computed over observations with positive insured losses. (Unconditional median coverage is zero when more than half of the events are entirely uninsured, as for types A, C and D). The physical types are grouped as follows:

A Earthquakes, volcanic eruptions and dry mass movement (rock falls, landslides, subsidence)

B Storms (tropical storms, extratropical storms, local windstorm)

C Flooding (river floods, flash floods, storm surge), wet mass movement (rock falls, landslides, avalanches, subsidence)

D Extreme temperatures (heatwave, freeze, extreme winter conditions), droughts, and wildfires.

Source: Calculations based on Munich Re Statistics (NatCatService).

**"Unmitigated Disasters? New Evidence on the Macroeconomic Costs of Natural Catastrophes", von Peter, et al 5 December 2012, BIS Working papers no 394. Available at www.bis.org**

# Role of Risk Transfer

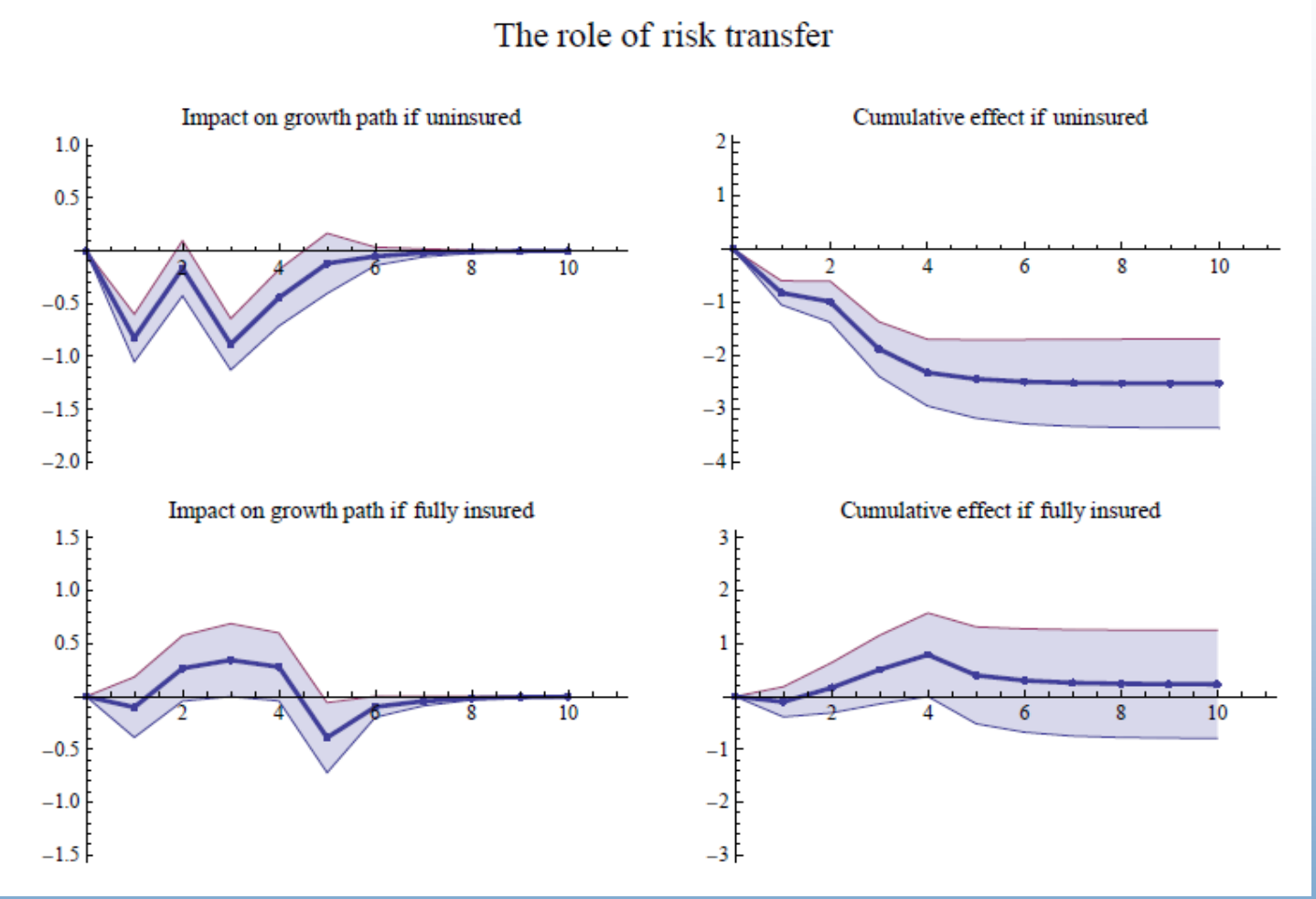


***Figure 4***: The impulse response function traces out the path of GDP growth over time by simulating the recursive equation (4) using the regressor Log10(Loss), with the estimated coeffcients from Table 3 (column 1), as described under Figure 2 (10,000 realizations). The upper panels simulate the growth response to a completely uninsured event of severity equal to the mean size of uninsured losses in the sample. The lower panels simulate a hypothetical fully (100%) insured event of severity equal to the mean size of insured losses.

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