

SI Re – Mutually yours

Sustainable, agile, committed

Insurance Linked Securities: Introduction and Overview

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SIGNAL IDUNA Reinsurance AG



«First Ever Swiss-Franc Cat-Bond»



January 5th, 2015

GC Securities* Completes First Ever Swiss Franc-Denominated Private Catastrophe Bond ("Gurten") Benefitting Gebäudeversicherung Bern

... but what about WinCAT-Wandelanleihe?

1997 *Wandelanleihe Winterthur-Versicherungen mit WinCAT-Coupons "Hagel"*, Fixed Income Resarch, Credit-Suisse First Boston; Authors Kurt Hess und Martin Jaggi; contribution A. Gisler: actuarial part in this research brochure.

Convertible bond Winterthur Insurance with WinCAT coupons "Hail"



**CHF 399 million subordinated 3-year convertible,
conversion premium 20%**

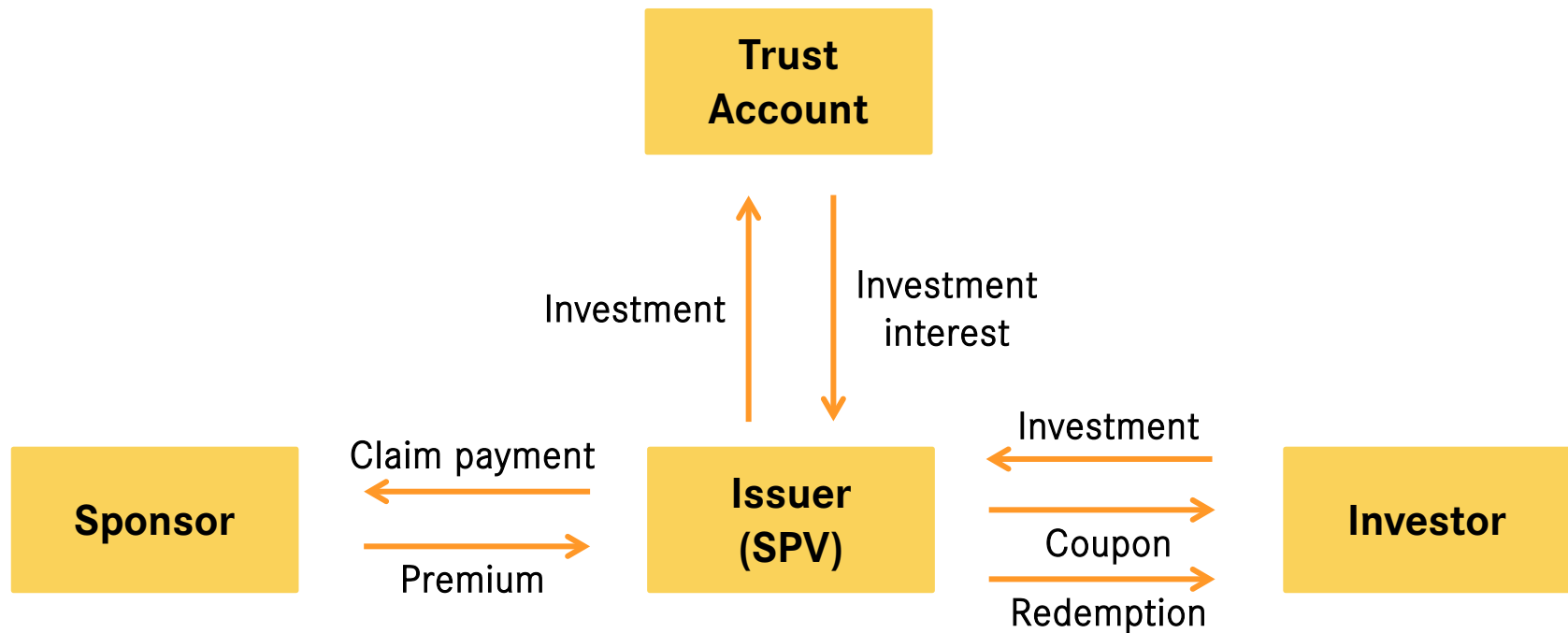
**Knock-out of 2 1/4% annual coupon if any single hail
or other storm damages more than 6,000 motor vehicles
insured with Winterthur Insurance in Switzerland**

1999 partial award of the 1999 Charly Hachemeister Price, Casualty Actuarial society USA, for the paper An addendum and a Short Comment on the Paper 'Estimating the Value of the Wincat Coupons of Winterthur Insurance Convertible Bond by U. Schmock' (with P. Frost) and the modelling of the WinCAT Convertible Bond

What is a Cat(astrophe) Bond?

- Securitization of an actuarial risk (ILS = Insurance Linked Security)
- For investors a fixed income investment on the asset side of the balance sheet
- Works like a standard bond, but a loss on investment is triggered by a catastrophe
- The loss increases (in general linearly) with the size of the indemnity
- Protection for cedents against large catastrophe losses
- Secondary market is '**O**ver **T**he **C**ounter', not on an stock exchange

Structure of a Cat Bond



A Cat Bond for Investors or Issuers

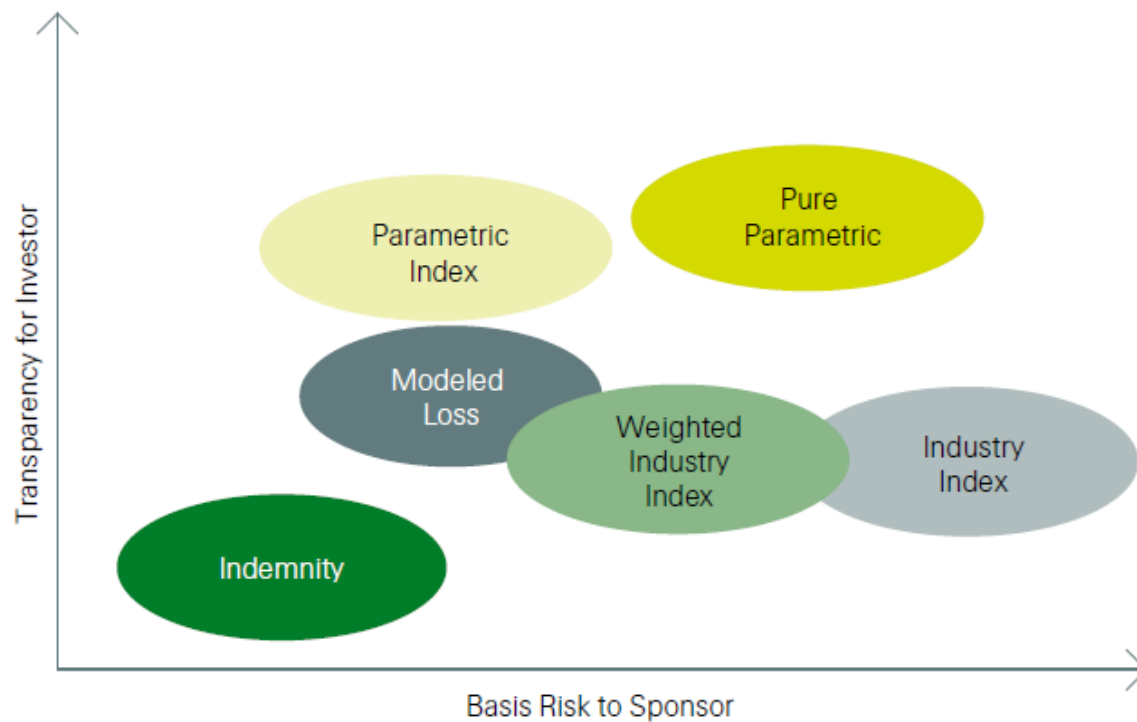
Investor

- Diversifying to traditional stock and bond markets
- High coupons
- Access to new markets

Sponsor (Issuer)

- Top risks can be covered by reinsurance
- Additional capacity
- Low credit risk
- Multiyear transactions

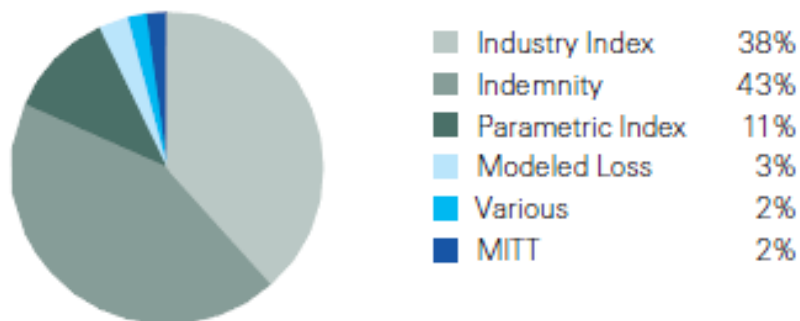
Types of Triggers



Source: Swiss Re Capital Markets

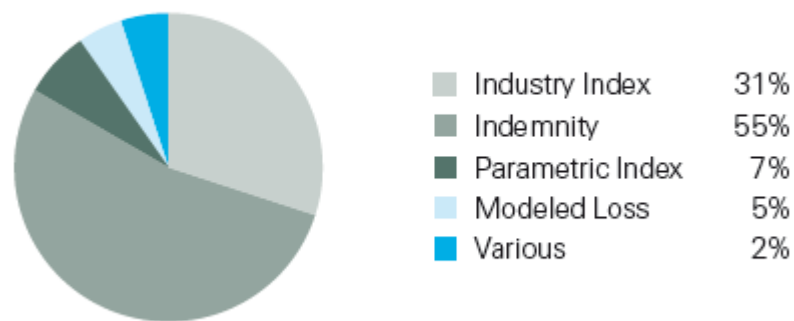
Volumes by Types of Triggers

Sector Data as of 31 December 2013



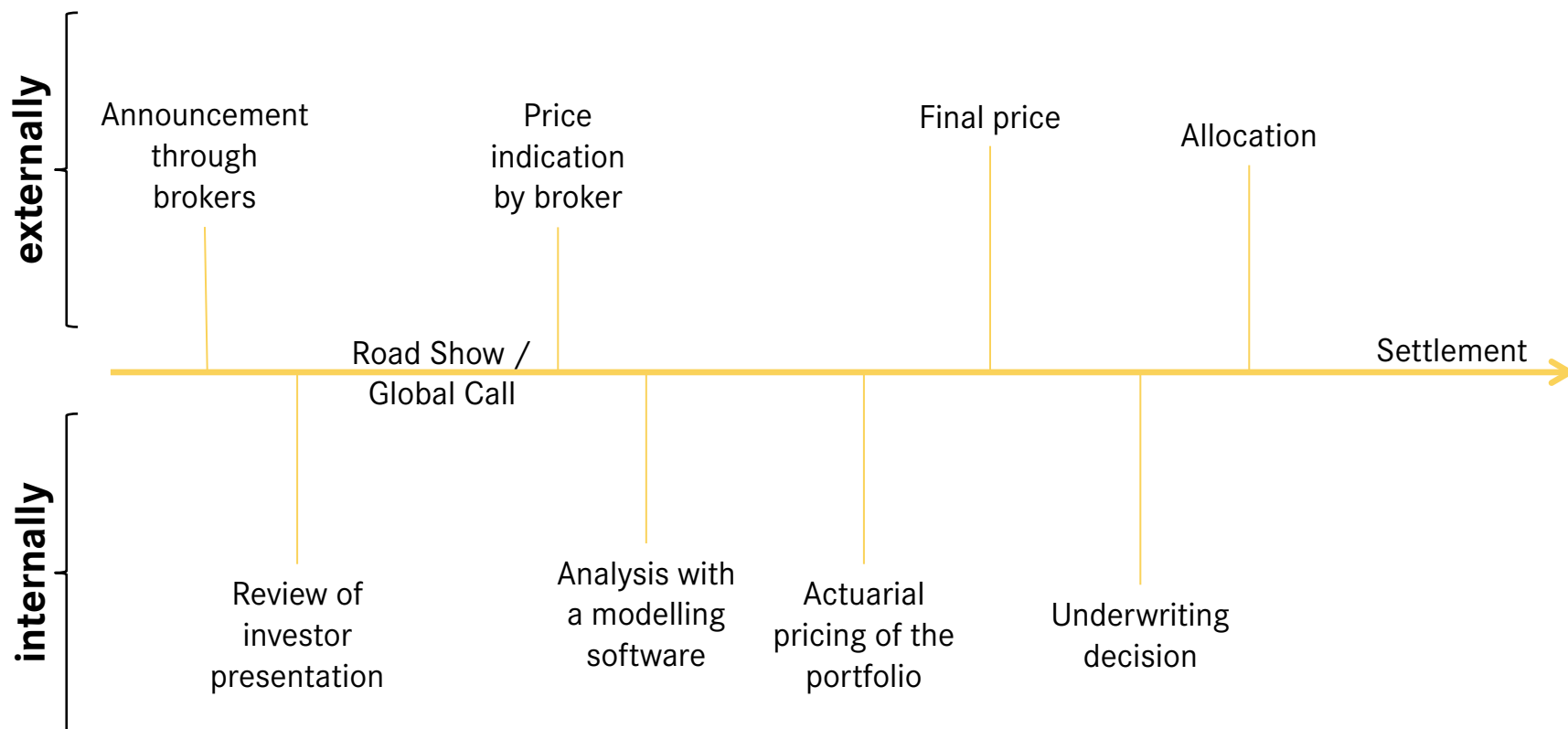
Source: Swiss Re Capital Markets

Sector Data as of 30 June 2014



Source: Swiss Re Capital Markets

The Investment Process for a Cat Bond



Typical Emission

- Investor presentation (~50 slides)
 - Information on the structure of the bond
 - Information on the cedent and its underwriting
 - Risk modeling by a modeling agent
- Offering Circular (~250 pages)
 - Contractual document
- Remodeling Files

Risk Modeling

- Modelling Software to find loss distribution of a single bond
 - Hazard Module
 - Engineering Module
 - Financial Module
- Portfolio modeling to support investment decision
 - Price / expected loss
 - Risk based capital
 - Correlations to other bonds in portfolio

Modeling Software – Hazard Module

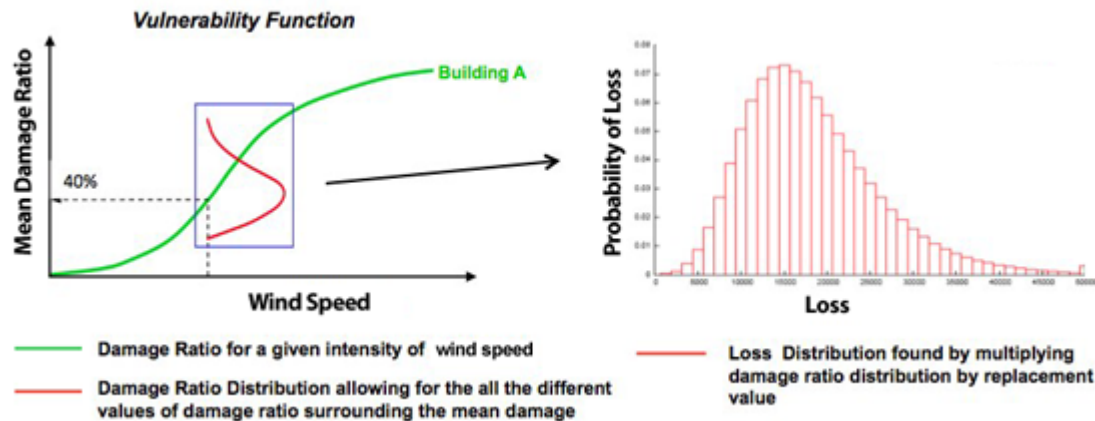


- Characteristics of natural catastrophes
 - Frequency
 - Intensity
 - Location
- Generate a large catalogue of events for simulation
- One characteristic generally describes the risk
 - Wind speed
 - Magnitude of an earthquake



Modeling Software – Engineering Module

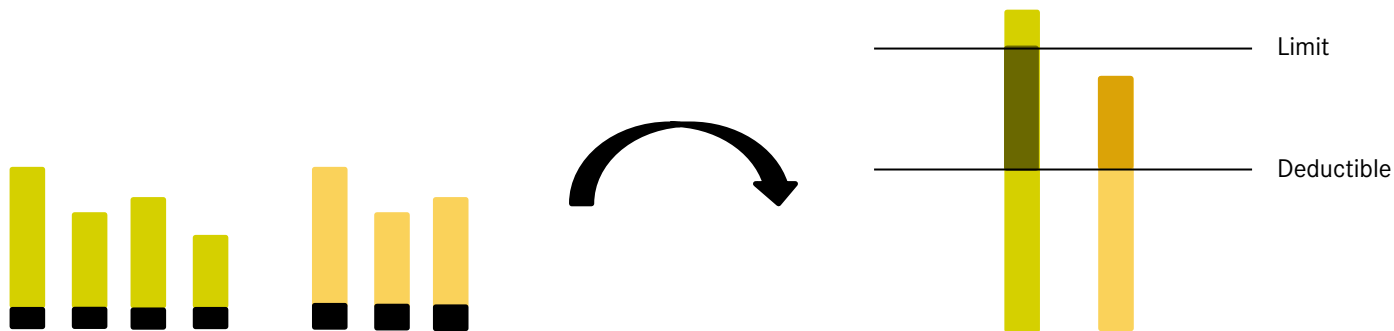
- Every insured property has a different vulnerability
- Many characteristics like construction type, size, age of roof, occupancy describe the property
- A damage ratio distribution and mean damage ratio are determined for the property



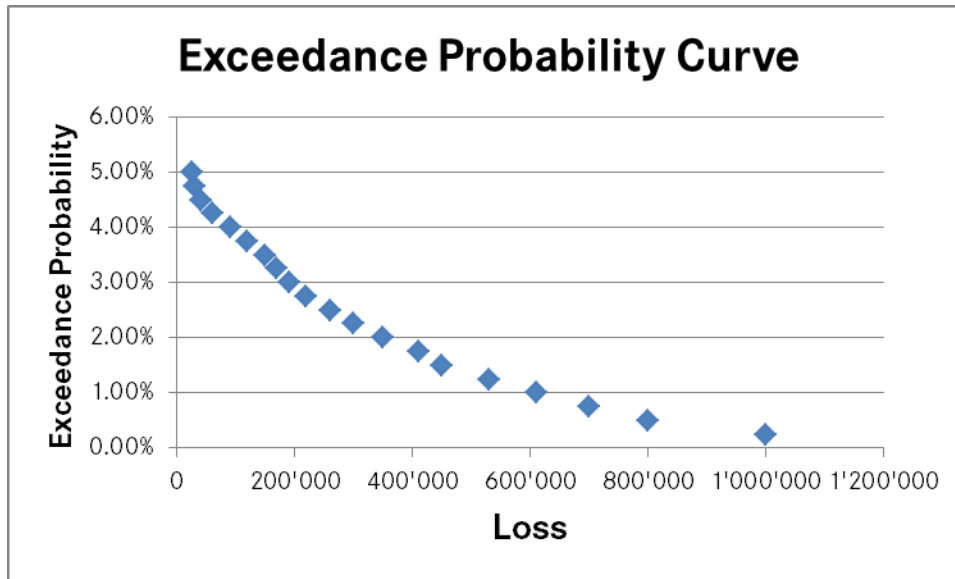
Source: <http://understandinguncertainty.org/node/622>, Shane Latchman

Modeling Software – Financial Module

- With the damage ratio distribution of a policy and the event detail, a loss distribution can be determined
- Insurance policy specifications such as limit and deductibles are applied to the loss distribution
- All losses of an event are added to have an event loss distribution
- Reinsurance terms can be applied



Exceedance Probability Curve & Return Period



- Probability to have a loss **higher than** threshold
- Return period T:
 - $1/T = P(X > x(T))$
- What does a 50-year event mean?

Did Cat Bonds pay out in the Past?

Muteki Ltd. catastrophe bond triggered by Japan earthquake confirmed as total loss

by ARTEMIS on MAY 7, 2011

 Share

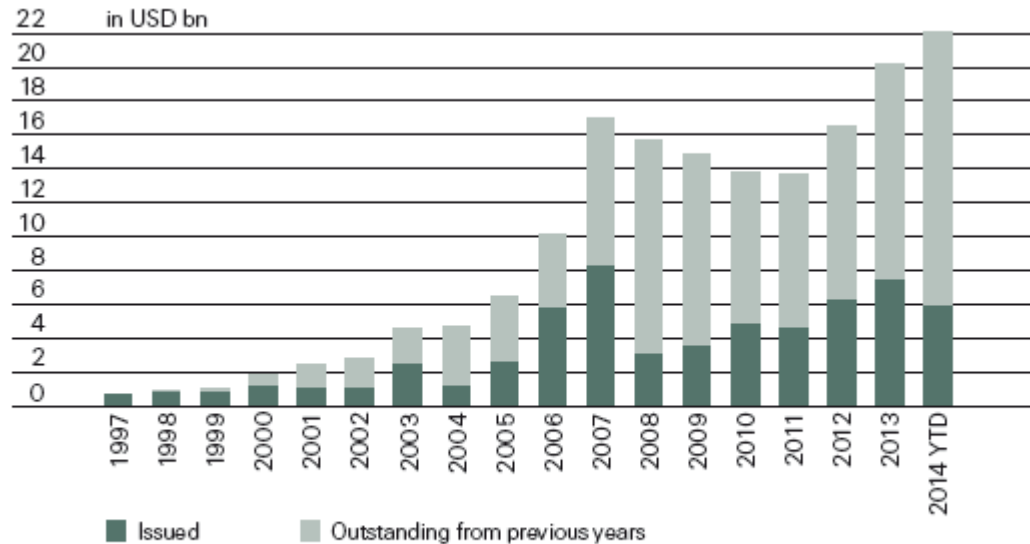
4

Finally confirmation has emerged that the \$300m [Muteki Ltd.](#) catastrophe bond issued in 2008 by Munich Re on behalf of Japanese cooperative Zenkyoren is a total loss after being triggered by the 11th March earthquake off the coast of Tohoku, Japan. The market has been expecting the loss and it's been priced in to the secondary market and funds portfolios but official confirmation had not been made public.

Ratings agency Moody's had [downgraded](#) the \$300m of Muteki Ltd's Series 2008-1 from 'Ba2' to 'C' at the end of March and said that they expected it to be a total loss.

The ILS Market

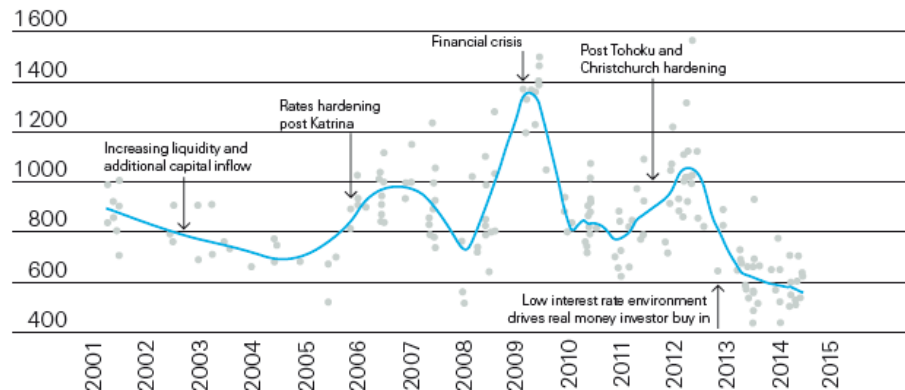
- Growth



- Low coupons on emissions

Source: Swiss Re Capital Markets; As of June 30 2014

- High prices on secondary market

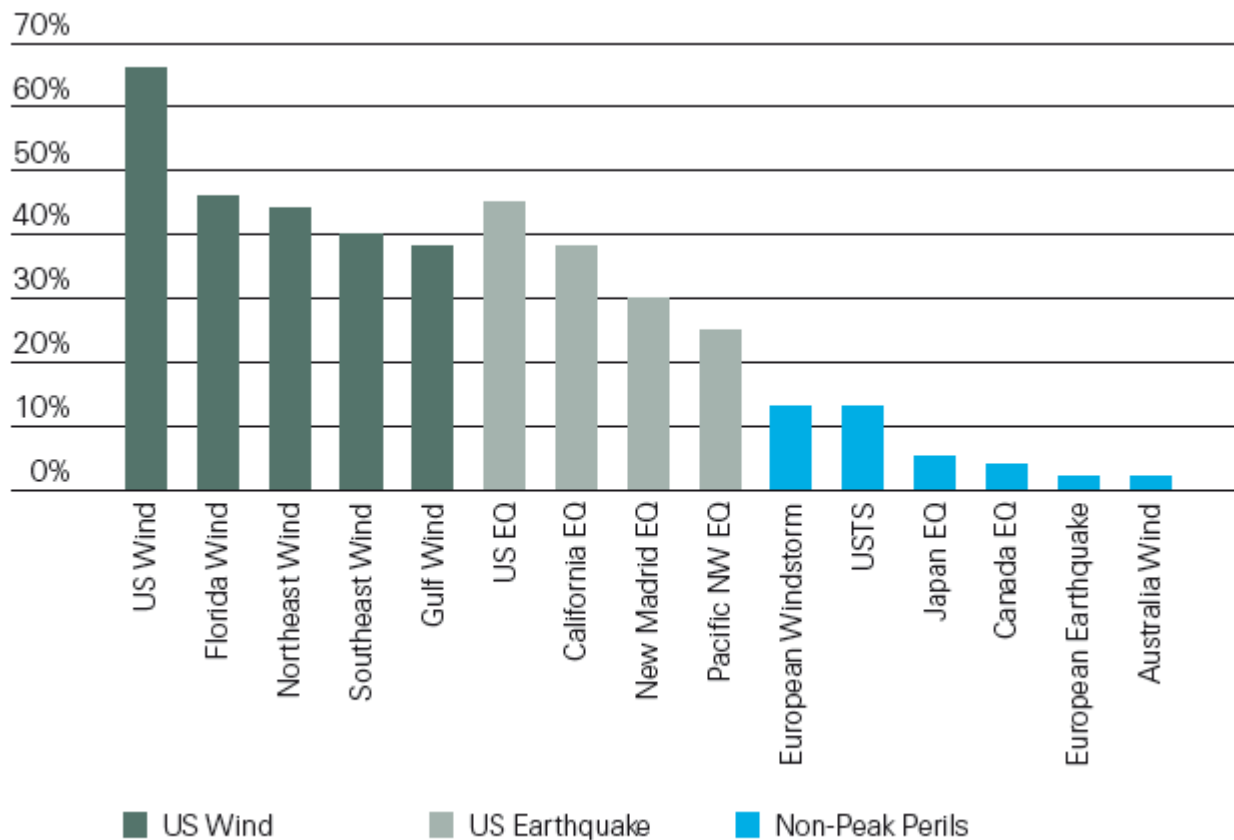


- No losses in 2013 & 2014

Source: Swiss Re Capital Markets; As of June 30, 2014

1 estimated primary issuance spread of US wind related bonds computed for an expected loss of 2% using regression analysis

Covered Perils and Regions of ILS Universe June 2014




Source: Swiss Re Capital Markets

Cat Bond of USD 1'500'000'000 issued

Everglades Re 2014 completes, officially the largest catastrophe bond ever

by ARTEMIS on MAY 2, 2014

 Share

16

It's official, the \$1.5 billion [Everglades Re Ltd. \(Series 2014-1\)](#) catastrophe bond has completed today and is now the largest catastrophe bond transaction issued in the markets history.

The third catastrophe bond issuance under the Everglades Re Ltd. shelf programme, this deal saw Florida's Citizens Property Insurance Corporation massively increase its reliance on the capital markets as a source of reinsurance capital. The successful issuance of the largest ever catastrophe bond, as well as the competitive pricing, [helped Citizens to grow its overall reinsurance protection by 68%, while actually spending a little less than in 2013.](#)

“These 10 Technologies Will Utterly Transform The World”

From a Report by Citi Research (May 2014)



- **Electric Vehicles**
- **Energy Storage**
- **Digital Currency**
- **Digital Banking**
- **Digital Marketing**
- **Immunotherapy**
- **Robots**
- **4-D Printing**
- **Precision Agriculture**
- **and ...**

Insurance Securitization

Description: Insurance securitization represents a threat to reinsurance, which is how insurers currently pool their own risk. Instead of having to dump all that risk into one or two firms, insurance securitization would allow an insurer to spread their risk across capital markets in the form of securitized bundles.

Insane stat: Reinsurers had to cut their prices 15% in response to securitizers.

Thank you!