



Catastrophes – Are They Becoming Too Big To Insure? Are Cats Eating Reinsurers' Lunch?

Dr Alan Punter, (Re)insurance Expert

Monday, 06 March 2023



A Word From Today's Chairman

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Today's Agenda



- 11:00 – 11:05 Chairman's Introduction
- 11:05 – 11:25 Keynote Presentation – Dr Alan Punter
- 11:25 – 11:45 Question & Answer



Today's Speaker

Dr Alan Punter
(Re)insurance Expert



Catastrophes: Are they becoming
too big to insure?
Are Cats eating Reinsurers' lunch?

Dr Alan Punter

FS Club Webinar, 6 March 2023

Poll

- The largest global insured natural disaster loss to date has been Hurricane Katrina in August 2005.

How much did it cost (at 2005 values)?

- \$10 to \$25 billion
- \$25 to \$50 billion
- \$50 to \$75 billion
- \$75 to \$100 billion
- Over \$100 billion

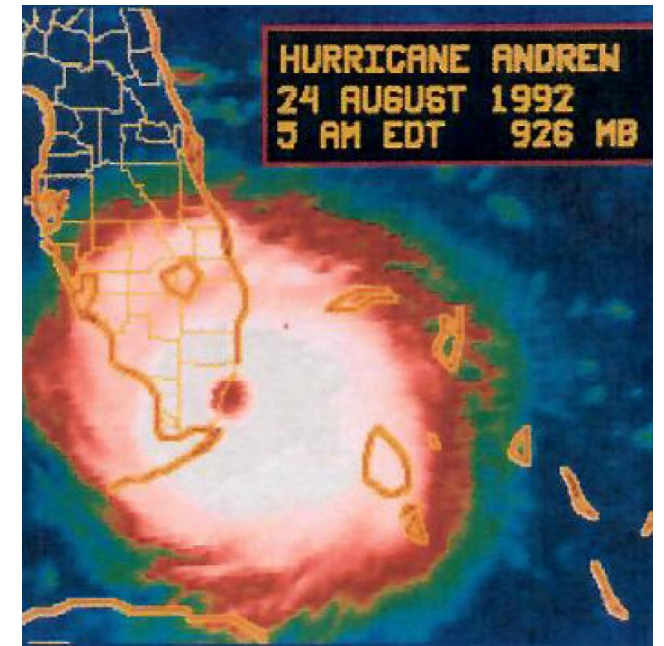
Top 10 Costliest Global Insured Loss Events (1900-2022)

Date	Event	Location	Insured loss	
			Nominal \$bn	2022 \$bn
Aug 2005	Hurricane Katrina	US	65	99
Sep 2022	Hurricane Ian	US, Cuba	53	53
11 Mar 2011	Tohoku EQ/Tsunami	Japan	35	47
Sep 2017	Hurricane Irma	US, Caribbean	33	40
Aug-Sep 2021	Hurricane Ida	US, Caribbean	36	39
Oct 2012	Hurricane Sandy	US	30	36
Aug 2017	Hurricane Harvey	US	30	36
Sep 2017	Hurricane Maria	Puerto Rica, Caribbean	30	36
Aug 1992	Hurricane Andrew	US, Bahamas	16	34
17 Jan 1994	Northridge EQ	US	15	31

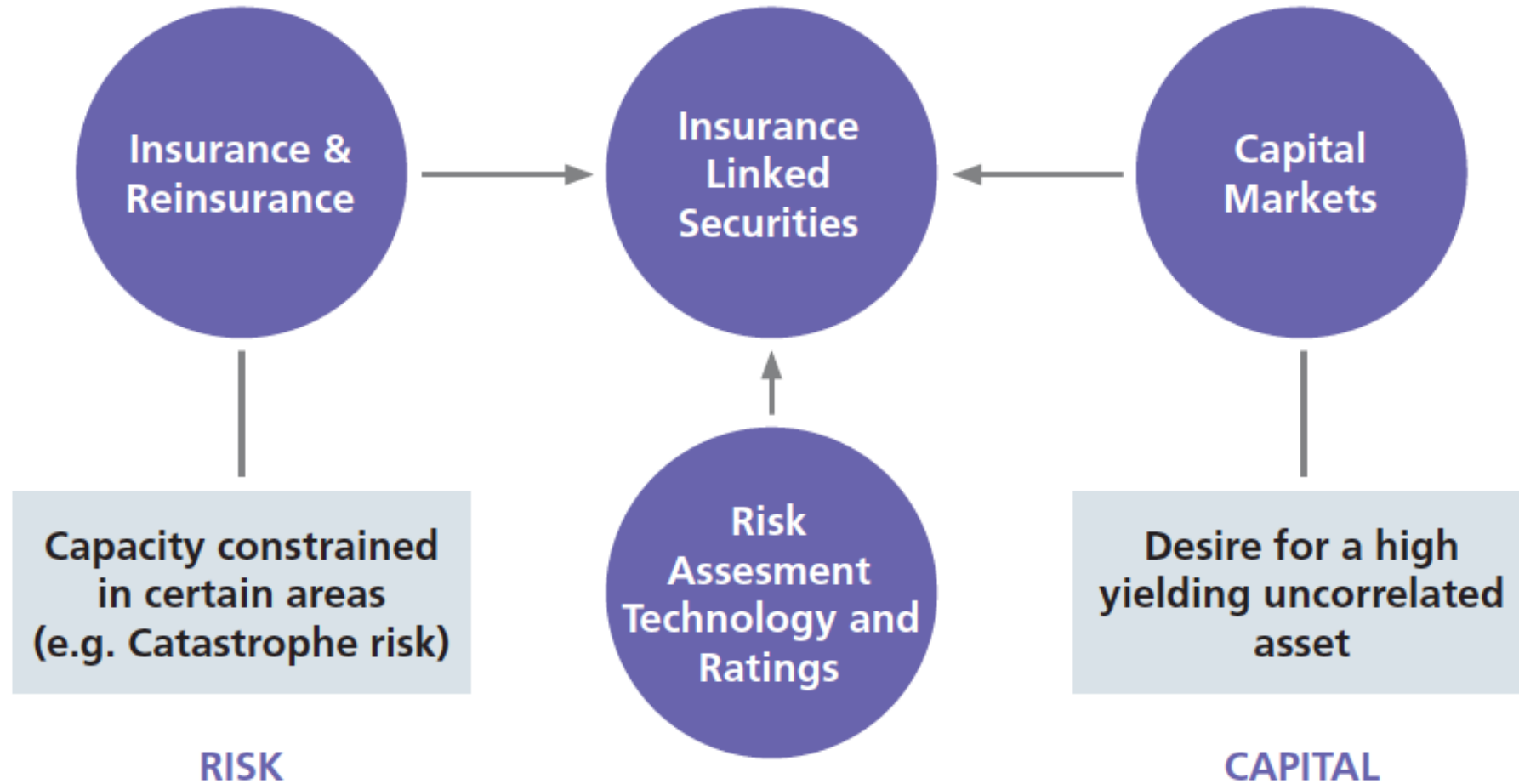
Source: Weather, Climate and Catastrophe Insight, Aon 2023

Why the financing of insured catastrophes had to change

- A definition of an insurance catastrophe
 - Industry-wide insured loss that becomes a Balance sheet rather than an Earnings event
- Turning point was Hurricane Andrew – August 1992
 - Estimated insured cost \$16 bn
- However, what if
 - Hurricane Andrew had hit Miami
 - Estimated insured cost **~\$50 bn**
 - Repeat of 1916 San Francisco earthquake
 - Estimated insured cost **~\$70 bn to \$110 bn**
 - Major floods in Texas
 - Estimated insured cost **~\$40 bn**
- How much capital did the re/insurance industry have in 1992, and would it have been enough?

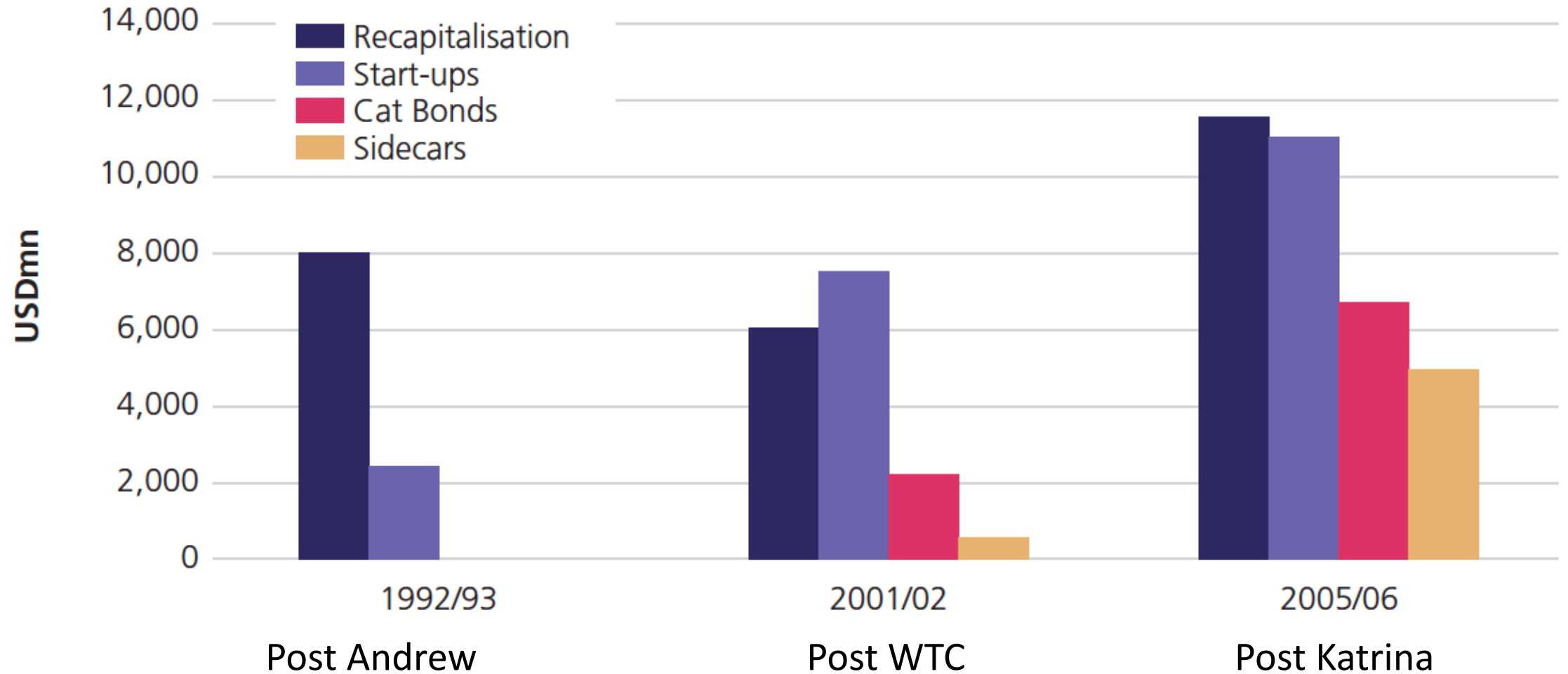


Where and how could the re/insurance industry access new risk capital



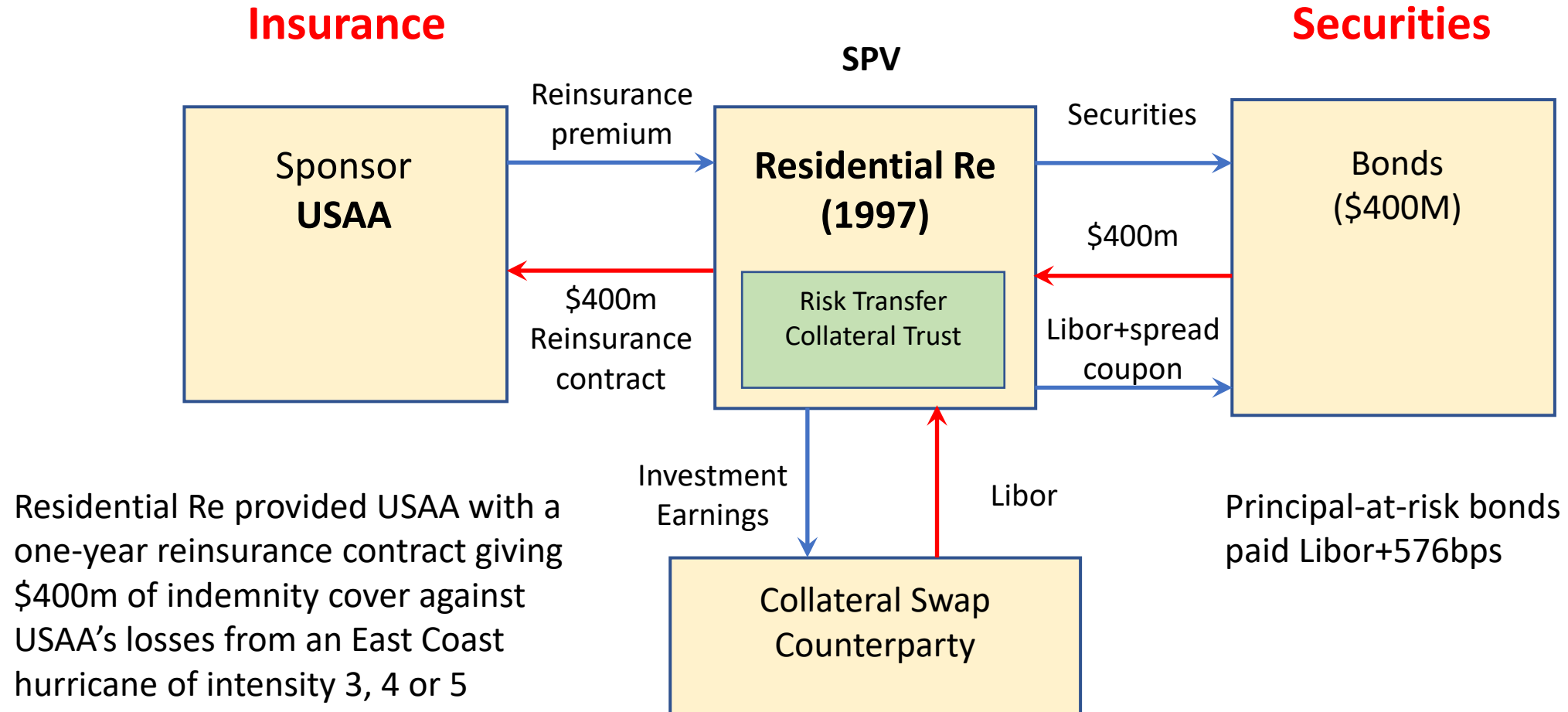
See "Convergence of Insurance and Capital Markets", World Economic Forum, October 2008

Post-catastrophe loss capital raising in Bermuda



Source: Guy Carpenter, 13 November 2008

Where and how could the re/insurance industry access new risk capital – an early Cat Bond

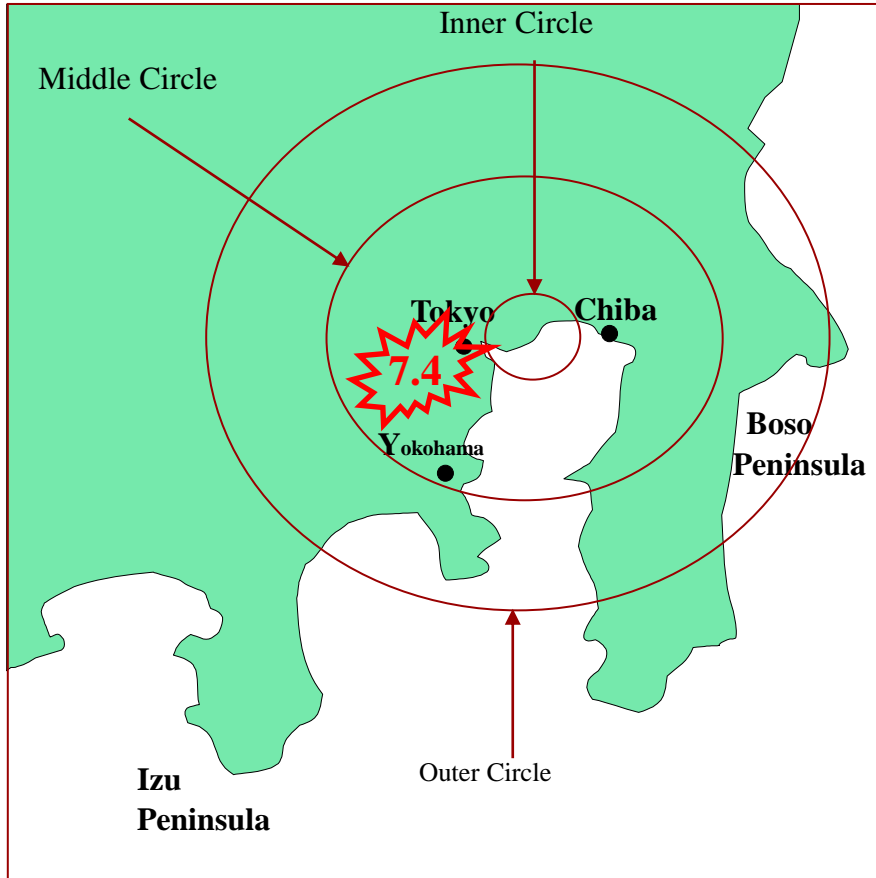


USAA has now issued around 40 cat bonds, raising nearly \$10bn of indemnity risk capital over time, and now has around \$2bn of protection in force

An alternative Cat Bond – Oriental Land / Concentric Re (1999)

- **Sponsor:** Oriental Land
- **SPV:** Concentric Re
- **Insurance policy:** 5-year policy offering \$100m non-damage cover following earthquake in Tokyo region, on parametric basis
- **Expected loss:** 0.413%
- **Bonds:** \$100m of 5-year bonds, rated S&P 'BB+'
- **Coupon:** 310bps (i.e. 7.5 times expected loss)

An alternative Cat Bond – Oriental Land / Concentric Re (1999)



JMA Magnitude	Inner Circle	Middle Circle	Outer Circle
6.5	25.0%	-	-
6.6	32.5%	-	-
6.7	40.0%	-	-
6.8	47.5%	-	-
6.9	55.0%	-	-
7.0	62.5%	-	-
7.1	70.0%	25.0%	-
7.2	77.5%	37.5%	-
7.3	85.0%	50.0%	-
7.4	92.5%	62.5%	-
7.5	100%	75.5%	-
7.6	100%	87.5%	25.0%
7.7	100%	100%	50.0%
7.8	100%	100%	75.0%
7.9 & higher	100%	100%	100%

Proportion of US\$ 100 million limit payable to Oriental Land based on grid dependent upon location and magnitude of Earthquake

Depth of hypocentre of Earthquake must be less than or equal to 101 km.

Key features of Cat Bonds (versus Re/insurance)

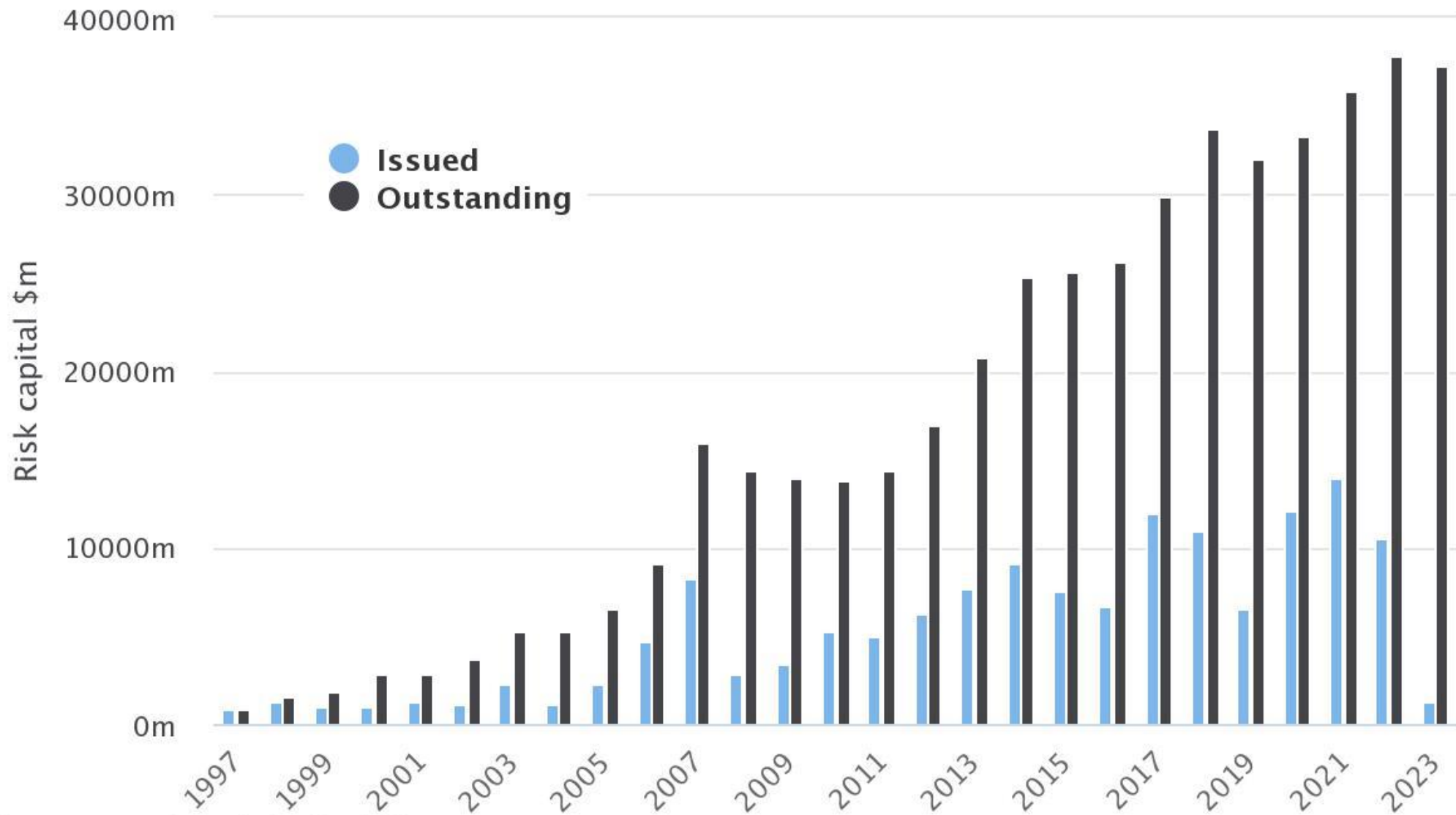
- Securities (not re/insurance policies)
- Pricing on credit-rated basis
- Fully collateralised
- Alternative trigger mechanisms
 - Indemnity
 - Industry loss index
 - Parametric
- Multi-year tenure (no reinstatement)
- Tradeable

Insurance-Linked Securitisation reaches the risks that other re/insurance cannot*

- Cat Bonds have now been issued for multiple property & casualty perils, and life & health risks ...
 - ... including **motor, operational risk, excess mortality, longevity, medical benefits, cyber**
- Cat Bonds have been issued by Corporations ...
 - ... including **FIFA, New York MTA, Alphabet**
- Cat Bonds have been issued by Government and NGOs ...
 - ... including **CEA, Citizens Property, Turkish Cat Pool, Pool Re, World Bank/IBRD**
- Cat Bonds have paid out on events ...
 - ... including **Töhoku earthquake (2011), Hurricanes Harvey & Irma (2017), Mexican earthquake (2017), Californian wildfires (2018)**

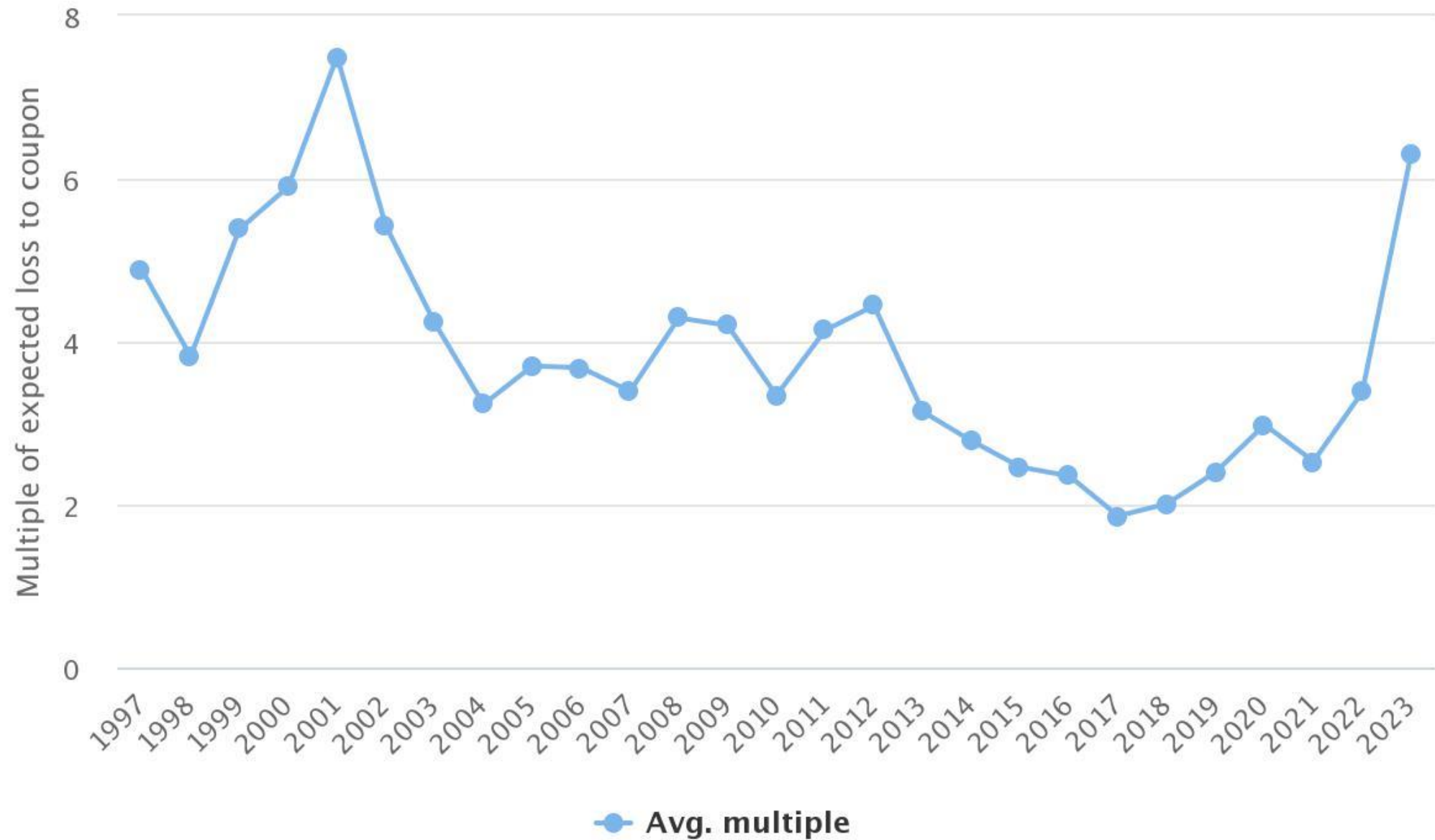
** with apologies to Heineken (1973)*

Catastrophe bond & ILS risk capital issued & outstanding by year



Source: www.Artemis.bm Deal Directory

Catastrophe bonds and ILS average multiple by year



Source: www.Artemis.bm Deal Directory

Trends in the Re/insurance Market

- Ongoing consolidation of re/insurers (and clients) ...
... leading to increased risk retention (by all parties)
- Retreat from selected risk classes (esp. peak risk) and territories by re/insurers
- Growth of alternative risk capital through alternative structures such as Cat Bonds, Sidecars, Collateralised Reinsurance ...
... with new capital providers, such as ILS funds, pension funds
- *De facto* segregation of market functions between financial (risk) capital and intellectual (underwriting) capital (*cf*: the MGA model) ...
... supported by other specialists (funds management, claims handling, etc)

Historical note: “*Consolidation is not the answer; disaggregation is the answer*” from Reinventing Re/Insurance for the Twenty-First Century, Geneva Papers on Risk and Insurance, January 2002

So to answer the exam questions:

1. Catastrophes: Are they becoming too big to insure?

Cautionary note – the Protection gap

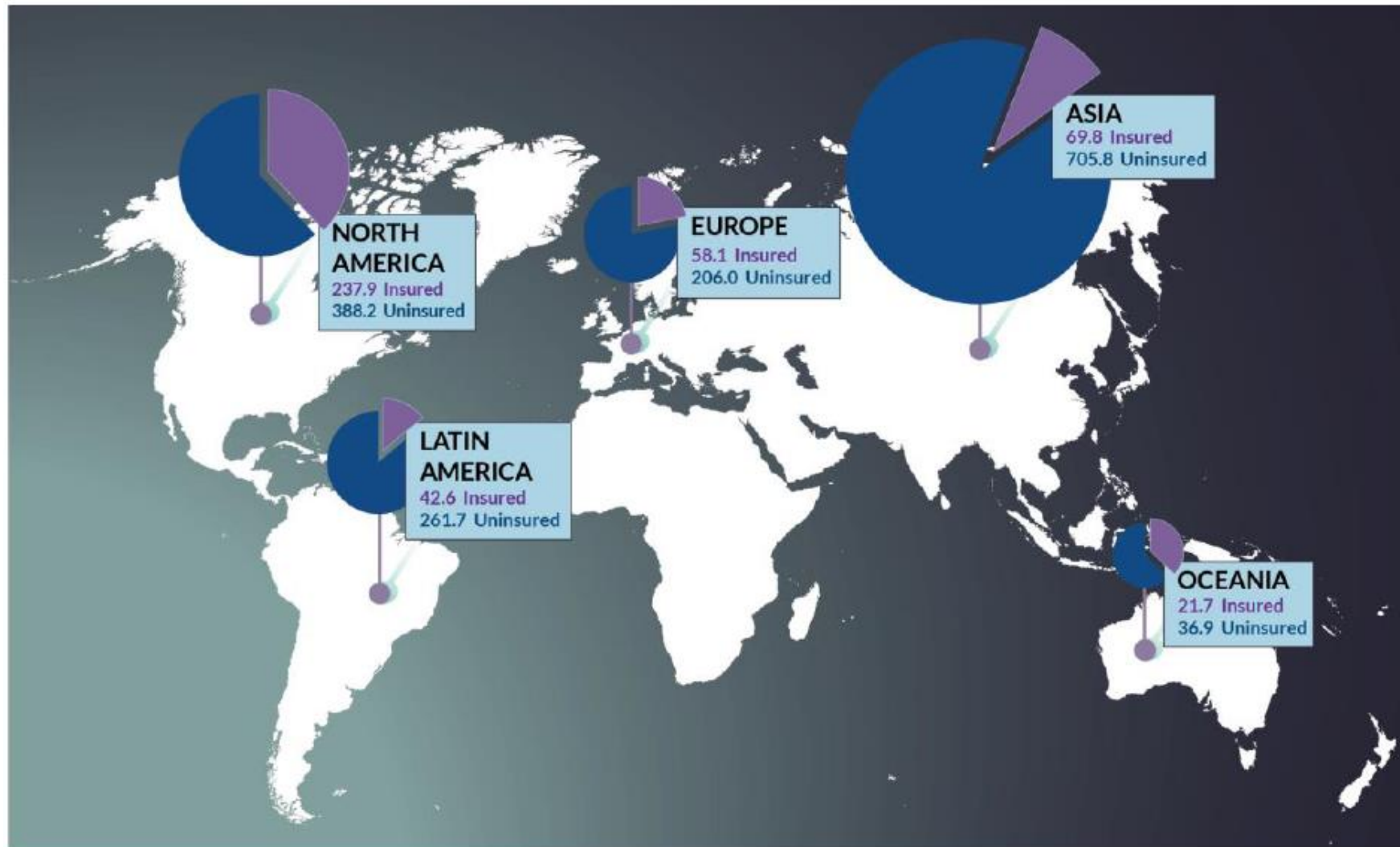
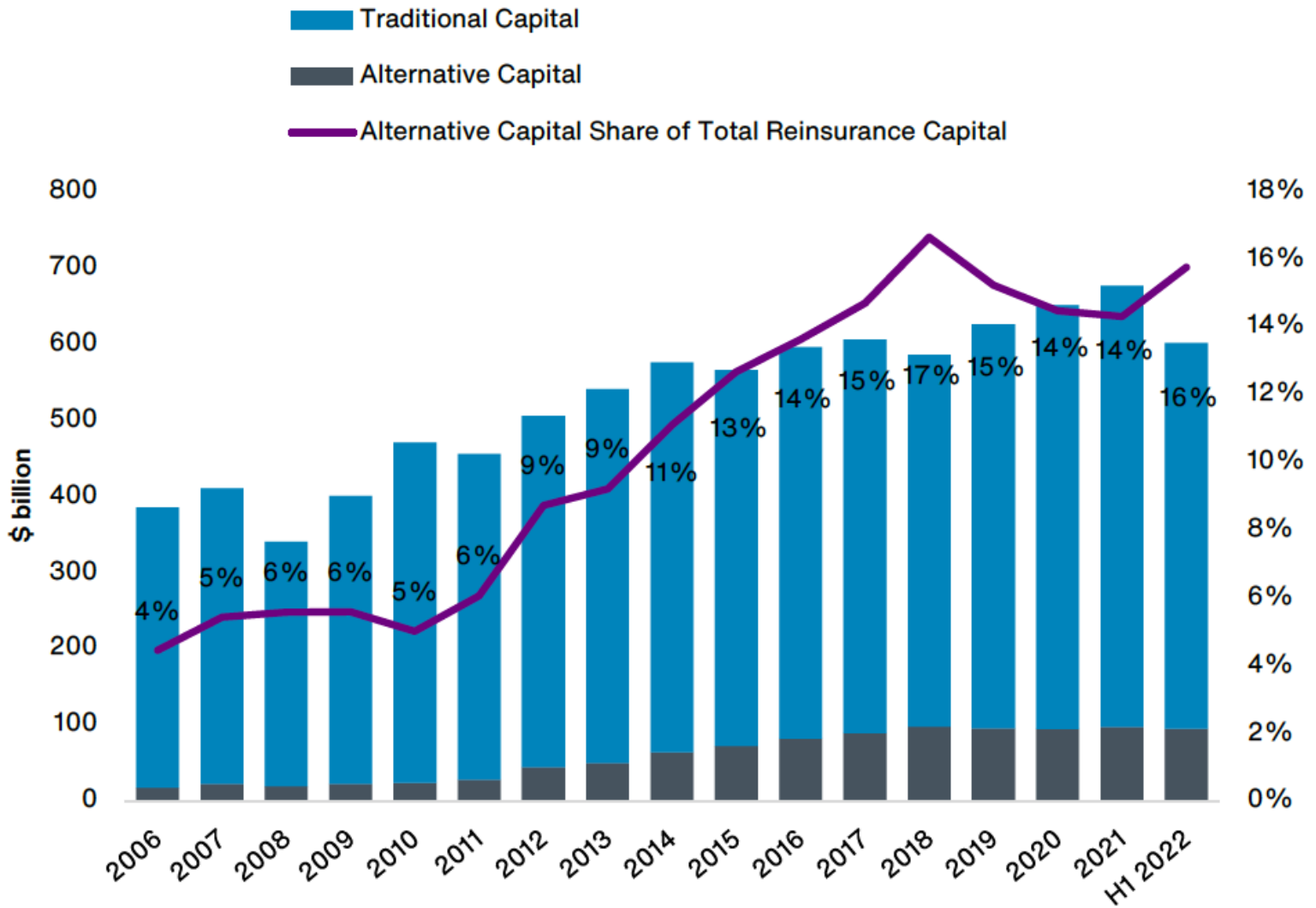


Figure 3. The gap between insured and total economic losses (the sum of insured and uninsured losses), by region, at the 1% exceedance probability (100-year return period) level. (Source: AIR)

So to answer the exam questions:

1. Catastrophes: Are they becoming too big to insure?
2. Are Cats eating Reinsurers' lunch?

Global Reinsurer Capital



Source: ILS Annual Report 2022, Aon Securities

Additional material

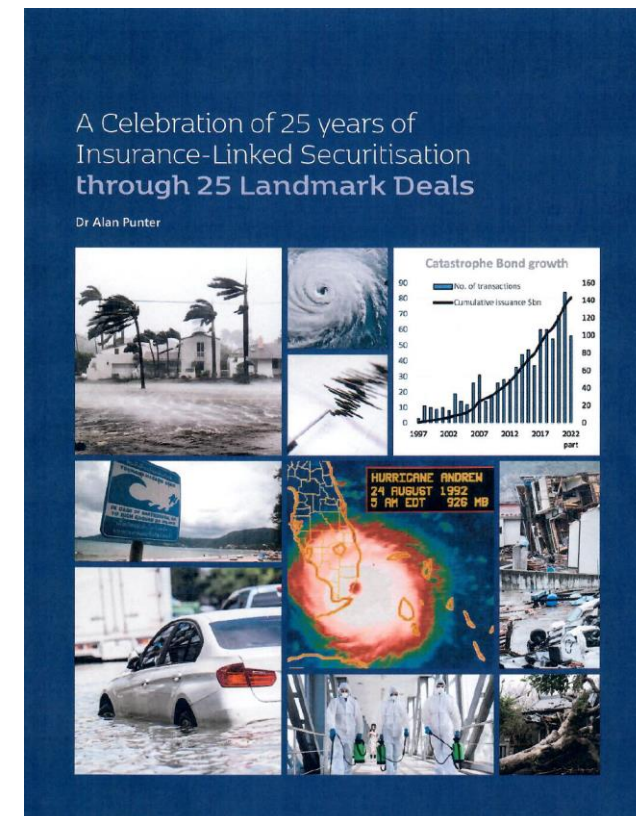
Book: “A Celebration of 25 years of Insurance-Linked Securitisation, through 25 Landmark Deals” Alan Punter, 2012

Website: www.artemis.bm news, deal directories, market statistics, market & conference reports (free subscription)

– see in particular “Catastrophe Bonds – A Celebration of 25 years – Artemis London 2022 Session 1” on Artemis Live

And websites of some of major players for ILS market reports

– Swiss Re, Aon Securities, Guy Carpenter Securities, Lane Financial LLC





Comments, Questions & Answers



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Forthcoming Events

- Tue, 07 Mar (10:00-10:45) What Is China's Growth Potential After Covid?
- Wed, 08 Mar (12:00-12:45) The Transformative Tree - Pongamia Agroforestry Systems
- Mon, 13 Mar (16:00-16:45) Creative Consulting: Moving From 'Persistent Misdirected Efforts' To Truly Transformative Results
- Tue, 14 Mar (09:00-09:45) Financial Centres Of The World 2023: Focus On Mauritius

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