Catastrophes: Real Risk; Real Reinsurance Value

Bradley Kading, March 2012

ABIR

Association of Bermuda Insurers & Reinsurers

Summary

- **A 400 Year US/Bermuda Partnership**
- **ABIR Stats**
- **Pacific NW Hazards**
- **Pacific NW Insured Loss PML's**
- **Mandatory EQ Coverage**
- **2011 Global Cat Losses, Lessons Learned**
- **Regulatory/Tax Protectionism**
- **What You Can Do**

Bermuda and the US

Mark Twain

“You can go to Heaven if you want to, I’d druther stay here (Bermuda).”

Mark Twain, 1909

Bermuda's American Partnership

- **400 years and counting**
- **Rescue of the Jamestown Colony**
- **Gunpowder to save George Washington's army**
- **Aiding the North and the South in the Civil War**
- **Anti-Nazi submarine warfare**
- **Cold War mid-Atlantic spying**
- **Insurance market support**

ABIR Data

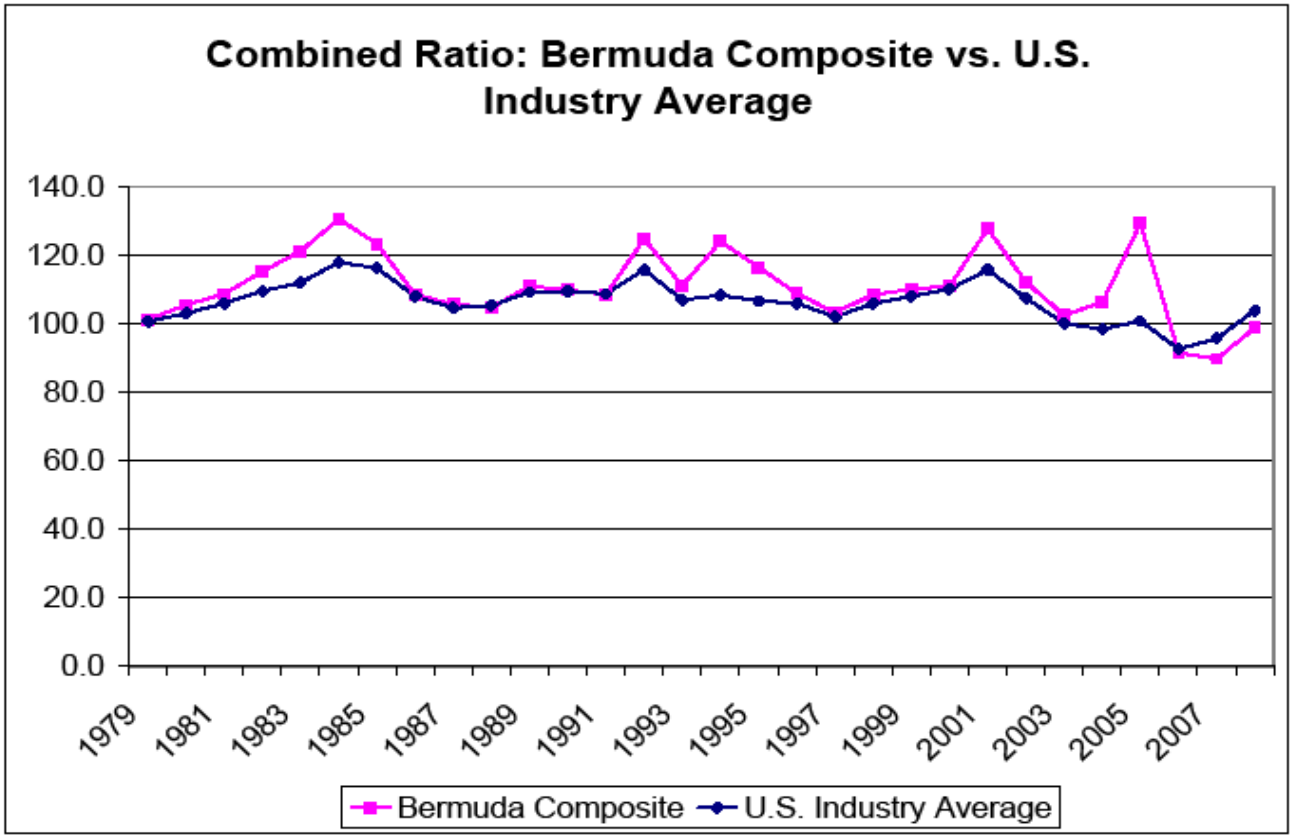
Association of Bermuda Insurers and Reinsurers

- **22 Companies**
- **Highly capitalized, distinct regulation**
- **$62 Billion Gross Written Premiums,**
- **$90 Billion Surplus**
- **Worldwide business enterprises**
- **Principal underwriting operations in Bermuda, Europe and the United States**

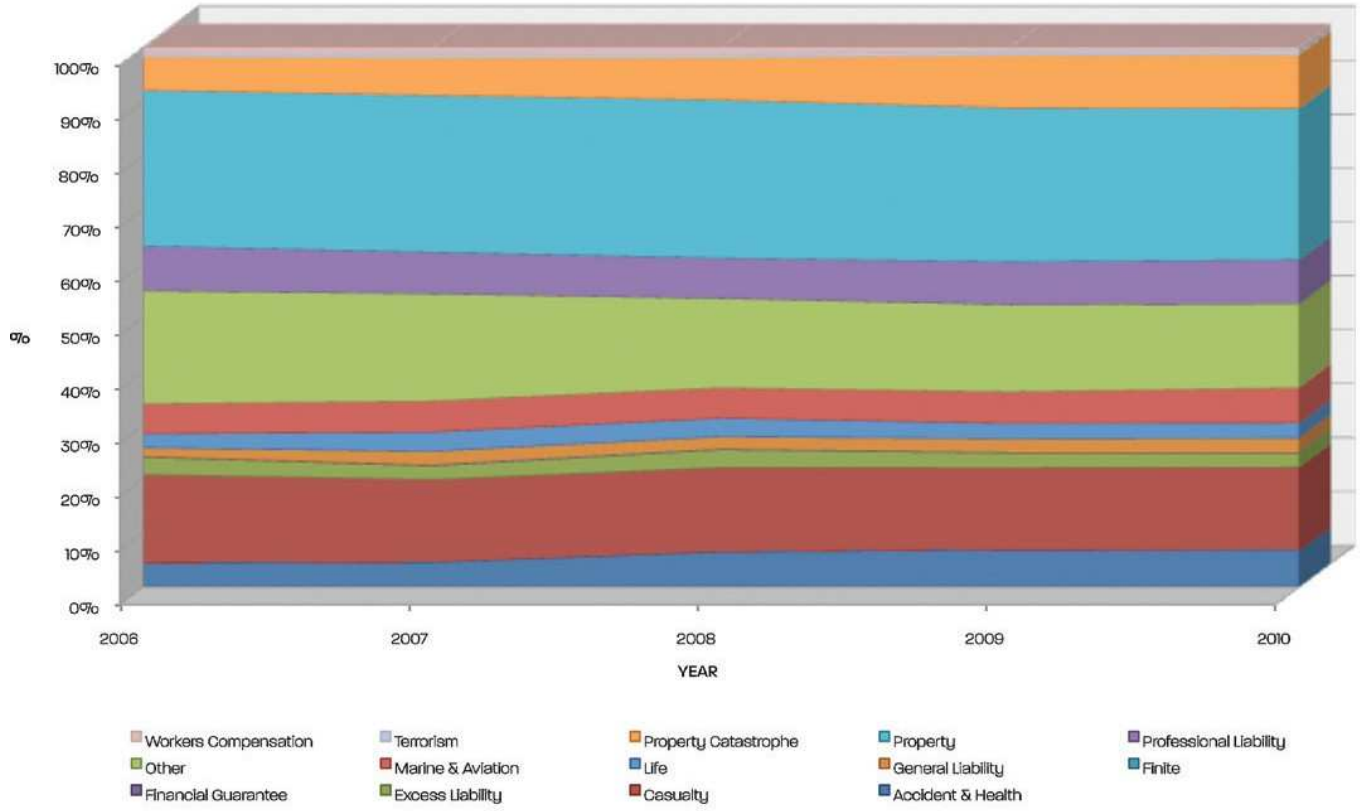
Market Diversification Reinsurance

- **European leaders 5X as big as largest Bermuda reinsurer**
- **Growth of Bermuda leads to market and risk diversification**
- **Bermuda carrier growth leads to market choice, less concentration**
- **Good for insurers and policyholders**

Do Bermuda Companies Write More Volatile Business?



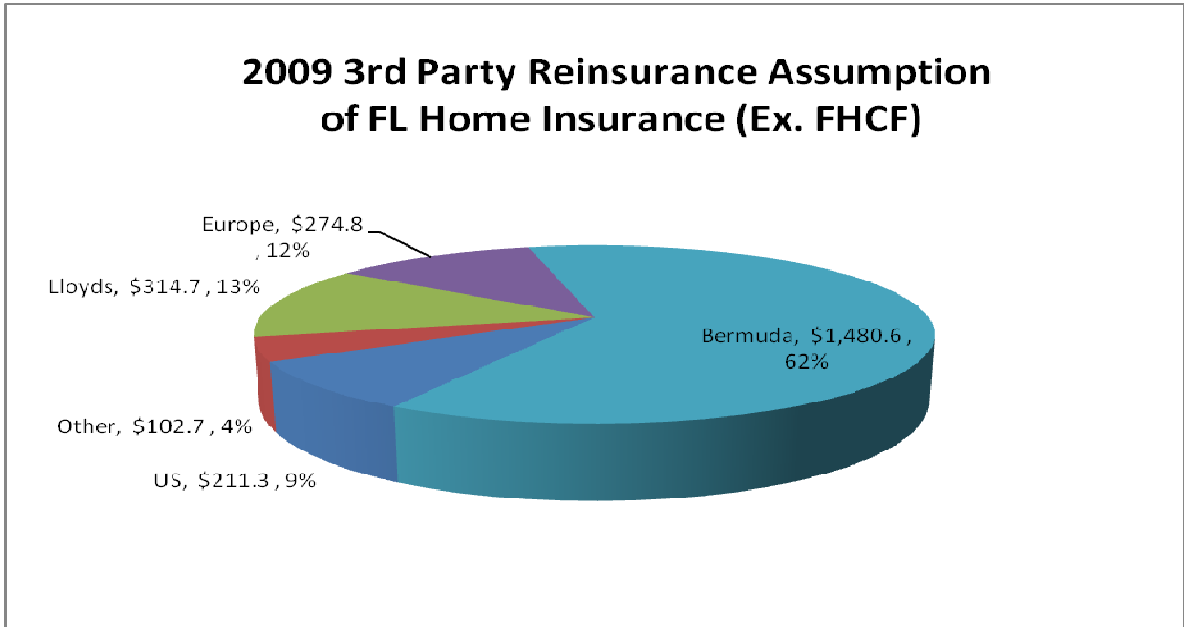
Deloitte Study:
Gross Premiums by Line of Business



Source: *Bermudian Business /Deloitte ;* Bermuda Insurance Survey April/May 2011

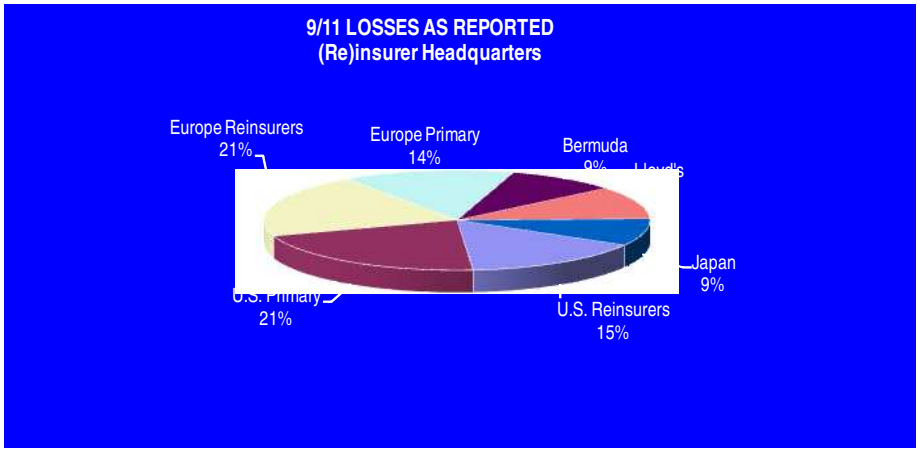
Florida Cats

Florida Insurers: 91% Private Reinsurance is Non-US



Source: ScheduleF.Com: Dowling & Partners Securities, L.L.C. 4/23/2010; private sector reinsurance, does not include Florida Hurricane Catastrophe Fund; Home insurance defined to be Florida domesticated insurance companies

International Insurers and Reinsurers Paid 64% of US 9/11 Claims

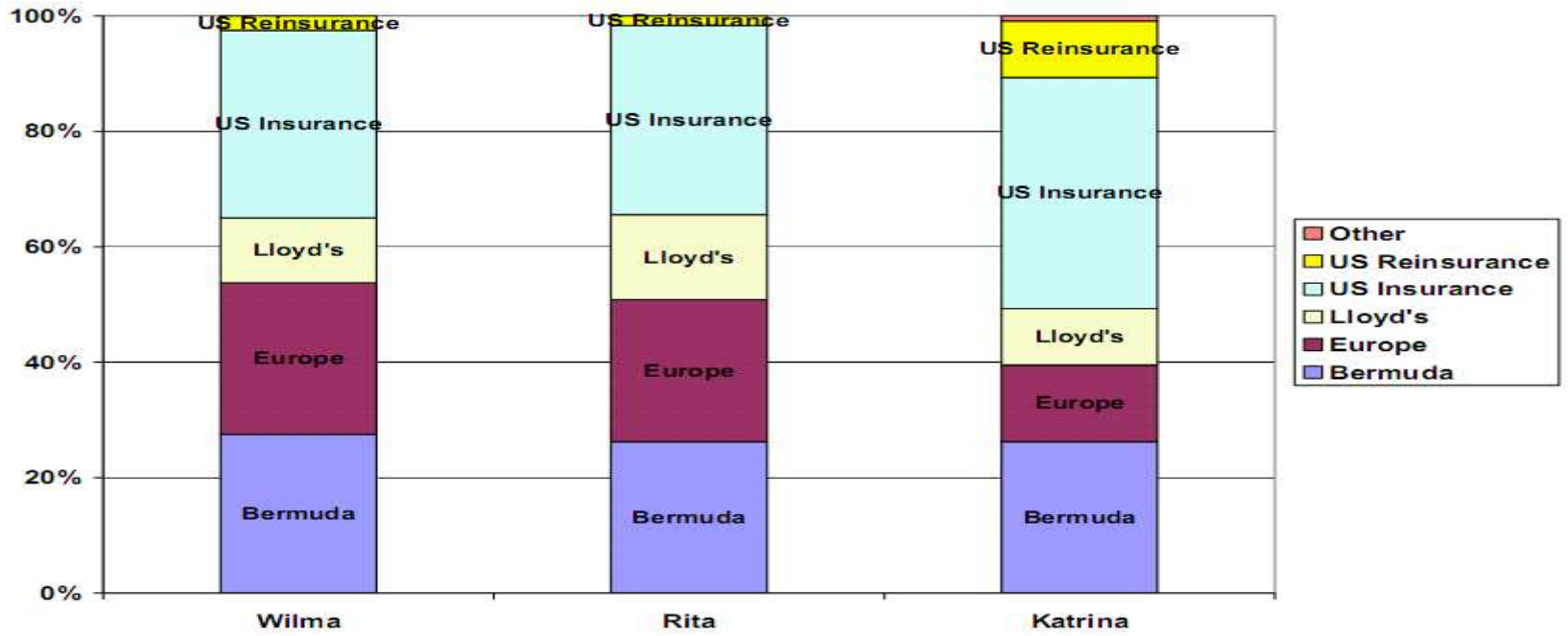


DOWLING & PARTNERS
WTC LOSSES

By Co Headquarters	**$,MM**
U.S. Reinsurers	$4,109
U.S. Primary	$5,659
Europe Reinsurers	$5,506
Europe Primary	$3,865
Bermuda	$2,479
Lloyd's	$2,844
Japan	$2,338
Total Announced	**$26,799**

More than 60% of KRW Losses Paid by International (Re)Insurers

Figure 4. Regional Distribution of 2005 Hurricane Insurance Payments



Source: J. David Cummins, "*The Bermuda Insurance Market: An Economic Analysis," 2008.*

Bermuda's (re)insurers cover the globe

Of reported claims liabilities from 2010 and 2011 catastrophes, Bermuda (re)insurers covered:

- 29% of the reported liabilities for the international reinsured share of the Japanese earthquake
- 25% from the Gulf of Mexico oil spill
- 37% from Europe's Windstorm Xynthia
- 51% from New Zealand's earthquakes
- 38% from Chile's earthquake.

Pacific Northwest Hazards

SHIVA Analysis 2010

- *Earthquakes:*
- Earthquakes are the most destructive hazard that Seattle faces. Since its founding, three major quakes have struck Seattle. They occurred in 1949, 1965 and 2001.
- Evidence of massive earthquakes off the Washington coast and along the Seattle Fault that runs through the center of the city.
- Casualties could exceed 1,000 people and economic damage could easily run into billions of dollars.

SHIVA Analysis 2010

- *Tsunami and Seiches:*
- Tsunamis are the product of earthquakes or large landslides.
- The generation of a tsunami is complex; a shallow earthquake that is at least magnitude 7.0 can cause a dangerous tsunami. Evidence shows that tsunamis believed to be caused by shallow earthquakes along the Seattle Fault have inundated Seattle shorelines.
- It is possible an earthquake or landslide could cause a powerful tsunami, but the likelihood is very low.

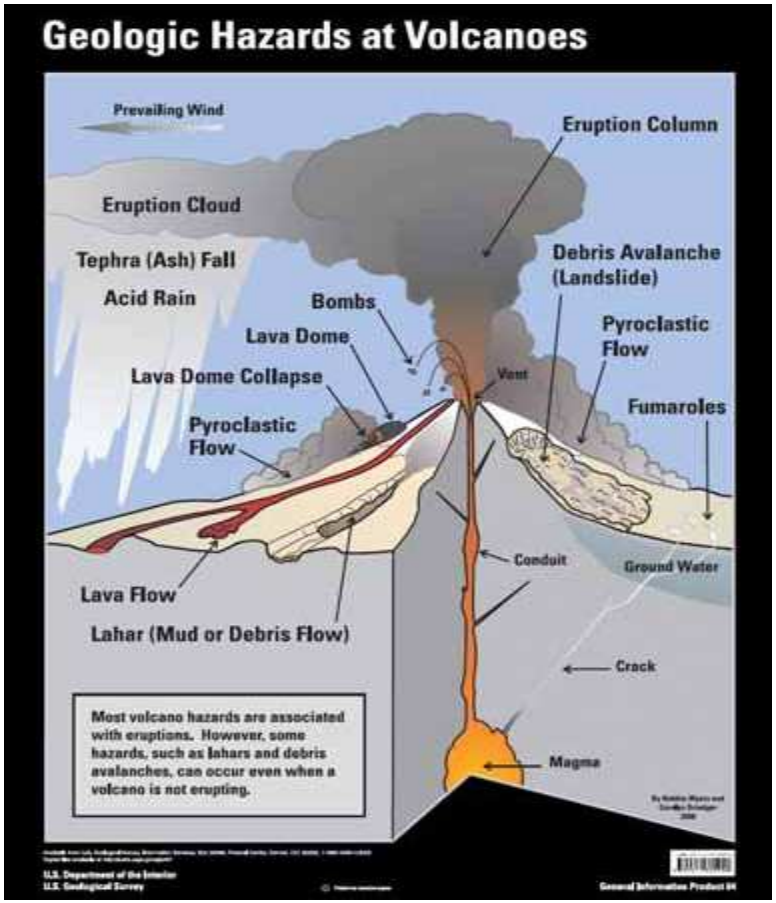
SHIVA Analysis 2010

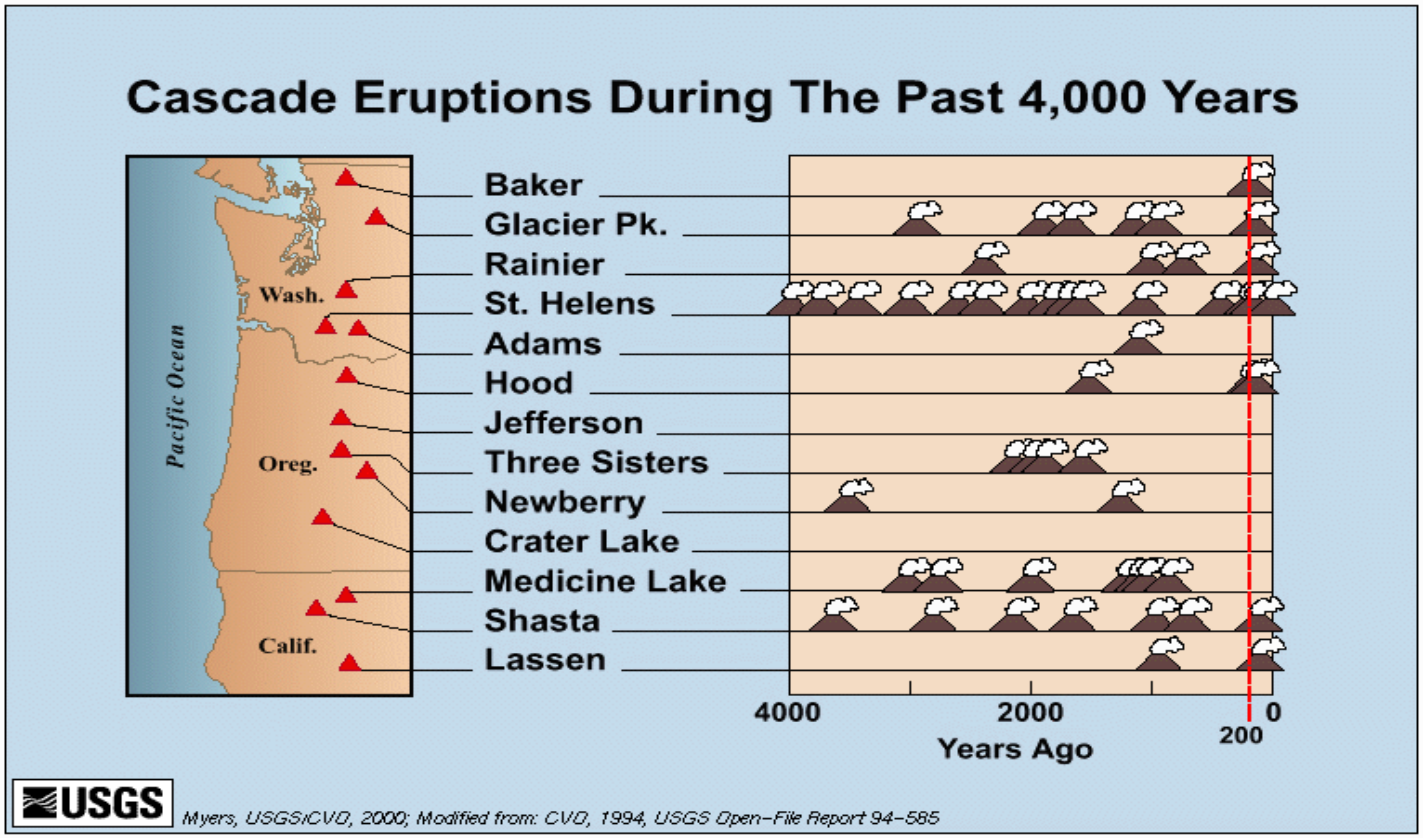
- *Volcanic Eruptions and Lahars:*
- There are five active volcanoes in Washington State. All too far away from the city to cause any blast effects.
- The most probable impact is the after effects of a lahar from Mt Rainier. Lahars from Mt. Rainier have buried low-lying areas west of the mountain
- A possible event is that a lahar would stop south of the city and that rain and erosion would wash the sediment down the Duwamish in the days and weeks following the incident.

SHIVA: EQ Frequency

- Deep quakes are the most common large earthquakes that occur in the Puget Sound region.
- Quakes larger than 6.0Mm occurred in 1909, 1939, 1946, 1949, 1965 and 2001.
- Mega thrust EQ every 400 to 600 years (last 1700)

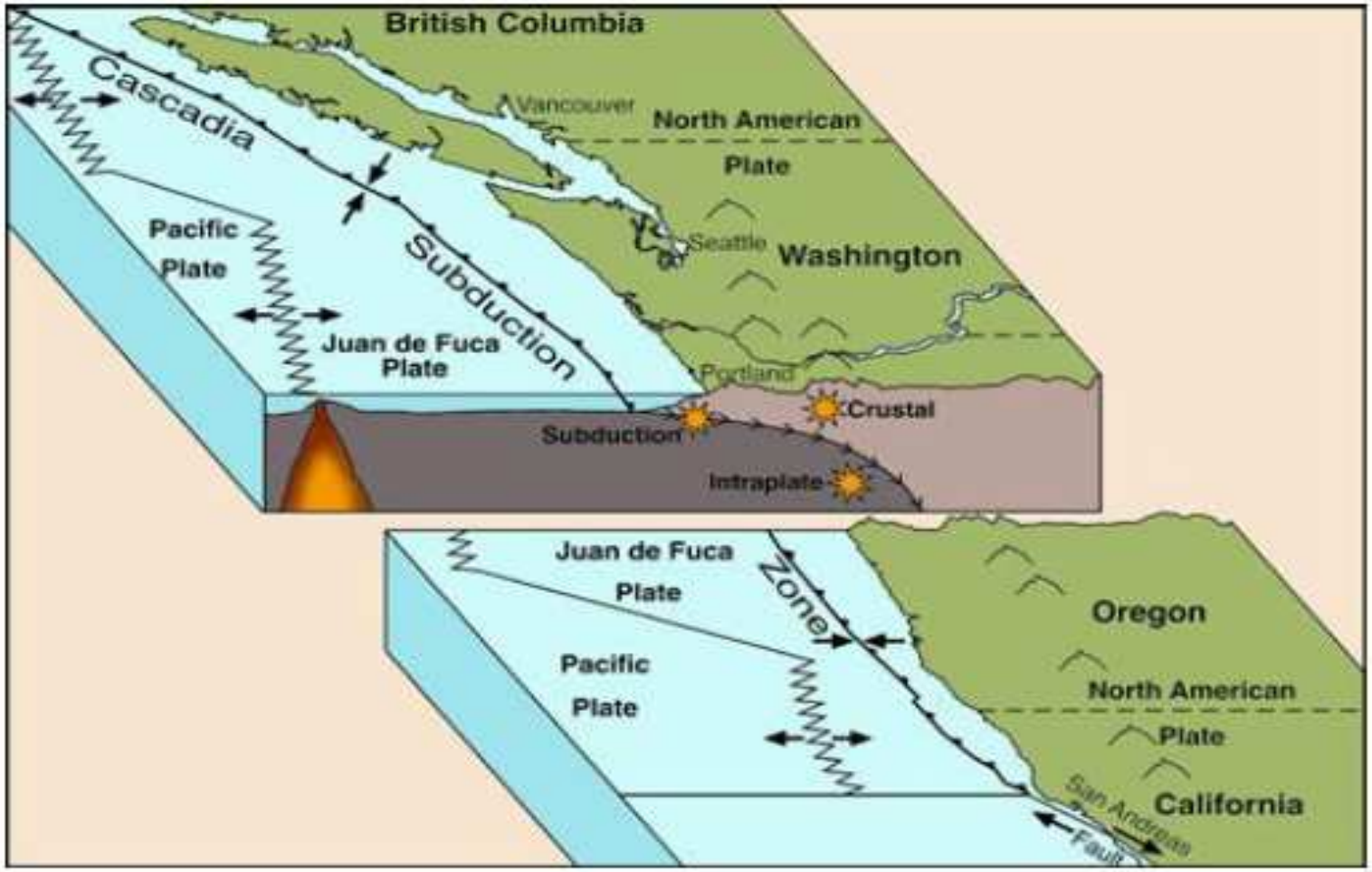
Mount St. Helens Eruption
May 18, 1980

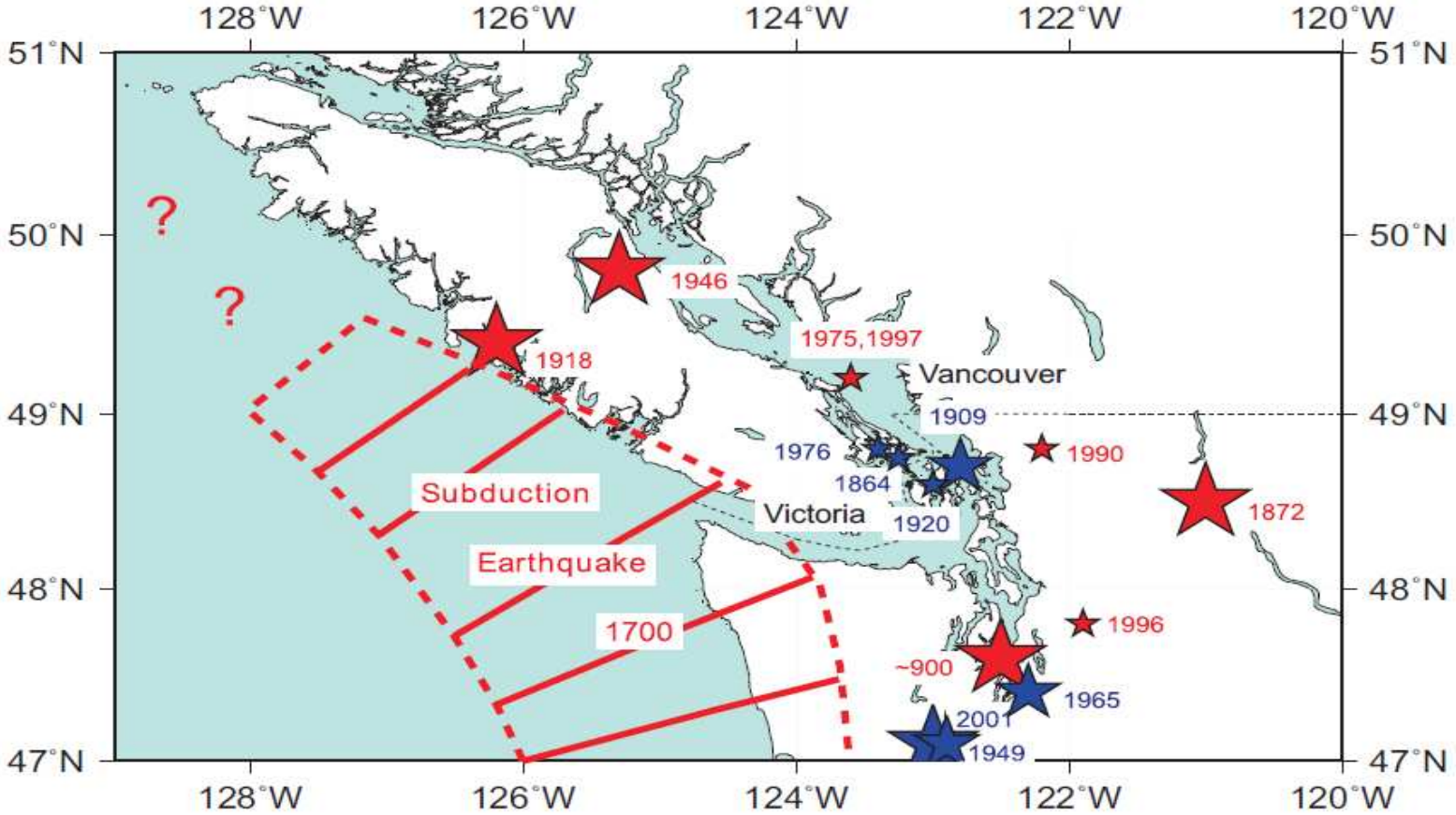




History of Cascade Eruptions over 4000 years.
The 200-year historic period is shown by the red line.

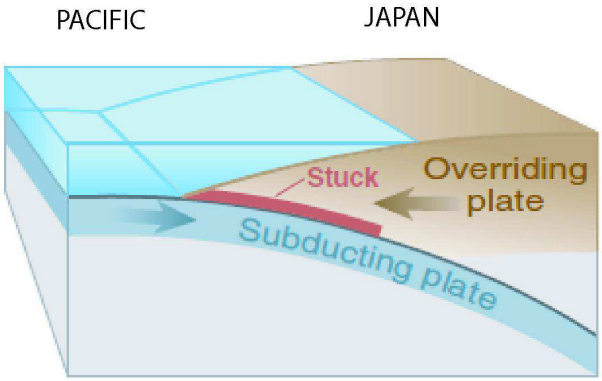
Tectonic Setting of the PNW Showing Three Sources of Earthquakes



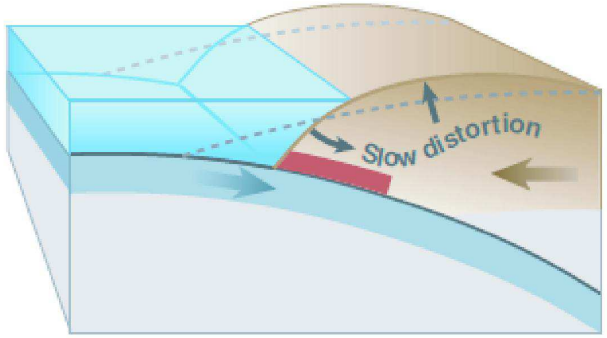


Inferred rupture area of the January 1700 Cascadia megathrust subduction earthquake shown in relation to the locations of other historical earthquakes in the Seattle-Vancouver region (from Lamontagne, et al., 2007). Red stars indicate shallow crustal earthquakes. Blue stars indicate deep earthquakes.

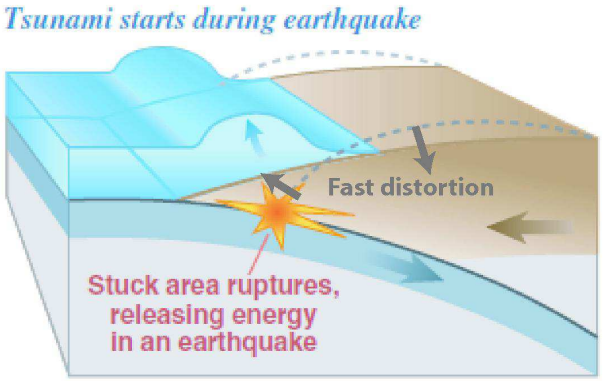
Tsunami Generation



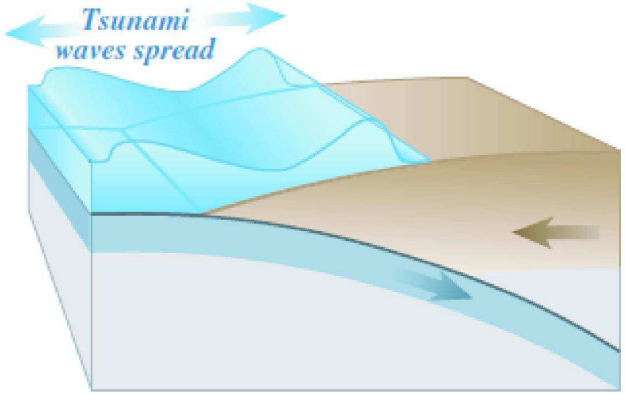
Vertical Slice Through a Subduction Zone



A. Between Earthquakes



B. During an Earthquake



C. Minutes Later

From Walters & Elliot (2001), COMET+, U. of Oxford

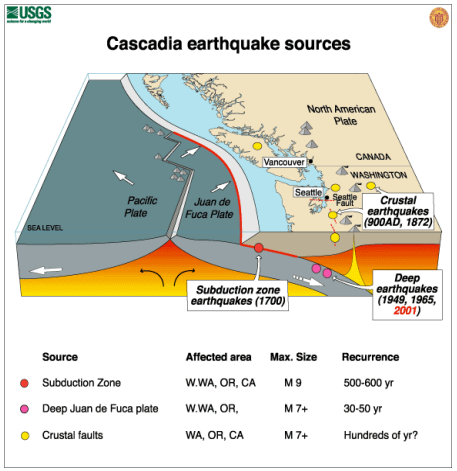
Over the top. The 11 March tsunami overwhelmed a coastal seawall in Miyako City designed for lesser waves.

(from Science, 1 April 2011, Vol. 332)

Photo Credit: Prof. Satake Kenji, ERI, U. of Tokyo

Pacific Northwest PML's

EQ Risk in the Pacific Northwest: Peak Scenario Losses



1. The Pacific Northwest lies along the “Ring of Fire”, a belt of seismicity along the Pacific Coasts

2. The Cascadian Subduction Zone is an area with the potential for massive M9 events, as recently as 1700

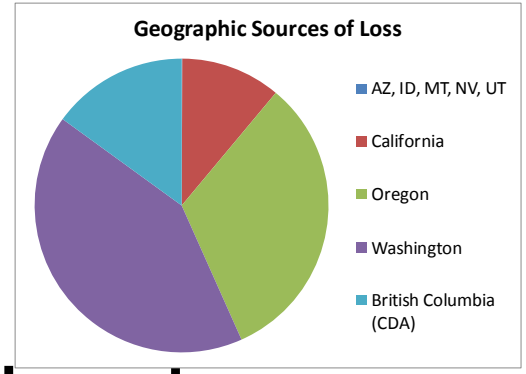
3. The fault zone extends underneath the coastal land zones, bringing a high potential for strong ground motions

Pacific Northwest Earthquake Risk

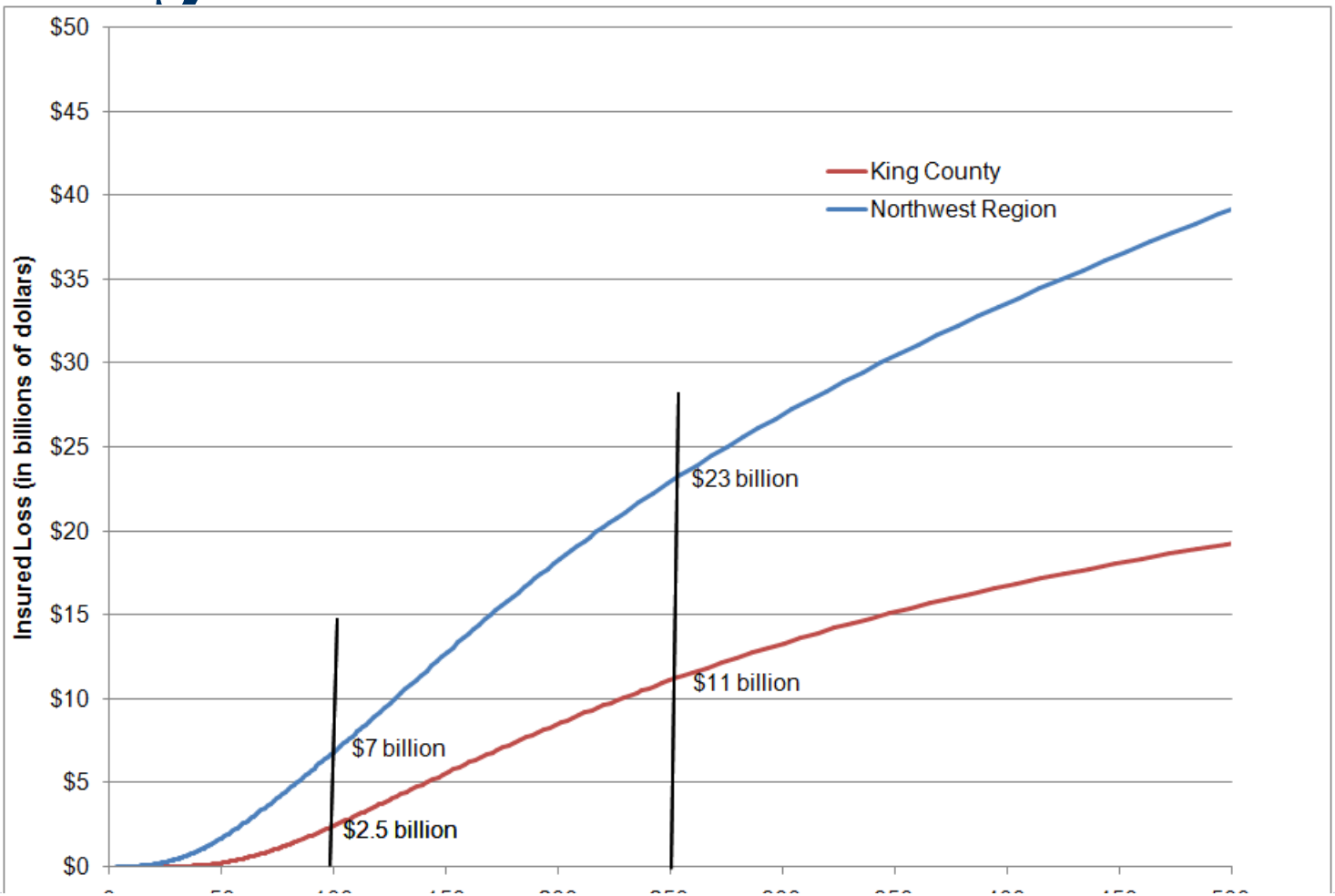
- **Property Damage from a M9 Cascadian EQ would likely exceed $200 Billion**
- **Damage would include British Columbia (Canada) and Washington, Oregon, California, Montana, Idaho, Utah and Nevada**
- **Primary agents of damage will be shaking (& soil failure), fire following earthquake and flooding from tsunami / seiche**

Pacific Northwest Earthquake Risk

- **Magnitude 9 Earthquake along the Cascadian Subduction zone would likely produce <u>insured losses</u> from $65 to $90 Billion**
  - **Fire Following could contribute up to 10% of the total**
  - **75% of losses expected in Washington, Oregon**
  - **About 10% of losses in Canada**
  - **Tsunami inundation losses could reach $100s of Millions, with high risk along the Seattle / Duwamish Shoreline**



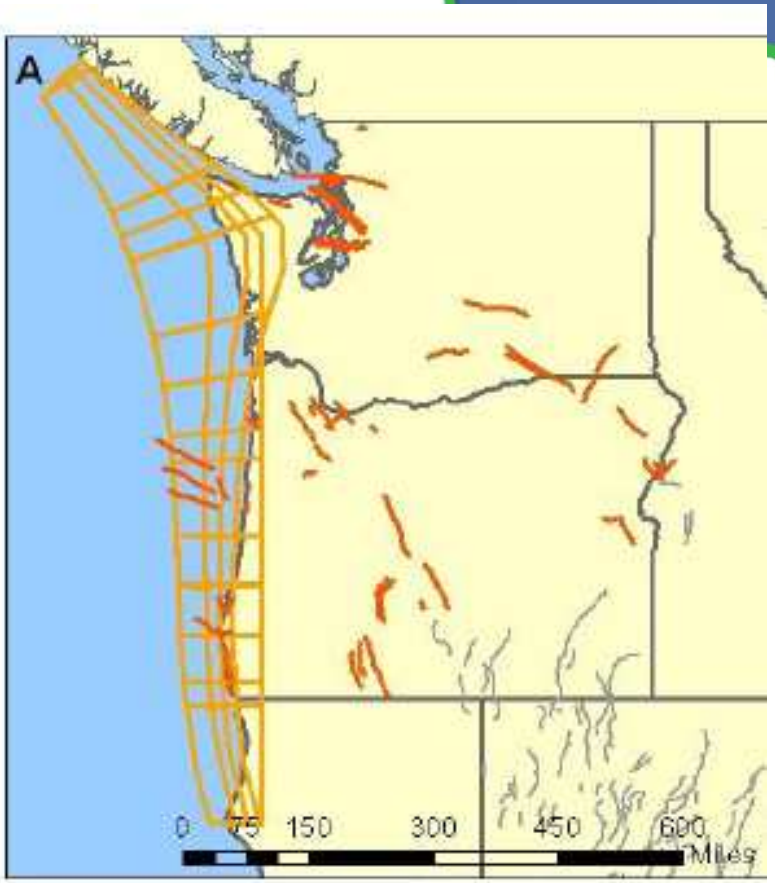
Earthquake Risk: Ground Shaking EP curve



M9.0 on Cascadia Subduction Zone

- **Insured losses due to ground shaking only**

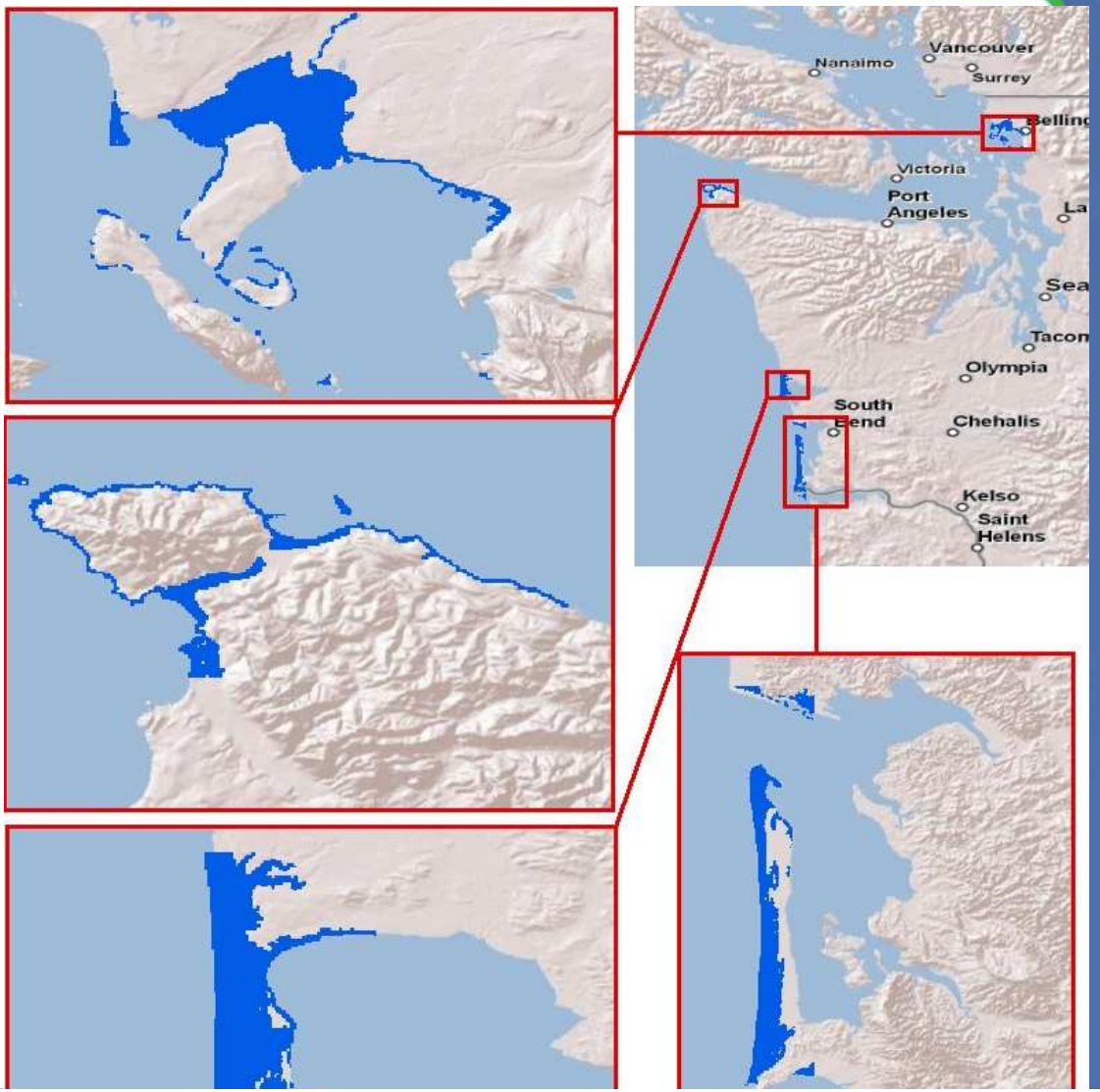
Mean	$59 billion
Standard deviation	$32 billion
Minimum	$19 billion
Maximum	$120 billion



There are four models of down dip extent for the Cascadia Subduction Zone in the RMS model, with events using one of three attenuation relationships. This results in 12 realizations of a M9.0 on the subduction zone.

Tsunami Risk in Pacific Northwest

- **Tsunami accumulation footprint for M9+ Cascadia earthquake impacting coastal regions in Washington**
  - **Bellingham, WA**
  - **Long Beach, WA**
  - **Neah Bay, WA**
  - **Ocean Shores, WA**
- **Based on limited information (not all coastlines considered)**



Volcano Risk in Pacific Northwest

- **Loss costs (average annual loss per $1,000 exposure) from volcanic ashfall for Western U.S. states (no contribution from mudflows/floods)**

State	Statewide Average Loss Cost for Earthquake Risk	Statewide Average Loss Cost for Volcano Risk
Oregon	1.3	0.015
Washington	2.9	0.023

EQ Protection

- **Per the IBHS, Washington has a strong EQ building code, with up to date seismic requirements**
- **IBHS: 6 ways for less than $70 to protect yourself:**
  - **Brace water heater**
  - **Mount flat panel TV on wall**
  - **Secure books cases/contents**
  - **Secure pictures to wall**
  - **Prevent cabinet drawers from opening**
  - **Plastic sleeves over bulbs**

If EQ Was Linked to Mortgage

Why Don't Earthquake Prone Regions Seem to Reflect Higher Risk?

- Who is currently the largest holder of insurable U.S. earthquake exposure?

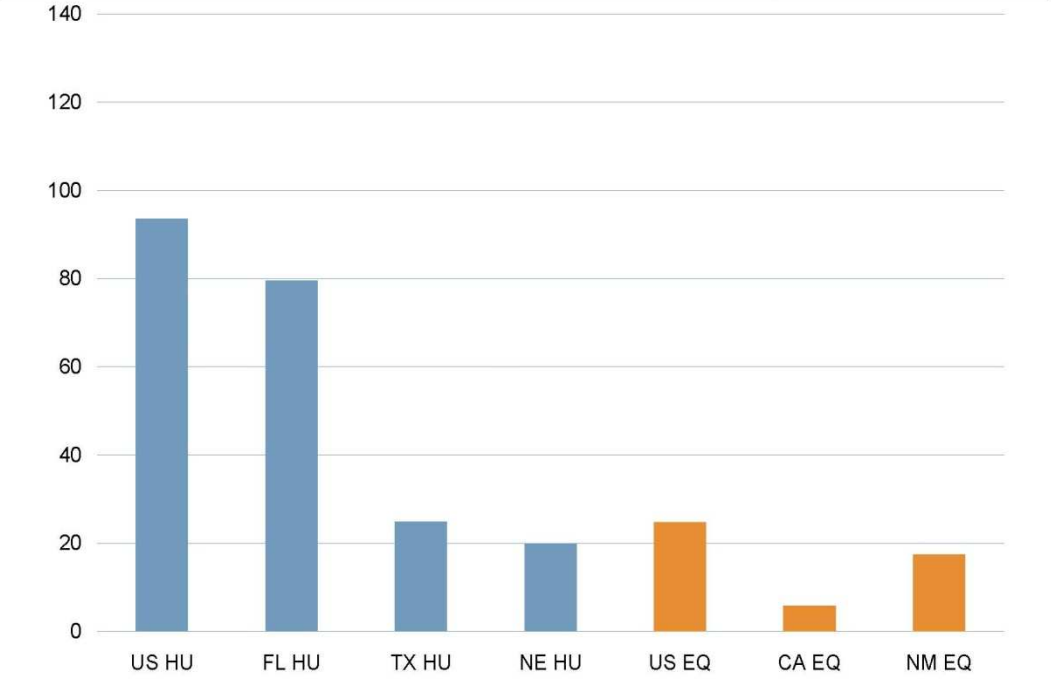
- Answer: U.S. Taxpayer

- How? Fannie Mae and Freddie Mac hold the risk

How Have Fannie and Freddie Altered the U.S. Insurance Market?

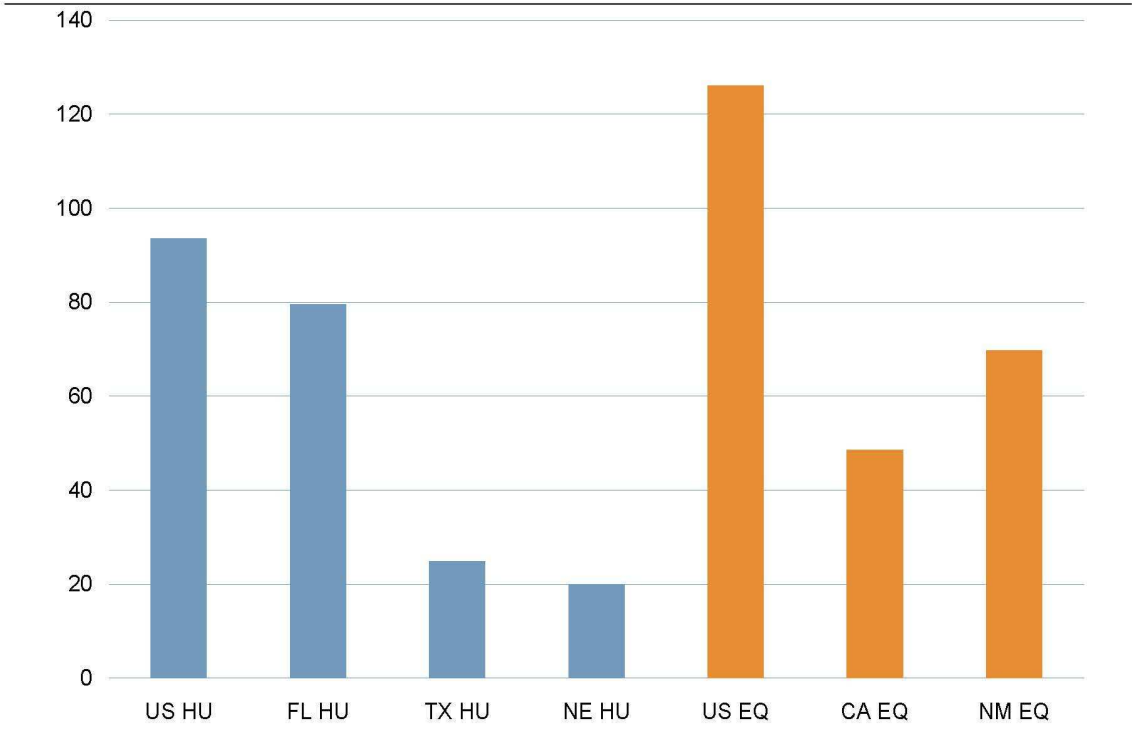
- Massively
- To gain a loan, homeowners are required to have insurance for:
  - Windstorm
  - Hail
  - Explosion
  - Civil commotion
  - Riot
  - Aircraft and vehicle
  - Smoke
  - Vandalism
  - Malicious Mischief
  - Theft
  - Glass
- Not required to have Earthquake insurance
- This federal policy is the reason hurricane is the most significant insured natural peril rather than earthquake

What is the Insurance Market for US Natural Catastrophes?



Source: Data Impact Forecasting, Analysis by Aon Benfield

What Would it be if Fannie and Freddie Required EQ Insurance?



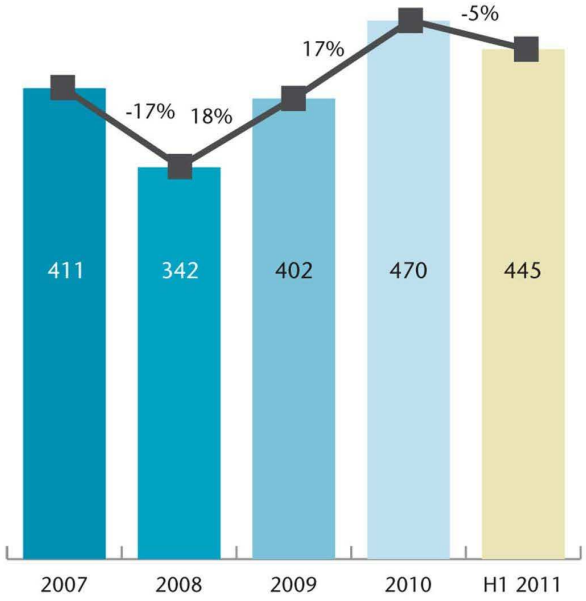
Source: Data Impact Forecasting, Analysis by Aon Benfield

Is the $100b Subsidy Too Large for Reinsurers to Absorb?

- No
  - Due to the diversification of their exposures, reinsurers will **NOT** have to allocate $100b of capital to absorb the earthquake exposure
  - Many metrics are used to evaluate reinsurer capital adequacy
    - Economic capital models / Individual Capital Assessments
    - Regulatory models
    - Rating agency models
  - For the reinsurance industry, the most significant constraint on underwriting catastrophe exposure is the A.M. Best model, referred to as Best's Capital Adequacy Ratio ("BCAR")
    - BCAR capital charge for catastrophe exposure has many dynamics, but is largely calculated as the losses that would result, after reinsurance / retrocessional recoveries, reinstatement premiums and statutory tax rate, from:
      - 1 in 250 (0.4% probability) Earthquake event
      - 1 in 100 (1.0% probability) Hurricane event
      - 1 in 100 (1.0% probability) Other modeled catastrophe event (e.g., Flood, Brush Fire, Tornado Hail)
    - The additional capital required to underwrite earthquake risk is the delta between the current U.S. hurricane peak and the potential further U.S. earthquake peak

Is There Enough Reinsurance Capital to Absorb Earthquake Risk?

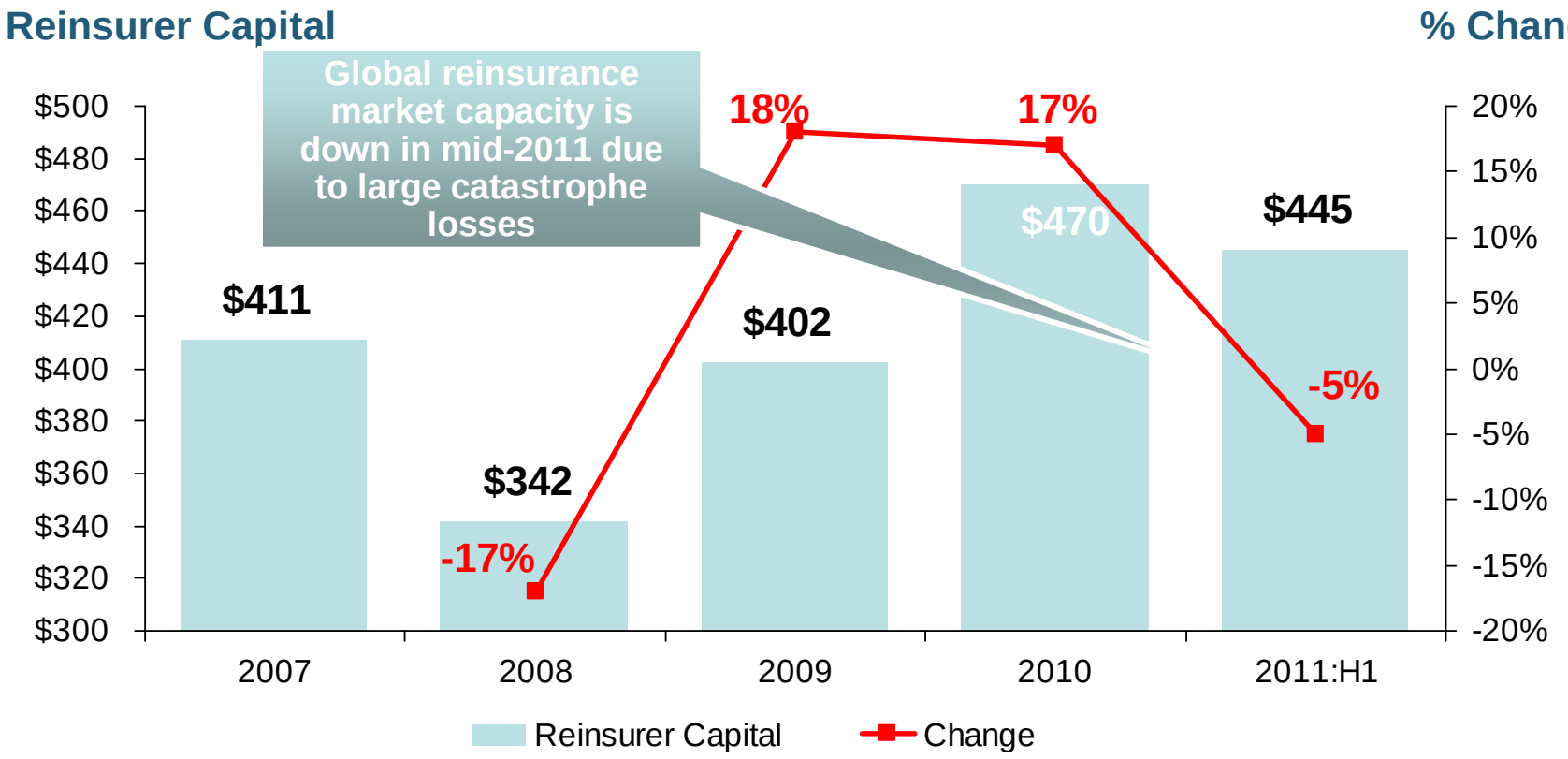
- Yes – despite difficult Q1 2011 catastrophes, reinsurer capital remains at near record levels
  - Reinsurer capital is more than likely going to end the year higher than it started
  - Capacity remains adequate to supply the current needs of insurers



Source: Individual Company Reports, Aon Benfield Analytics

2011 Global Cat Losses

Global Reinsurance Capital, 2007-2011:H1



High Global Catastrophe Losses Have Had a Modest Adverse Impact on Global Reinsurance Market Capacity

Source: Aon Reinsurance Market Outlook, September 2011 from Individual Company and AonBenfield Analytics; Insurance Information Institute.

2011 Australia

- **Floods, hurricanes, fires**
- **$8 B from mega cats**
- **$3.5 B reinsured**
- **44% to reinsurers**
- **90% of that non-domestic reinsurers**

2011 New Zealand

- **Earthquake, in addition to 2010 losses**
- **$17 B insured**
- **$12.5 B to reinsurers**
- **73% reinsured share**
- **100% to non-domestic reinsurers**

2011 Japan

- **Earthquake, tsunami, nuclear**
- **$35 to $40 B insured mega cats (outside government programs)**
- **$12 to $14 B privately reinsured**
- **40% to private reinsurers**
- **98% to non-domestic reinsurers**

2011 Thailand

- **Floods (back up location for displaced Japanese firms)**
- **$15 to $20 B insured mega cat losses**
- **$12 B reinsured**
- **60% reinsured**
- **95% to non-domestic reinsurers**

2010 Chile

- **Earthquake**
- **$8.5 B insured loss**
- **$8 B to reinsurers**
- **95% to reinsurers**
- **100% to non-domestic reinsurers**

2011 Summary

- **Mega cat events were 71 to 81% of the $105 B global cat losses for 2011**
- **45% of global cat losses went to reinsurers**
- **54% of the mega cats were reinsured**
- **96% of the reinsurance for mega cats went to reinsurers outside of the “event” jurisdiction**
- **Reinsured share of the 2011 cat events: $47 B**

Reinsurance Reliability

- **Private reinsurers:**
  - **provide reliable, steady and growing capacity**
- **When there are shock losses:**
  - **it is not supply of reinsurance that falls, but demand for reinsurance that jumps**
- **Have an excellent track record:**
  - **of meeting increased demand**
  - **of raising capital when needed**
  - **of paying claims**

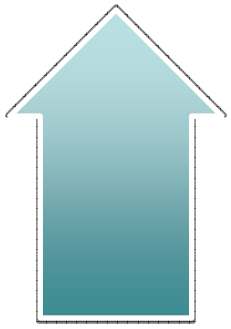
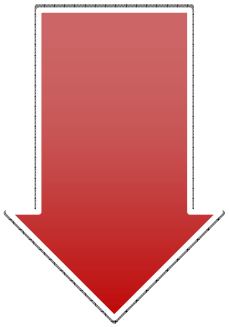
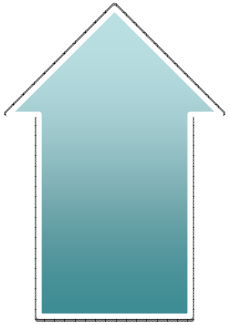
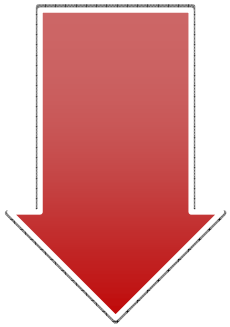
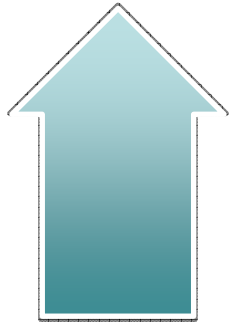
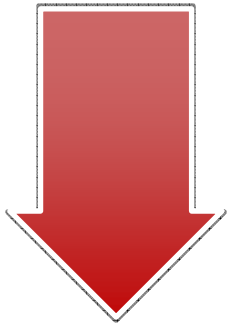
Risk Based Pricing

- **Insurers:**
  - **Need rate adequacy so that they can price coverage based on risk**
- **Reinsurers:**
  - **can price coverage based on risk**
- **Policymakers:**
  - **should study the evidence (academic papers, other states, other markets) and take action to eliminate the red tape that impinges on risk based pricing**

Re Underwriting 101

- **We underwrite with client exposures**
- **We underwrite with client financials**
- **We provide capacity based on our:**
  - **capital,**
  - **knowledge,**
  - **models and**
  - **diversified portfolios**

Reinsurance Supply - Elasticity of Private Capital

1993-1994	1995-2000	2001	2002-2005	2006	2007-2010
Raising $	Returning $	Raising $	Returning $	Raising $	Returning $
					
~**$7B** raised in ~1 year	Buybacks and dividends	~**$20B** raised in ~4 months	Buybacks and dividends	~**$34B** raised in ~4 months	~**$66B** in buybacks + dividends

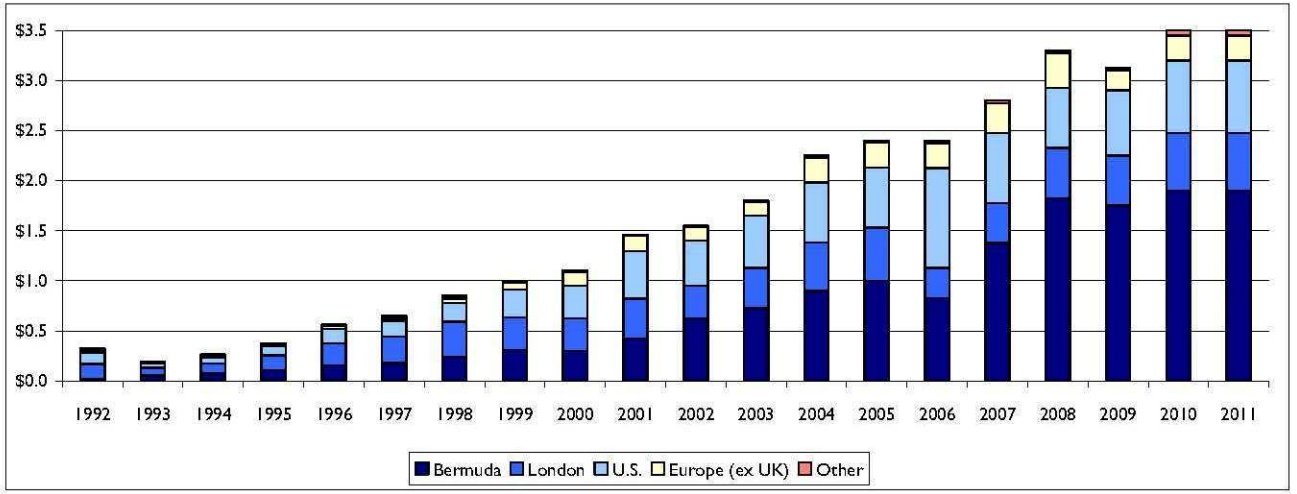
2006 capital raise exceeded 2005 storm losses

Florida's Hurricane Cat Fund increased by $12B in 2007

Source: Dowling & Partners, Aon Benfield Aggregate, Morgan Stanley

US Cat Reinsurance Supply: Reliable, Growing

Property catastrophe capacity



Note: Size of largest U.S. placement in $Billions, based on maximum amount exposed in any zone by a single ceding company program, including aggregate excess contracts. Excludes Cat bond capacity and side cars; includes National Indemnity. Market regions are shown by underwriting office, not domicile.

Source: Holborn Perspectives: The 2011 Reinsurance Market: Managing Exposures and Expenses, January 1, 2011; Association of Bermuda Insurers and Reinsurers (ABIR) February 2011

Mitigation – Perpetual Reinsurance

WeatherPredict Consulting Inc

STORMSTRUCK

HURRICANE RISK MITIGATION LEADERSHIP FORUM SERIES

Strengthening Homes and Safeguarding Families
FLASH inc
FEDERAL ALLIANCE FOR SAFE HOMES
www.flash.org

RenaissanceRe wall of wind

Institute for Business & Home Safety

2011 Lessons Learned

- **Global risk spreading works**
- **Cat capacity remains abundant**
- **Price increases vary by geography/event**
- **Local markets (Thailand, New Zealand) could not have financed these large losses internally**
- **External contribution provides an economic boost**
- **AVOID Protectionism; AVOID Cat Funds**

Protectionism

- **Regulation**
- **Tax**

Reinsurance Tax (HR 3157; S 1693)

- **Discriminatory reinsurance tax bill:**
  - **Targets all international insurers. Creates a punitive tax that renders utilization of affiliated reinsurance at any level uneconomic. Results in double taxation.**
  - **Purpose:**
    - » **Revenue raiser?**
    - » **Market barrier?**
    - » **Address an inequity?**

Debate's Three Dimensions

- **International Trade:**
  - **European Commission and governments**
  - **OFII, Peterson Institute, and Mickey Kantor**
- **Consumer Impact**
  - **Insurance regulators**
  - **RIMS, Captives, NRRA's, FCAN and Consumer Federation SE**
- **Business Risk Management**
  - **Insurers and associations**

Scott Clark, RIMS

"As long ago as 1992, foreign reinsurers helped Florida property-owners to recover their losses from Hurricane Andrew. After the hurricane, seven catastrophe reinsurers were founded in Bermuda to meet the sudden demand for coverage.

The only winners from Rep. Neal's tax increase would be a handful of domestic insurance companies that don't provide much reinsurance but desperately want to protect themselves from international competition. The losers would be everyone else."

Scott Clark, Miami Dade Schools Risk Manager, RIMS Officer,
June 2010, Miami Herald

RIMS Statement 2/12

"2011 should serve as a wake-up call to those who wish to impose limits on global risk distribution via reinsurance. The President's proposal ignores the facts: instituting this tax would significantly reduce America's ability to manage volatile, catastrophic insurance risk, and would further burden American homeowners, large and small businesses and public sector organizations during these challenging economic times."

Dan Kugler, Board Liaison to the Risk and Insurance Management Society, Inc. (RIMS) External Affairs Committee

Brattle Group/Cummins' Conclusions

- **Enactment of the discriminatory reinsurance tax bill will lead to:**
  - **Elimination of affiliated reinsurance for non US groups**
  - **20% reduction in overall US reinsurance market supply**
  - **1 to 2 % drop in supply of primary insurance**
  - **4% drop in coverage purchased**
  - **$11-$13 billion annual increase in US insurance costs**

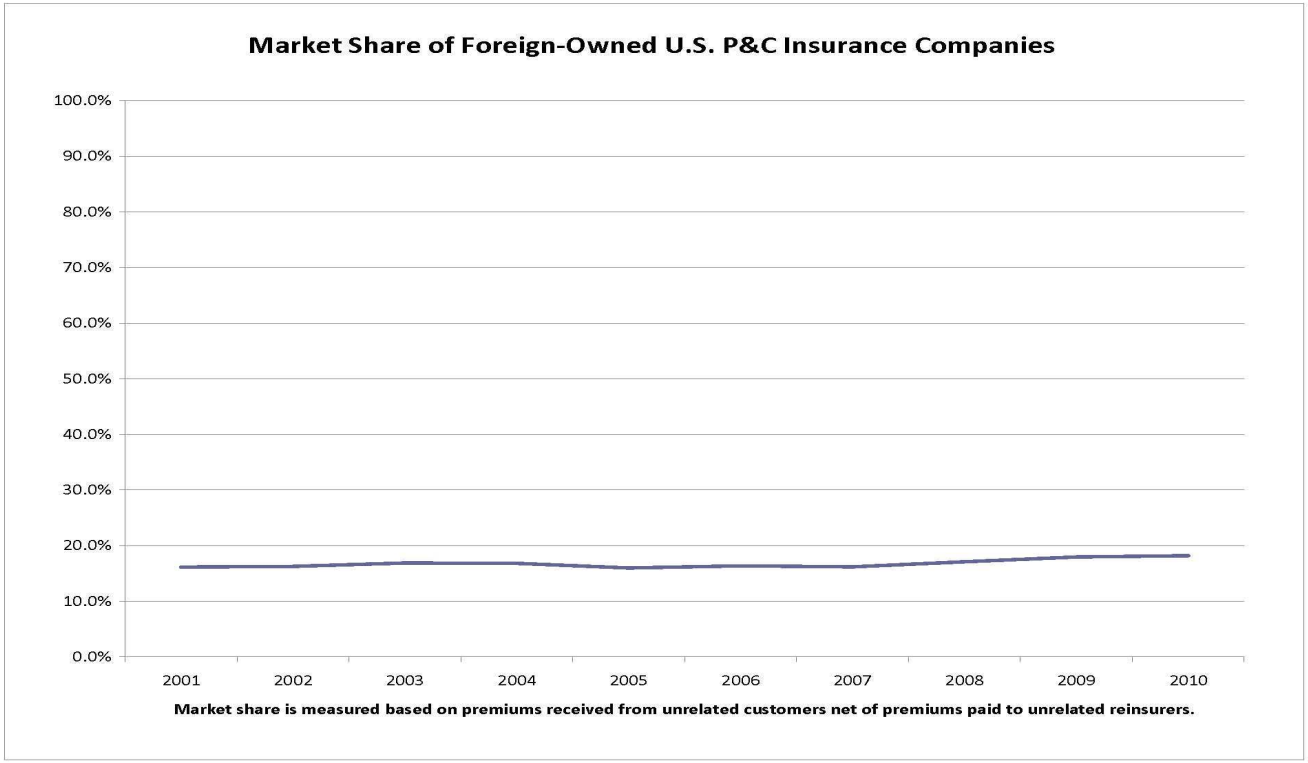
Brattle Group--Economics

- **Vertical integration**
- **Flagship business model**
- **Efficiencies of affiliated reinsurance**
- **Adverse selection and moral hazard**
- **This – Not Tax -- drives US and non-US use of affiliated reinsurance**

Brattle Group Analysis

- **For each $1 of affiliated reinsurance lost, substitute:**
  - **29 cents of non-affiliated, ($6.9 B)**
  - **56 cents of capital, ($13.4 B)**
- **This resulting short fall leads to a capacity reduction which leads to higher consumer prices**
  - **From less than 1% to more than 16% by line of business**
  - **Feedback affect of reinsurance cost not counted**

Little Growth in Foreign Market Share . . .



Why the Proposal is Flawed . . .

- **Effectively a gross premiums tax (losses ignored) – highly punitive**
- **Imposes double tax – ignores US treaty regime (treaties seek to *avoid* double tax)**
- **Proponents argue profits shifted to low-tax jurisdictions, but proposal applies to all non-US reinsurers *regardless of jurisdiction:***
  - **losses also sent offshore**
  - **FET applies to Bermuda transactions**
- **Ignores powerful non-tax reasons for reinsuring with affiliates (*e.g.*, centralization of risk capital, diversification)**
- **Ignores current legal authority targeting abusive transactions**
- **Will lead to trade retaliation**

Protectionism

- **Brazil, mandatory cession to local reinsurers (40%)**
- **Limits on affiliated cessions for local insurers (20%)**
- **Argentina: mandate to have local reinsurer; cross border only as an exception**
- **US: reinsurance tax; mandatory state funds (MN, MI, FL, others)**

Conclusion

What Can You Do?

- www.keepinsurancecompetitive.com
- **Play the You Tube video and spread the word on the discriminatory reinsurance tax**
- **Talk to your insurance commissioner and your Member of Congress about your concerns**
- **Work with RIMS National**
- **Participate in Annual Lobby Day**
- **Join RIMS PAC**

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Association of Bermuda Insurers and Reinsurers