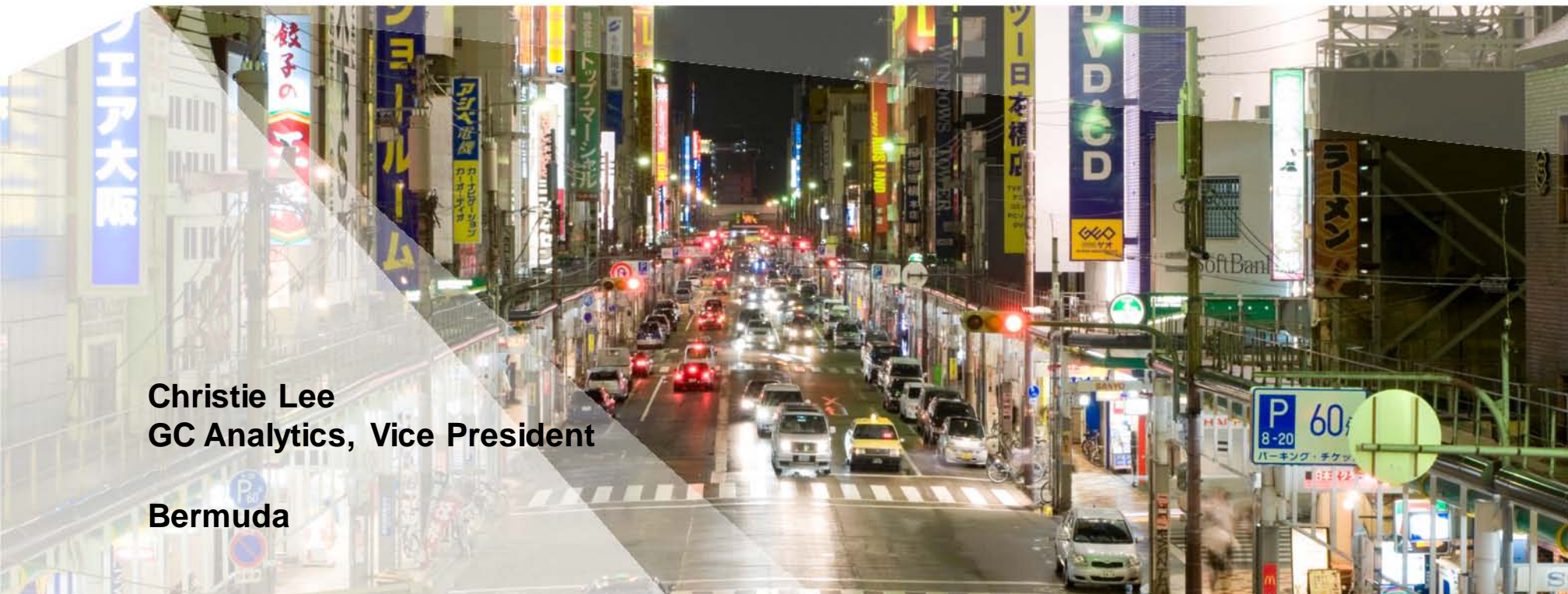


CAS/ CARe SEMINAR
CS-2: INTERNATIONAL PROPERTY
The Challenges of Having Incomplete Data

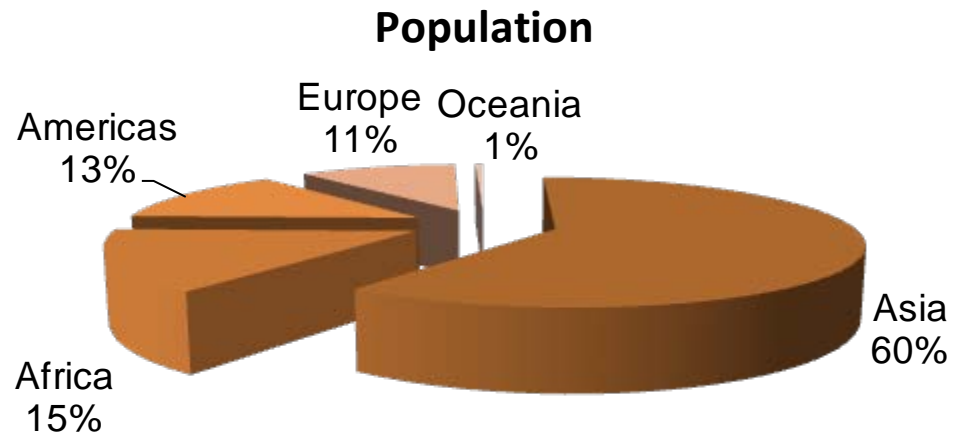
JUNE 6, 2013



Christie Lee
GC Analytics, Vice President

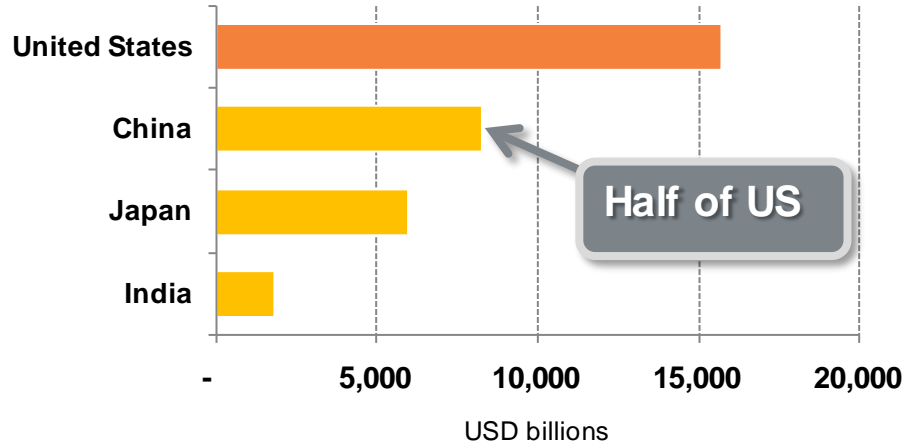
Bermuda

Introduction

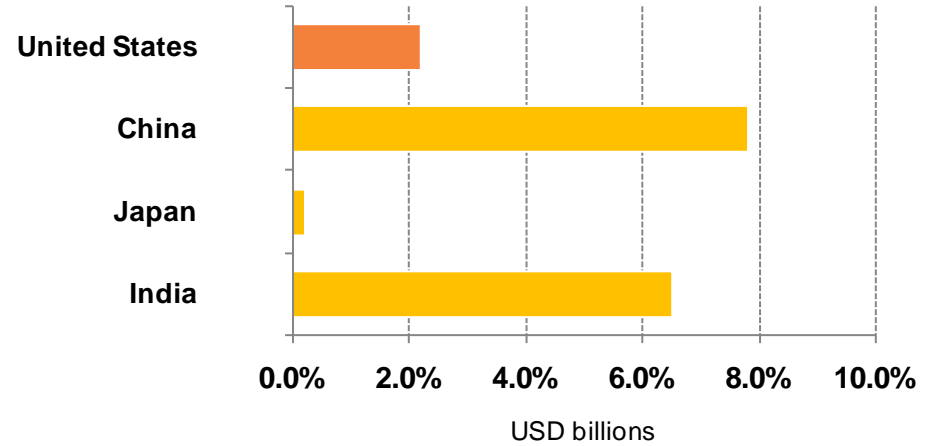


Asia Economy and Insurance Market

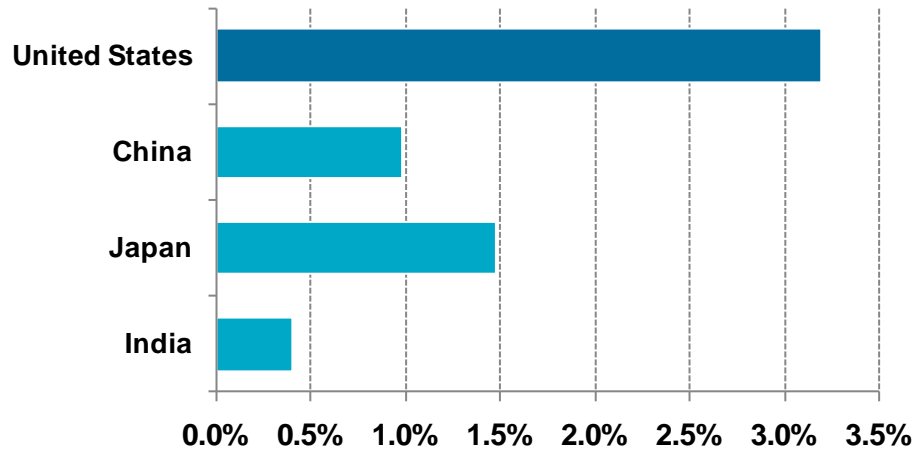
2012 GDP



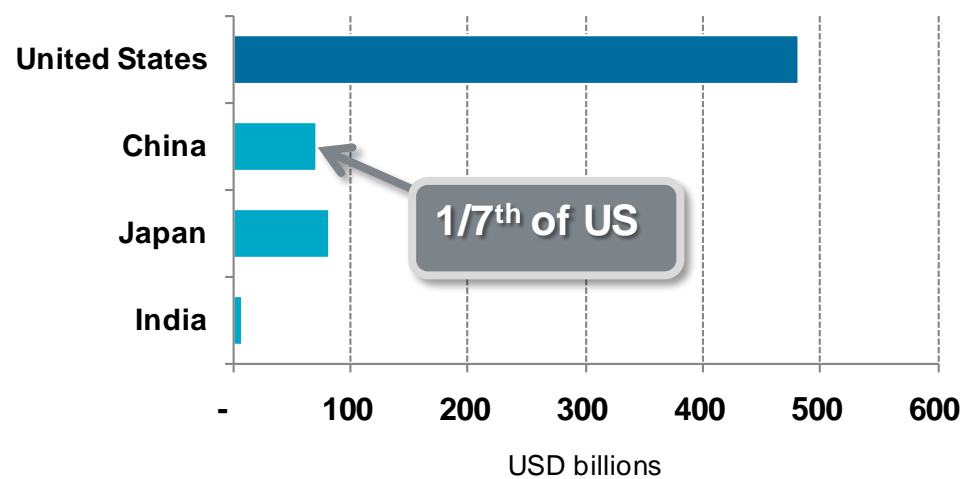
2012 Real GDP Growth



P&C Premium as a % of GDP



2011 P&C Premium Income



Exposure Rating Property and Engineering Per Risk Treaties

General Limitations

- Limited detailed data for large multi-risk/multi-location policies and layered/stacked policies
- Deductibles are not provided
 - Bigger issue to layered policies
- Coinsurance of large risks make risk accumulation management difficult
- Many multi-year engineering projects
- Limited industry data

Property



Examples of Large Property Policy in Asia

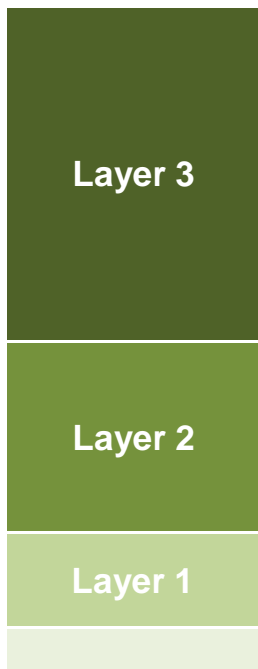
Multi-risks and Multi-locations



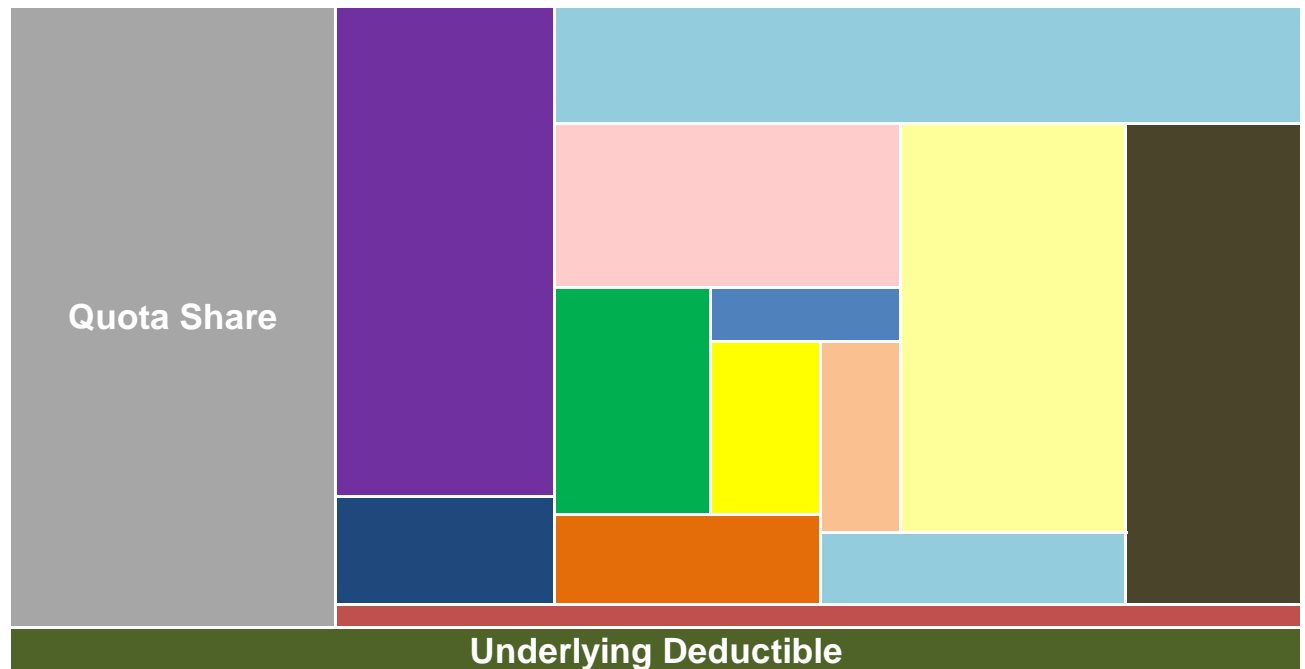
TOKYO ELECTRIC POWER COMPANY



A Large Policy Structure Could Be...



A typical insurance scheme



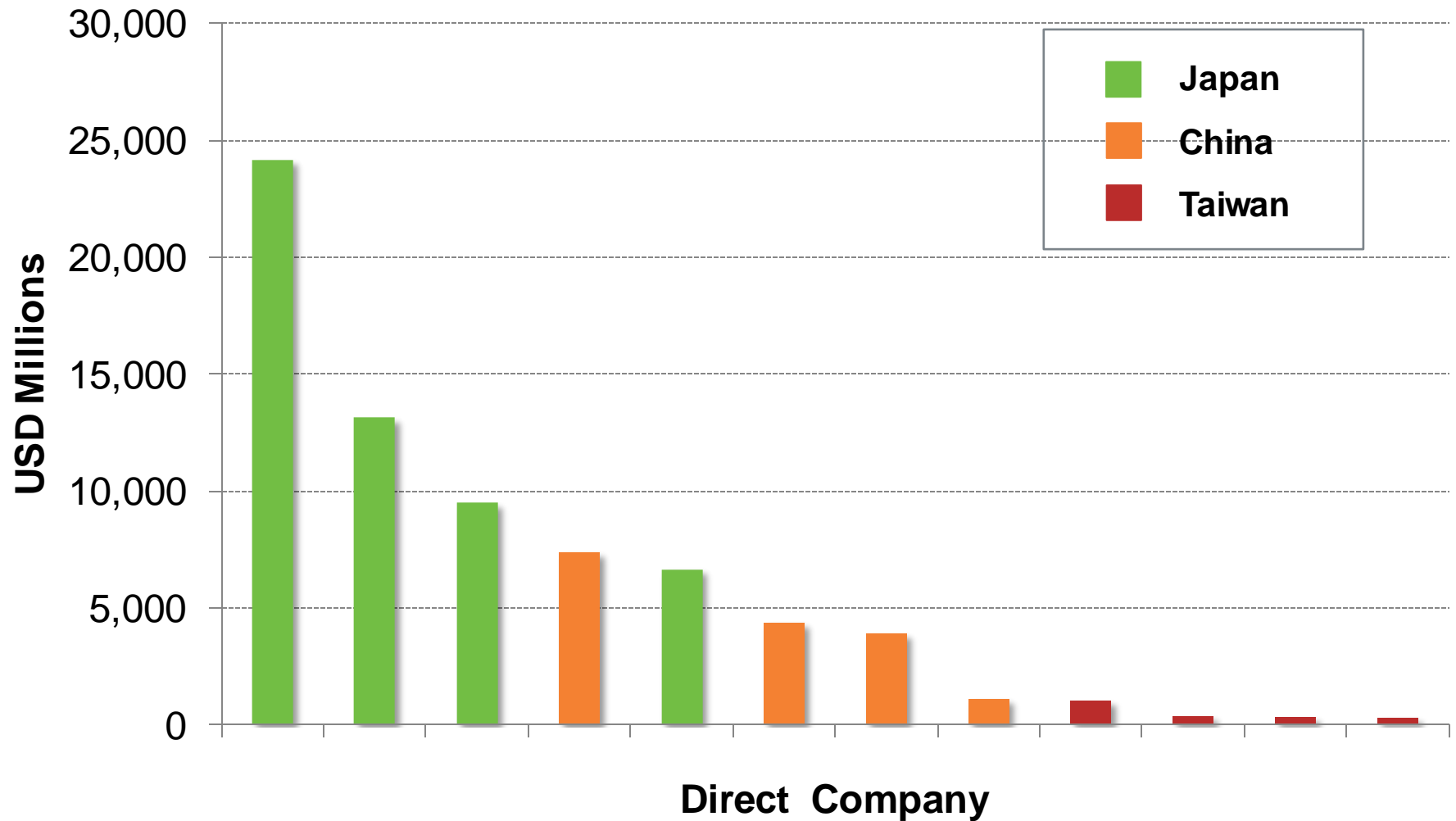
However, some policies' structure in Asia can be as complicated as above

Why Would Some Asia Large Policies Look Like This?

- The total limit of the policy on the prior slide is 3 billion USD
- This is larger than any one local company is willing to insure
- Most insurers are only able to write about 100M to 500M USD on any one risk
- Thus, the policy is co-insured by many companies
- The structure is cut into pieces in order to maximize the usage of local insurer and foreign insurer / reinsurer capacity

2011 Insurance Company Capital Level

Top 4 insurers in Japan, China and Taiwan



Limited Detailed Data for Large Policies

- Multi-location policies create difficulties when creating risk profiles.
- Ideally, insurers could provide the policies terms and premium along with the value of all the individual risks.
 - With this data, premium could be allocated down to risk level prior to exposure rating.
- In practice many insurers do not provide this detailed data. Instead, the information is included in the risk profiles. Typically, they either:
 1. Put all the premium in the risk band corresponding to the **top risk sum insured**
 - All premium are allocated to the top risk
 - Ignoring policy limit

➡ **Overstate large loss potential**
 2. Put all the premium in the risk band that corresponds to the **policy limit**

Sum Insured	Premium
<5M	8.65M
5M - 10M	15.95M
10M - 15M	7.12M
15M - 25M	24.12M
25M - 35M	14.52M
35M - 50M	32.09M
50M - 75M	35.42M
75M - 100M	18.24M
100M - 150M	15.97M
150M - 200M	32.21M
Total	204.29M

Deductibles are Not Provided

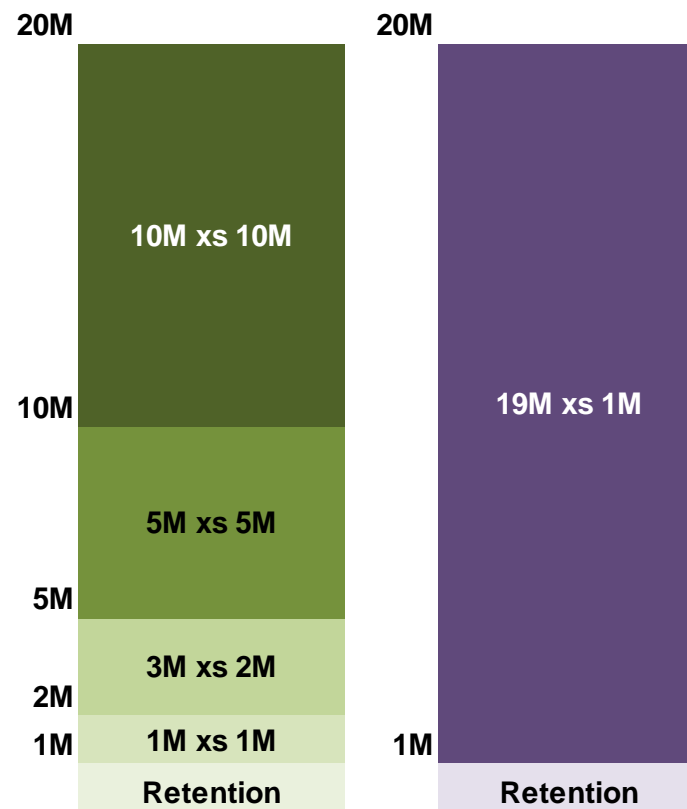
- In most cases, deductibles are not provided, and thus **understating large loss potential**
- For example, two risks
 - 10M xs 0 with premium \$1M
 - 10M xs 100M with premium \$1M
 - Both are covered by RI layer 5M xs 5M
 - The second risk should be more likely to generate losses to the reinsurance layer.

Limit Band	Premium
<5M	8.65M
5M - 10M	15.95M
10M - 15M	7.12M
15M - 25M	24.12M
25M - 35M	14.52M
35M - 50M	32.09M
50M - 75M	35.42M
75M - 100M	18.24M
100M - 150M	15.97M
150M - 200M	32.21M
Total	204.29M

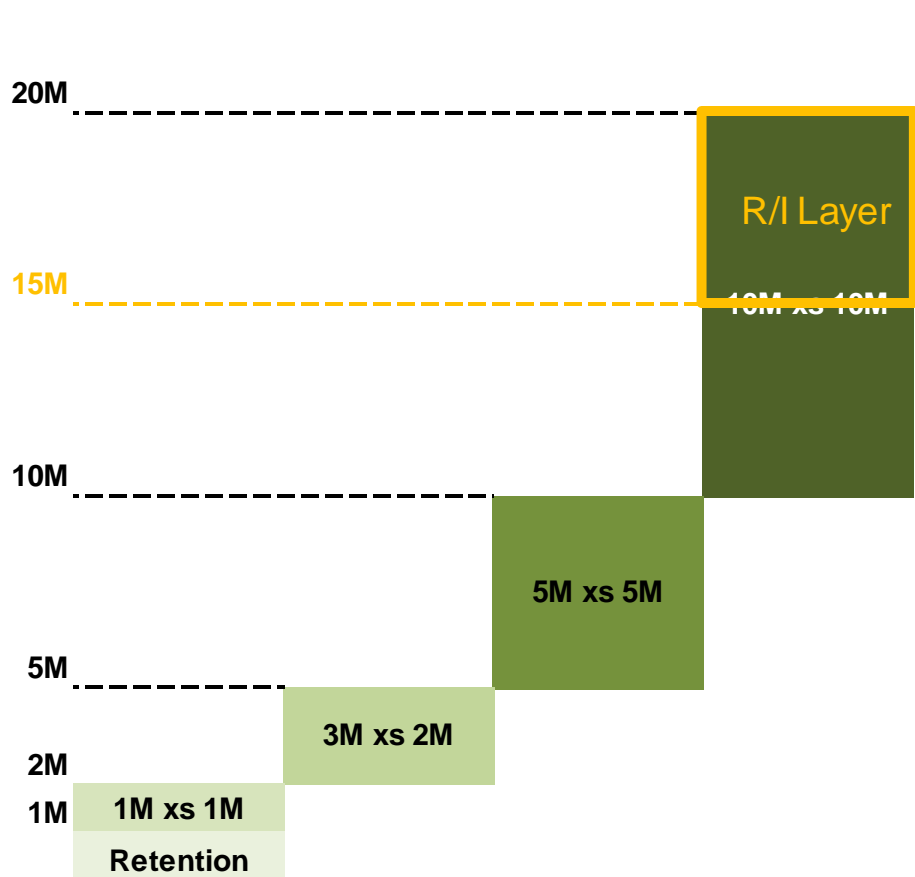
Without deductible information, reinsurance losses are understated

Stacking Quick Review

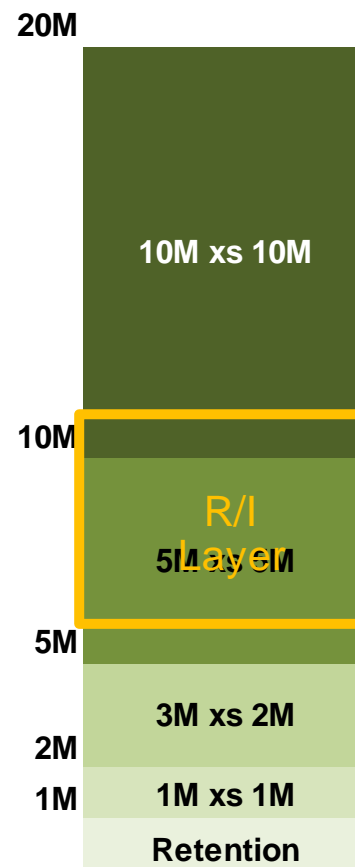
- Stacking is where a single underlying risk or portfolio of risks are insured by multiple excess of loss contracts
- For example, Co ABC writes a series of XOL layers covering the same risk
 - 1M xs 1M
 - 3M xs 2M
 - 5M xs 5M
 - 10M xs 10M
- If Co ABC is taking 100% participation in all layers, this is essentially the same as writing a single policy 19M xs 1M



Stacking Quick Review



No Stacking



With Stacking

The exposure to the RI layer is significantly higher with stacking applied

Stacking Sensitivity Test

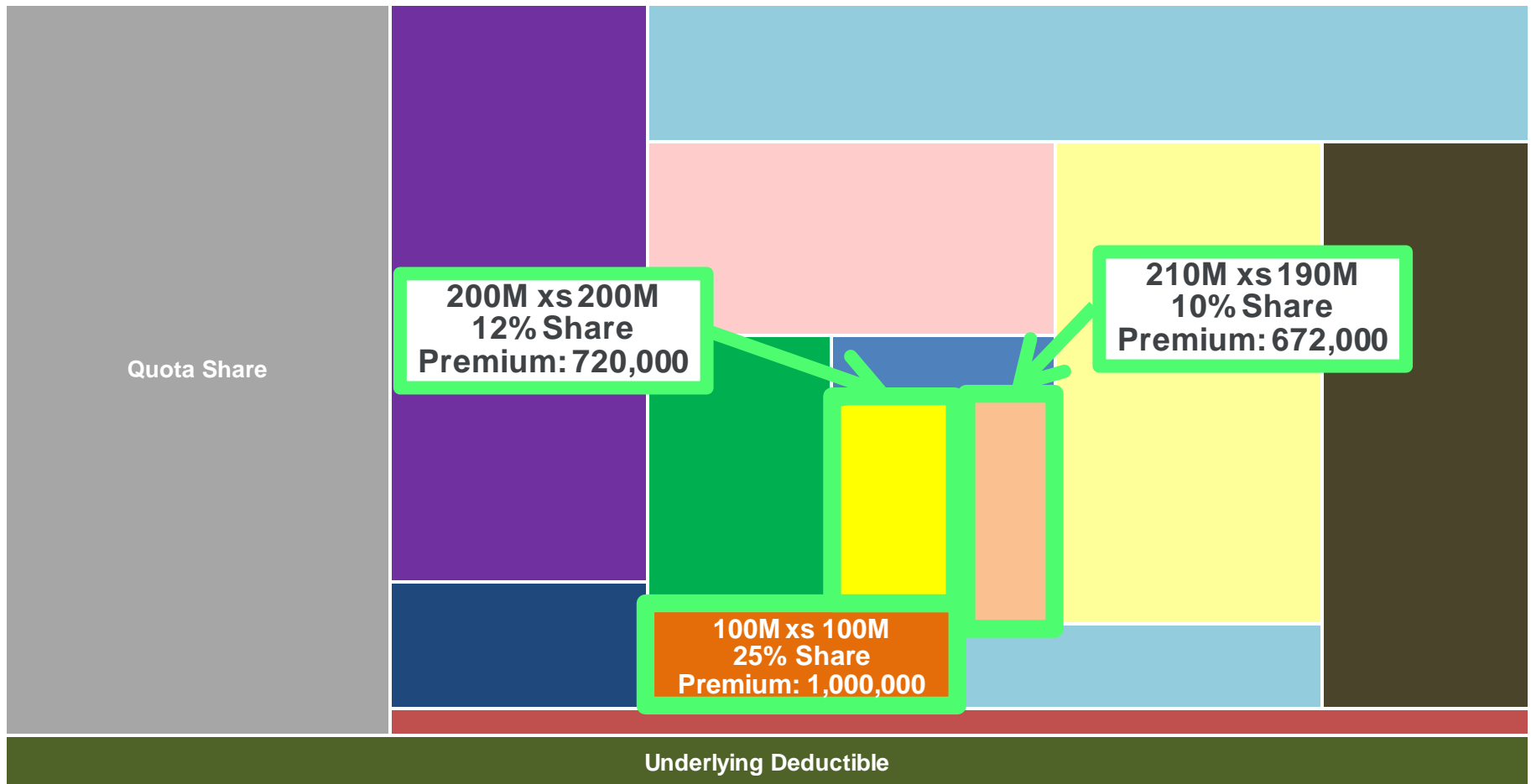
- Calculate the expected RI loss on a policy with 27 risks and 5 layers
 - Total Limit of 120M
 - Subject Premium: \$520,000
 - 60% loss ratio
 - Country-specific property risk exposure curve

RI Layer	Exposure Rating			
	Detail Risk List (No Stacking)	%	Detail Risk List (Stacking)	%
10M xs 0	234,706	75%	149,329	48%
10M xs 10M	47,307	15%	50,381	16%
20M xs 20M	20,633	7%	51,972	17%
20M xs 40M	7,595	2%	28,140	9%
20M xs 60M	1,729	1%	17,070	5%
20M xs 80M	0	0%	10,093	3%
20M xs 100M	0	0%	4,985	2%
Total	311,970	100%	311,970	100%

Ignoring stacking would understate the large loss potential

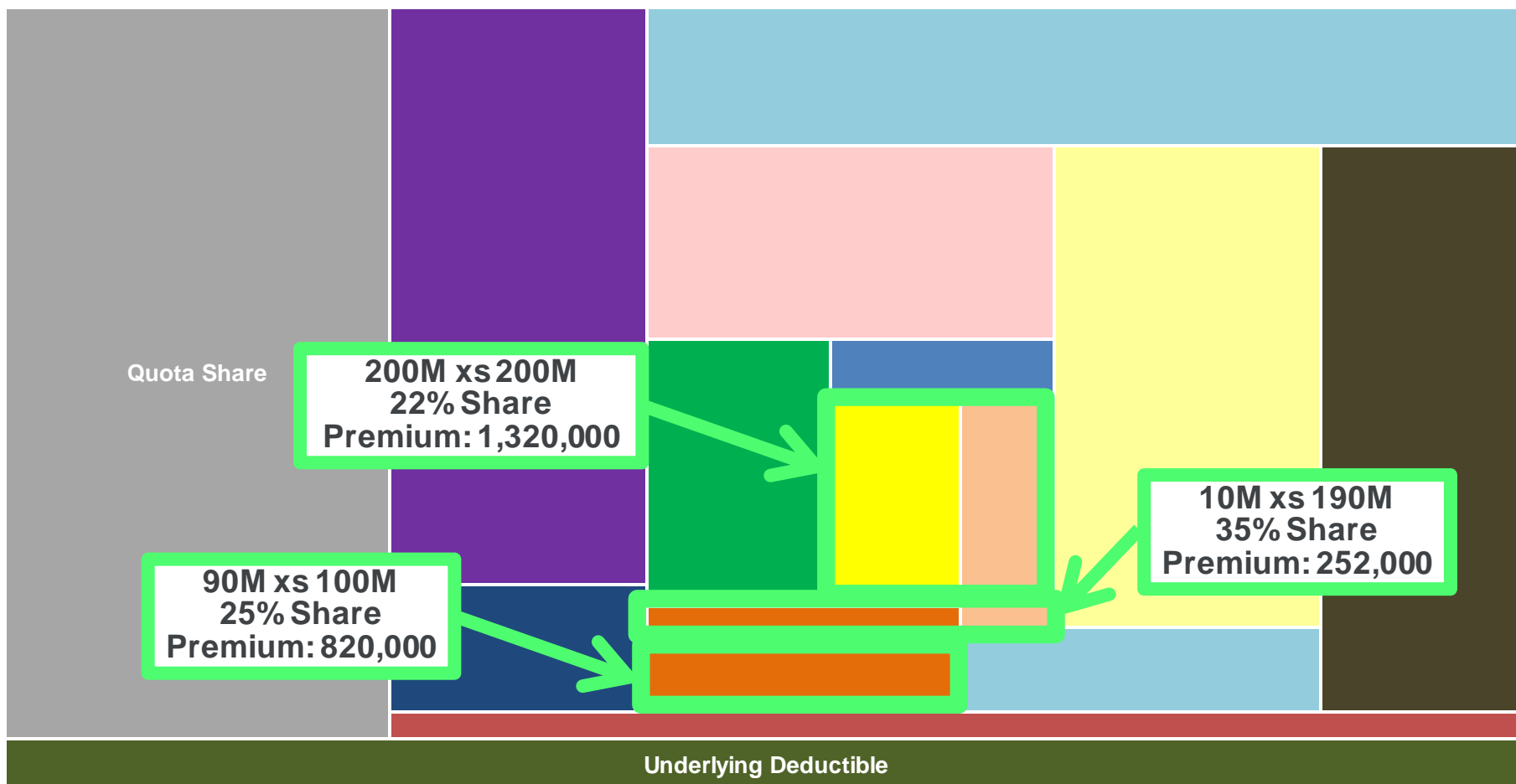
Large Policy Stacking

- Modeling irregularly stacked large policy requires creativity. If you model the following 3 layers...



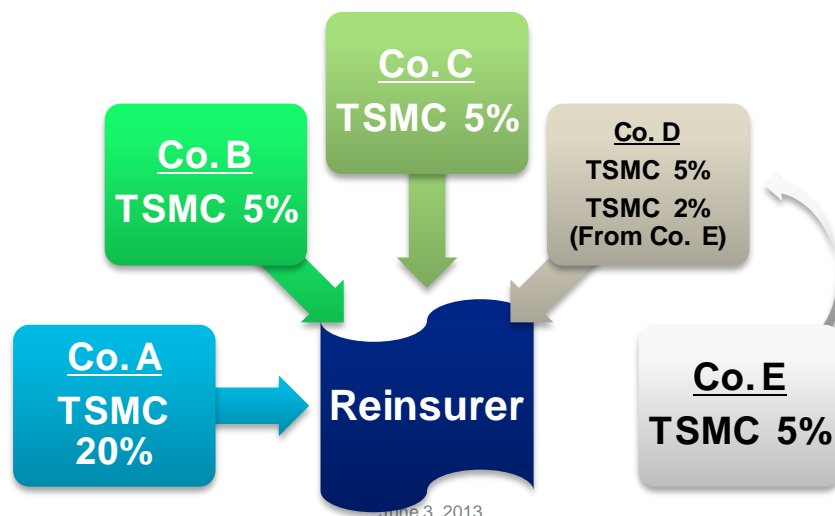
Large Policy Stacking

- You have to reorganize the layers and redistribute the premium so that there is no overlapping.



Co-insurance

- Most large policies are co-insured in Asia so reinsurers will be covering the same primary policy on various treaties. Reinsurers typically will not be able to know their total accumulation on any one risk.
- For example, company A is the leader for TSMC and retains a large share of the policy. The reinsurer will likely know the value ceded from company A. However, company A is likely coinsuring this risk with the rest of the market. The reinsurer is unlikely to know how much of TSMC they are reinsuring from treaties of company B, C, D, ...
- Difficult to analyze the retrocession treaty without knowing the accumulated risk size.



Engineering



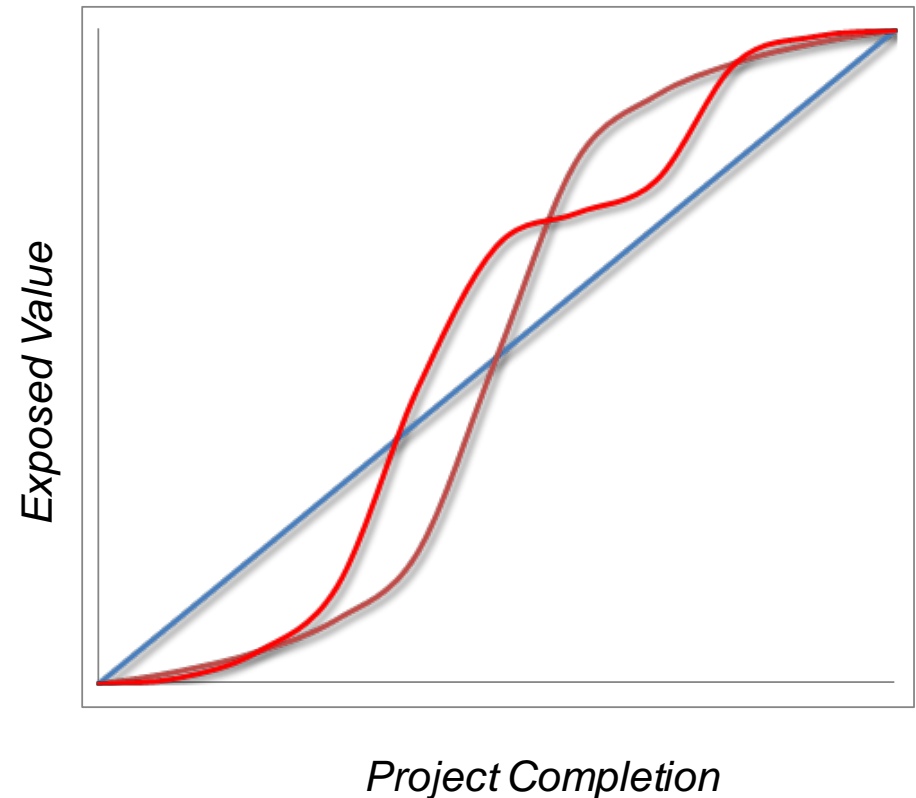
Engineering Exposure Challenges

Multi-Year Policies

- The underlying policies are likely to be multi-year policies, while reinsurance policy is annual policy
- Exposure develops over time as construction takes place
- To exposure rate the Per Risk XOL treaty, whether apply the project value or the exposed value depends on what curve you are using

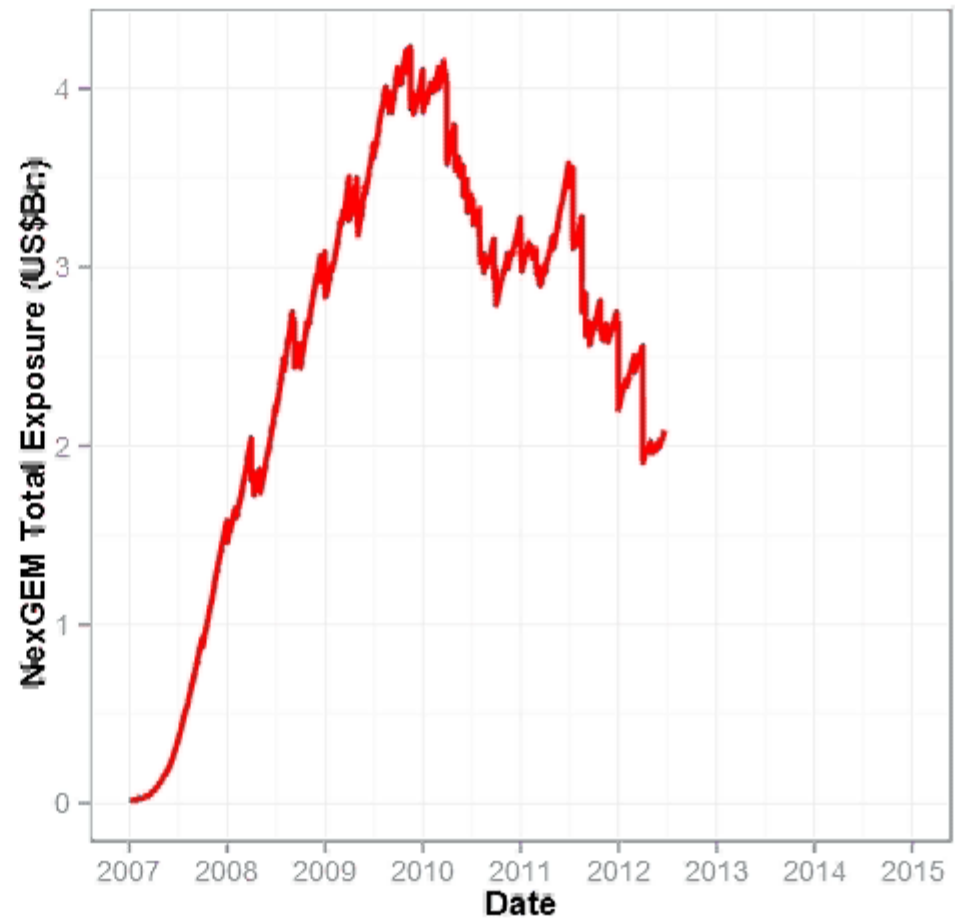
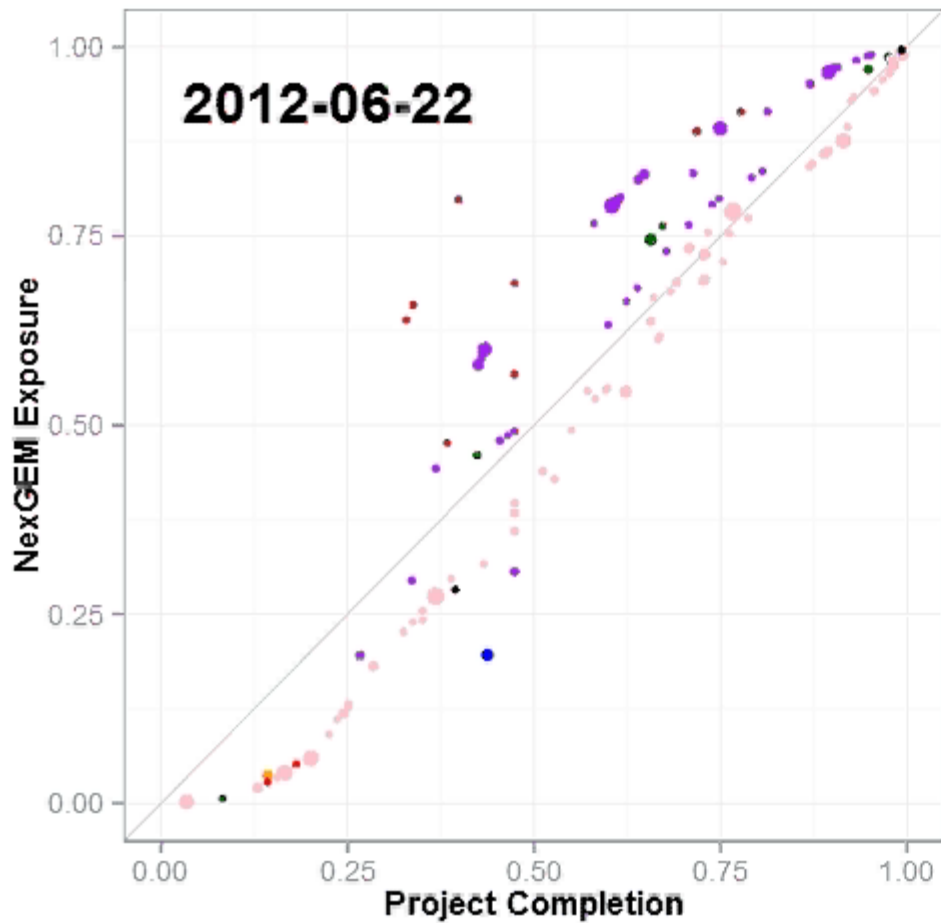
Engineering Exposure Challenges

- How should the premium be distributed? Linear pattern?
- Different construction types follow different paths
- The exposed value does not increase uniformly
- Modeling the best estimate exposed value is critical



Engineering Exposure Per-risk and Combined Portfolio Analyses

it works...



Conclusions



Conclusions

- Requires the whole industry to improve together:
 - If the lead reinsurer isn't asking/capturing the detailed data, then the following reinsurers will not have this data. This requires the entire market to improve.
 - Separate large/ multi-location policy data
 - Provide large policy details
 - By risk location
 - Deductible
 - Limit
 - Company Share
 - Stacking
 - Ask for named account details for risk accumulation study
- In some cases the catastrophe modelling data will have the policy and risk details needed to correct the risks profiles

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