



Current Challenges and Future Prospects of Fire Insurance in Japan

The Institute of Actuaries of Japan

CAS Annual Meeting,
November 12, 2019

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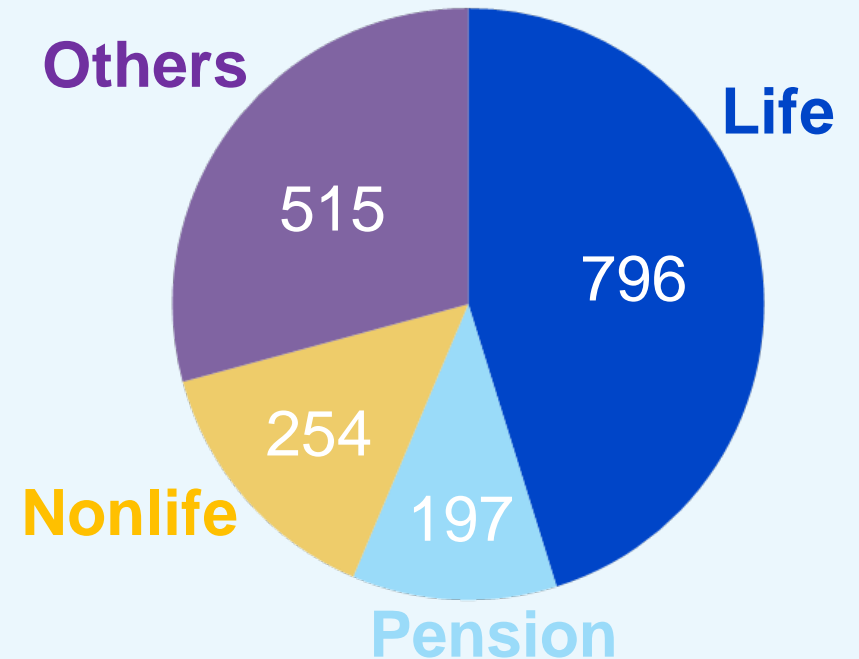
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- We are the Nonlife insurance team in the 8th Overseas Actuarial Training Program held by the Institute of Actuaries of Japan (IAJ).
- Team members are from different backgrounds (reserving and pricing) and have worked for insurance company, consulting firm, and rating organization.



公益社団法人 日本アクチュアリー会
Think the Future, Manage the Risk

- The IAJ, founded in 1899, is one of the two actuarial institutions in Japan, and engaged in a broad range of activities including:
 - study and research of actuarial science
 - the education of actuaries
 - administration of the qualifying actuarial examination system
 - facilitation of professional and cultural exchanges with overseas actuarial organizations.



Fellow actuaries (FIAJ) in each firm as of March 2019

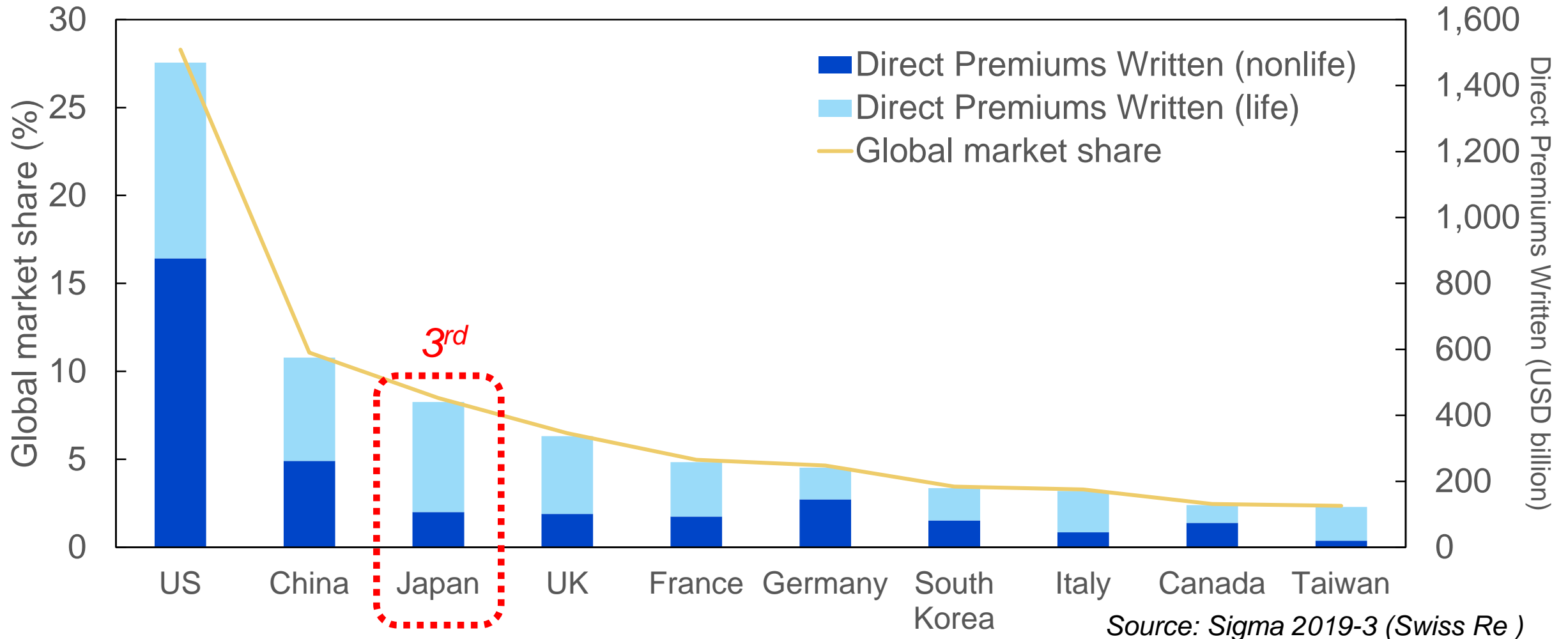
- I. Current Status of the Japanese Fire Insurance Market
- II. Pricing Methodology in Japan
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Global Ranking of Japanese Market



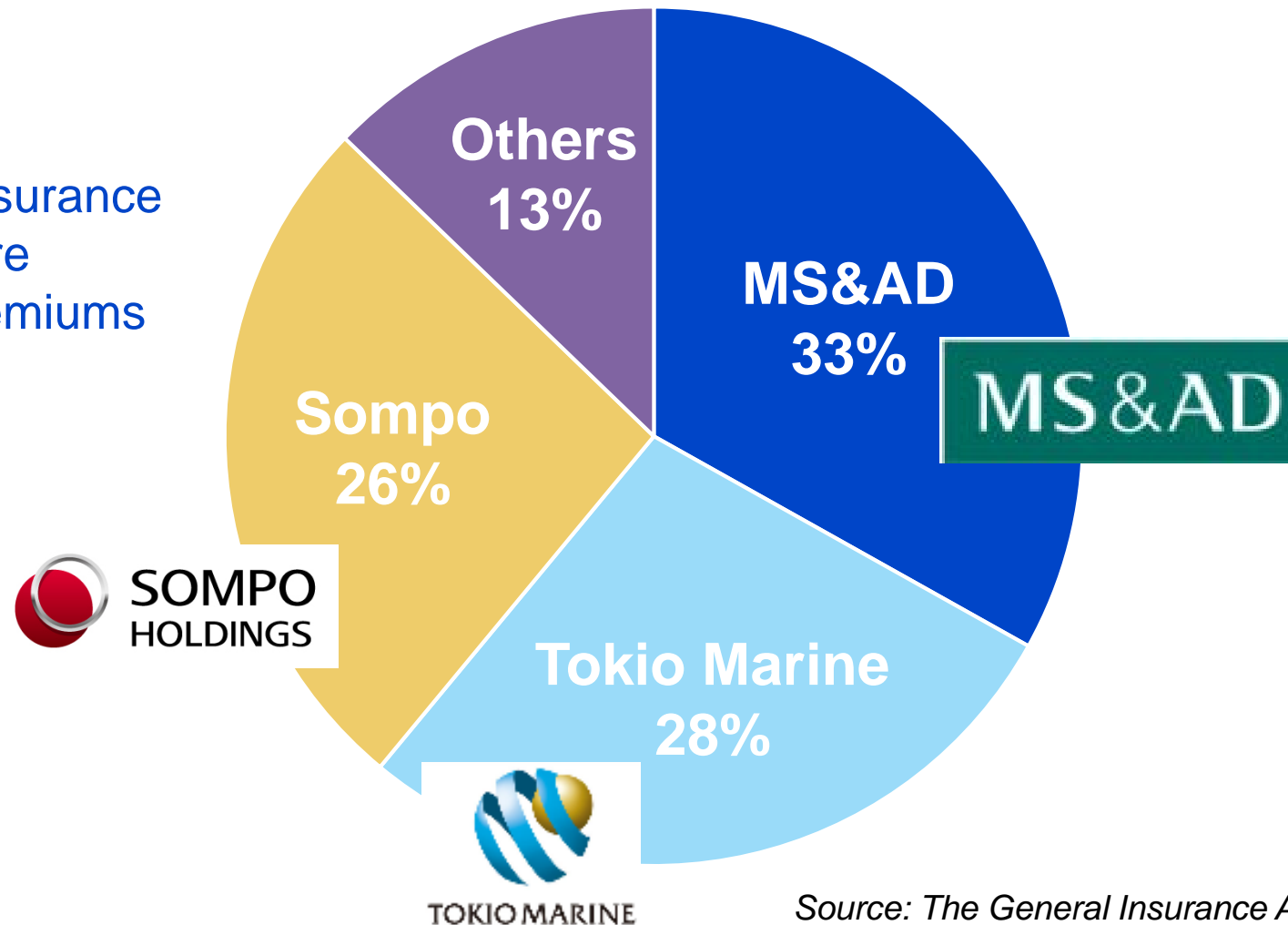
- The world's 3rd largest insurance market in 2018.
- 441 billion USD in direct written premiums, 8.5% of global market share.



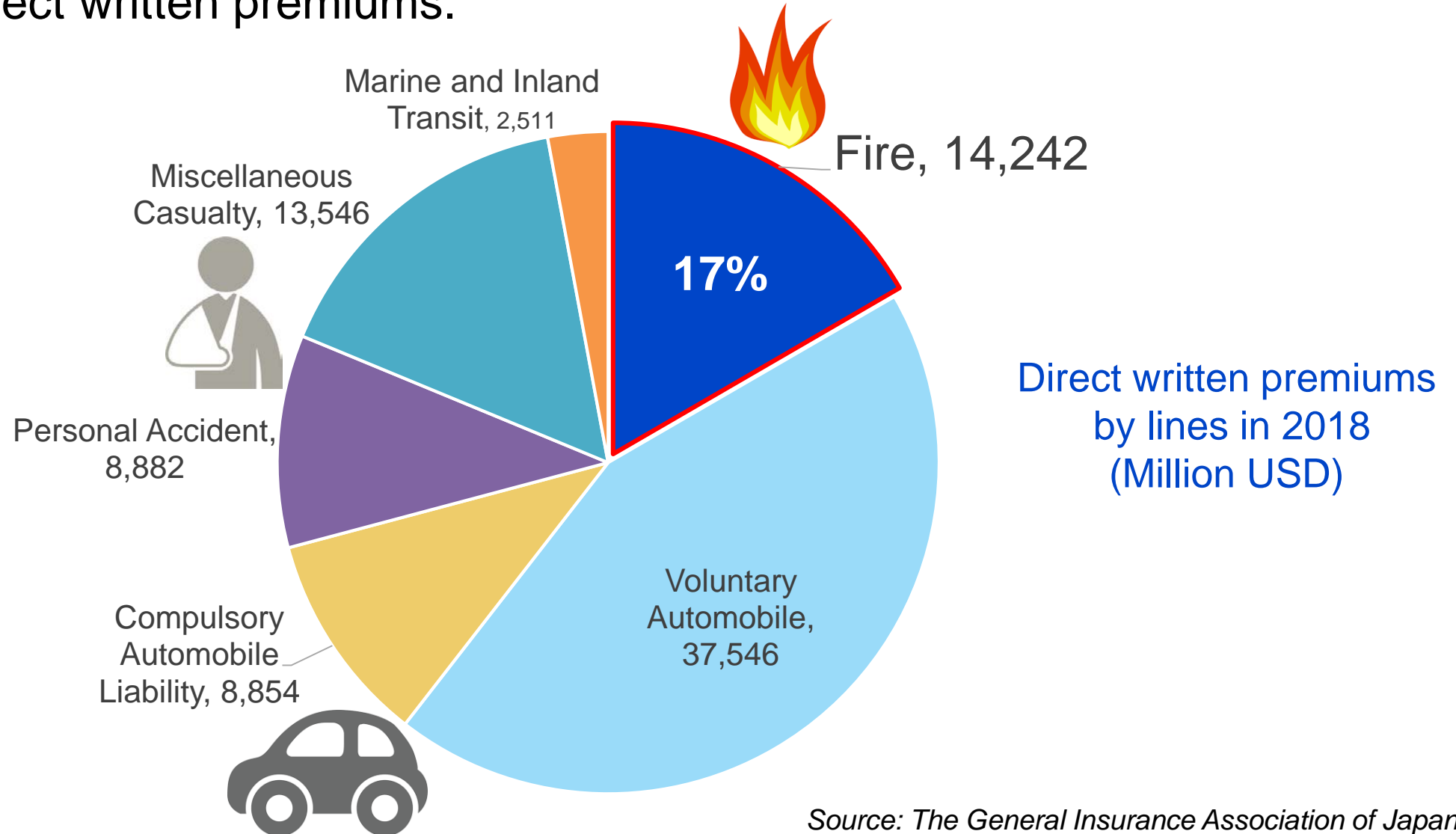
Source: Sigma 2019-3 (Swiss Re)

- 52 nonlife insurance companies operate in Japan.
- 3 large insurance groups dominate 87% of the nonlife insurance market.

Japan's nonlife insurance
market share
by net written premiums
(FY2018)



- Fire insurance (Homeowners and Commercial lines) constitutes the 2nd largest share of direct written premiums.



Coverage by Homeowners Policies



- Named peril coverage is popular in Japan.

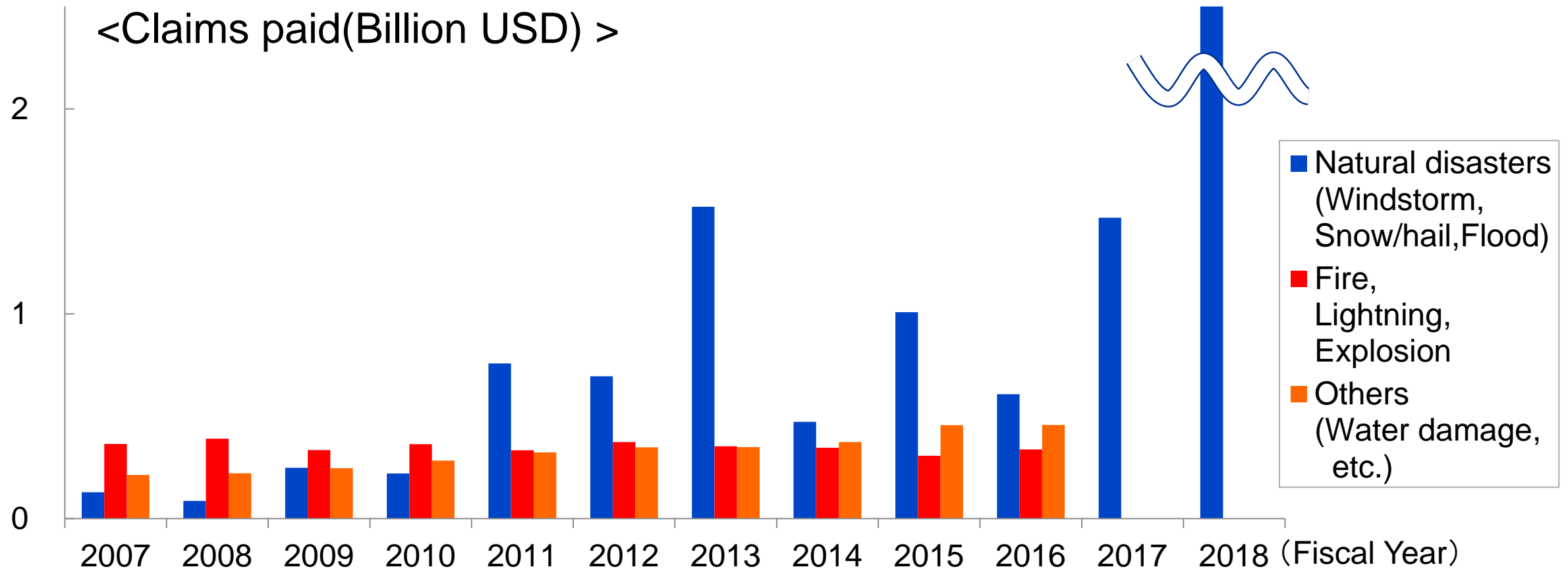


etc.

Claims Paid per Peril

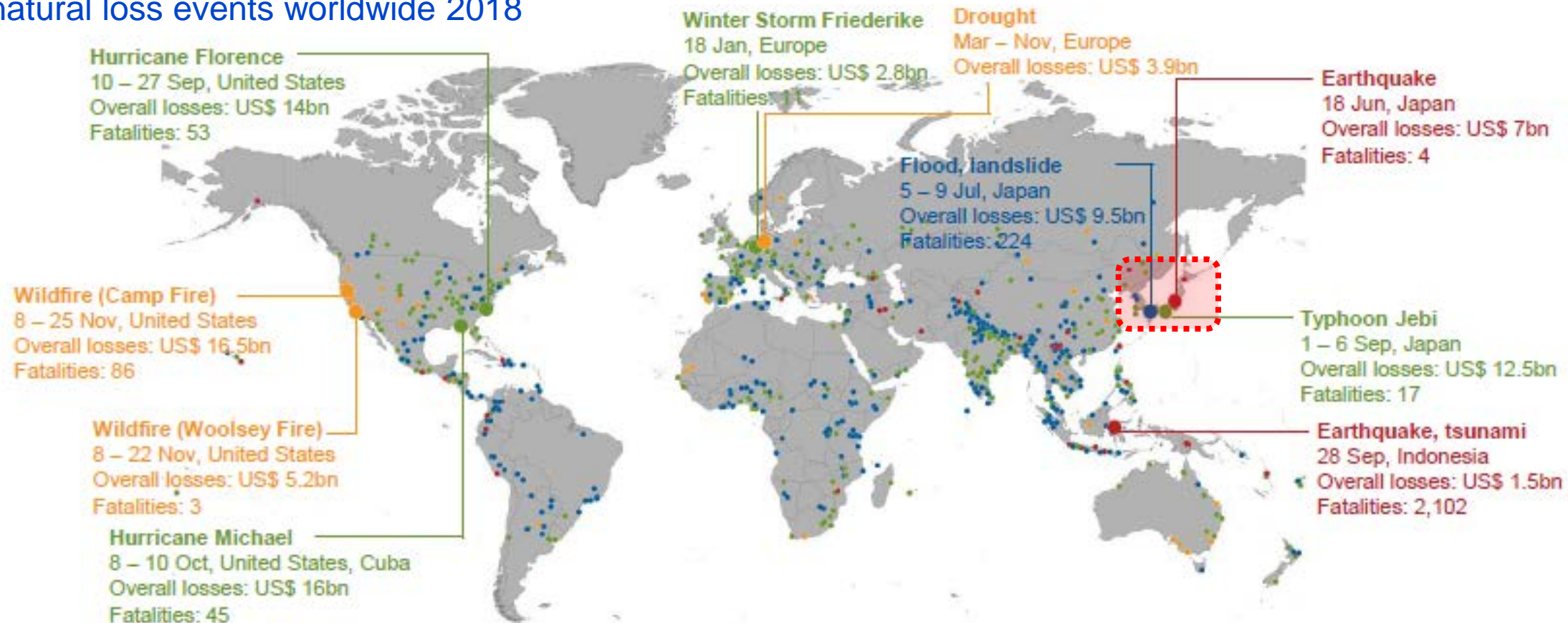


- Natural disasters have resulted in significant amounts of paid claims, which have greatly fluctuated from year to year.
- The amounts due to other perils are stable.



- Natural disasters are the biggest concern in Japan.

Relevant natural loss events worldwide 2018



Geophysical events
Earthquake, tsunami, volcanic activity

Meteorological events
Tropical storm, extratropical storm, convective storm, local storm

Hydrological events
Flood, mass movement

Climatological events
Extreme temperature, drought, wildfire

○ Catastrophes
○ Small, medium and large loss events

- FY2018 was especially a devastating year and 3 events ranked within the top 10 most paid claims due to natural disasters. FY2019 ... ?

	Name of Disaster	Fiscal Year	Paid Claims (Million USD)
1	Typhoon No. 21(Typhoon Jebi)	2018	8,511.8
2	Typhoon No. 19(Typhoon Mireille)	1991	4,750.0
3	Typhoon No. 18(Typhoon Songda)	2004	3,240.0
4	Snowfall, Feb. 2014	2013	2,712.7
5	Typhoon No. 24(Typhoon Trami)	2018	2,678.2
6	Typhoon No. 18(Typhoon Bart)	1999	2,588.2
7	West Japan heavy rain	2018	1,520.9
8	Typhoon No. 15(Typhoon Goni)	2015	1,419.1
9	Typhoon No. 7(Typhoon Vicki)	1998	1,376.4
10	Typhoon No. 23(Typhoon Tokage)	2004	1,010.9

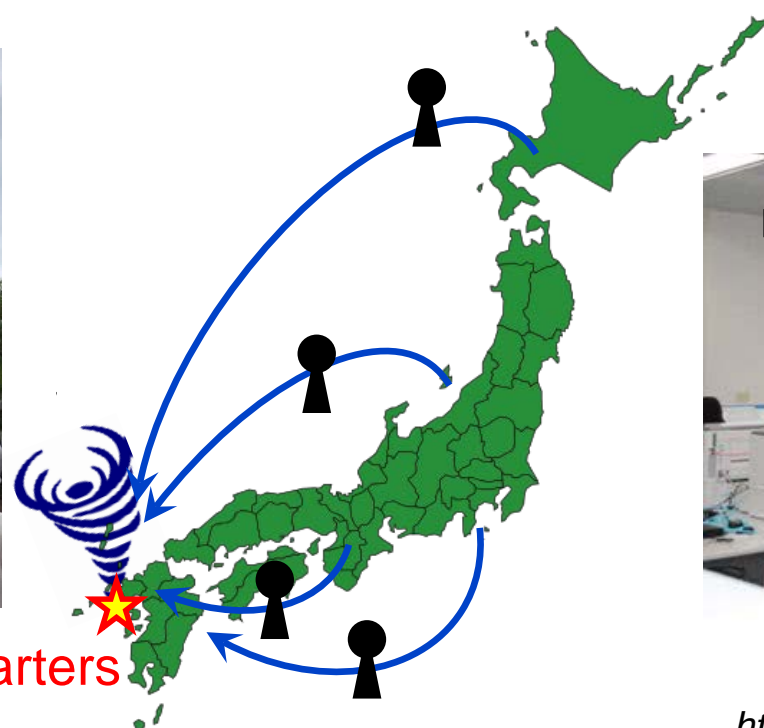
Source: The General Insurance Association of Japan

Natural Disaster Countermeasures 1

claim settlements



- To manage massive claim settlements effectively and in a timely manner, each major company sets up disaster management task force and establishes a response headquarters at the disaster-stricken areas.
- Employees, appraisers, and loss adjusters from all over the branches and headquarters are dispatched to the disaster areas to make swift settlement.
- Drones and robotic process automation are introduced to enhance efficiency.



Natural Disaster Countermeasures 2

Artificial satellite images



- Some insurance companies are utilizing satellite images, past claim settlement records, and AI analysis to analyze typhoons and flood damages.



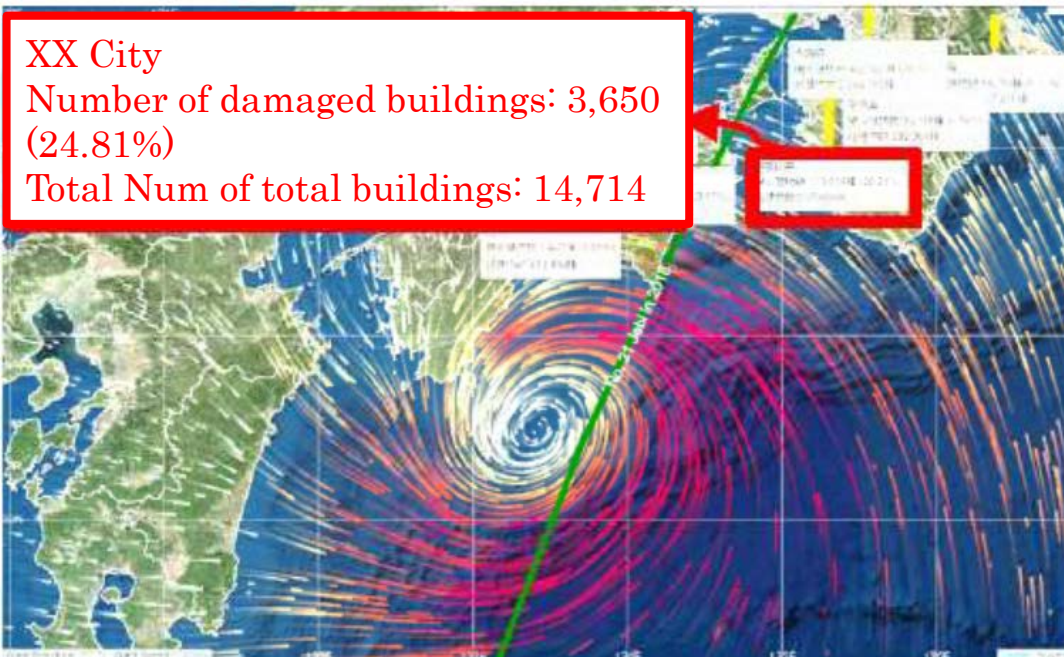
- ✓ Prompt claim settlements : minimize on-site investigation and reduce the time required for loss adjustments.
- ✓ Improved quality for services : using both on-site and satellite images, claim adjusters can make more prompt and precise decisions.

Natural Disaster Countermeasures 3

Real-time prediction



- One insurance company publicizes real-time display and prediction of the number of damaged buildings and damage rates for typhoons, heavy rains, and earthquakes.
- Future prospects can be simulated by using past records of meteorological information, including major loss records of typhoons and earthquakes, from all around the world.



- ✓ Risk mitigation : Inhabitants and municipals can use the information to reduce potential future risks and to cultivate risk awareness.
- ✓ Further study : Scholars can utilize and develop their methods through this system.

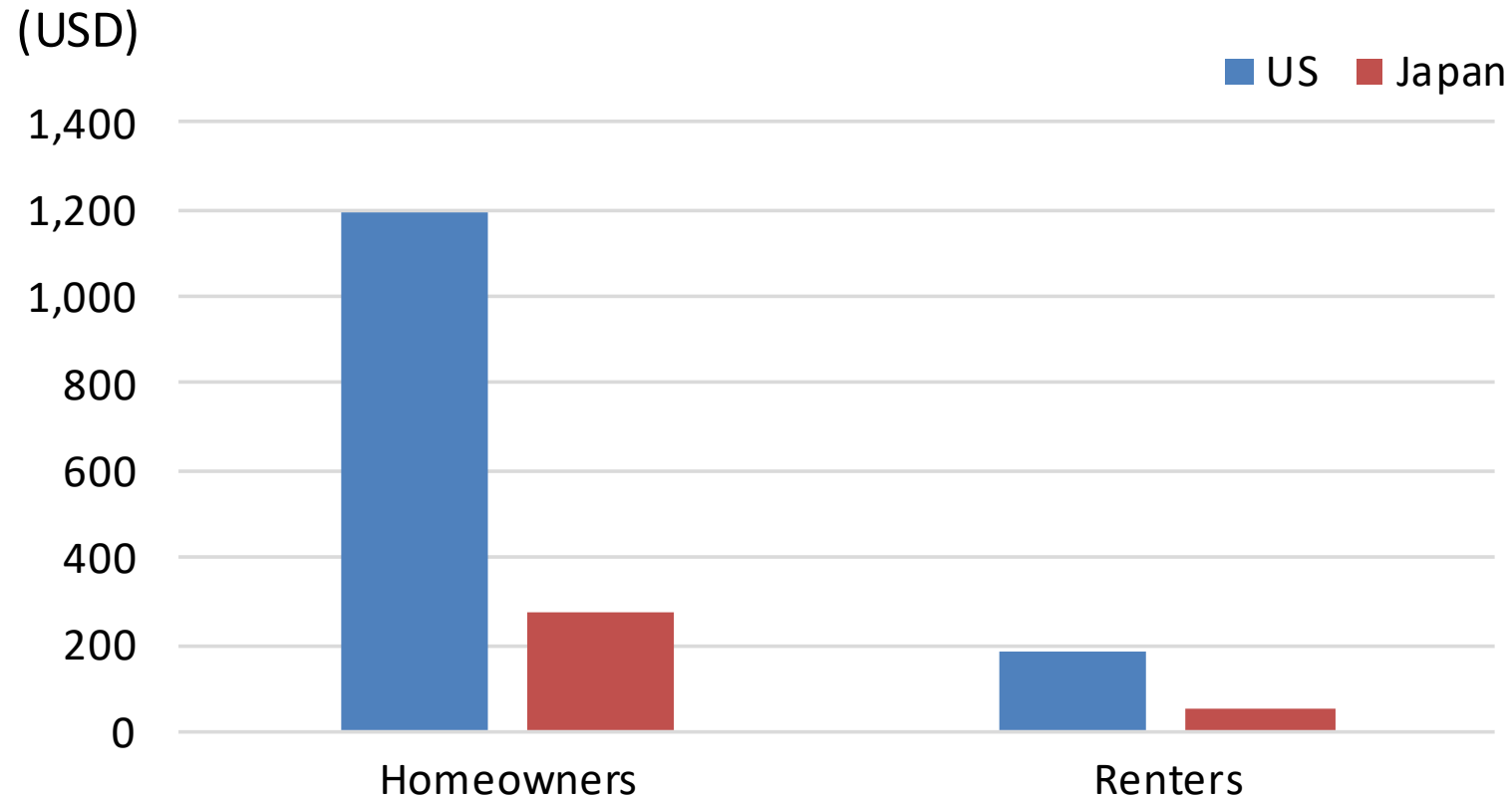
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Fire Insurance Premium in Japan















- Homeowners and Renters insurance premium in Japan is less expensive than in the U.S.

Premiums per year of Homeowners and Renters Insurance in US / Japan



- Factors below may contribute to the difference in Claim Frequency and Severity.

	Factors	U.S.	Japan
Internal factors	Size of houses (average amount of insurance coverage)	Large 	Small 
	Construction costs	High 	Medium 
	Kitchen stove safety	Medium 	Safer 
External factors	Size of hurricane / typhoon	Large 	Large 
	Frequency of low-temperature days	High 	Low 
	Humidity	Arid 	Damp 

Pricing Process of Fire Insurance



GIROJ

② General Insurance Rating Organization in Japan (GIROJ) calculates reference loss cost rates by making full use of rational techniques, including scientific and engineering approaches and actuarial science.

Reference loss cost rates

③ Provide member insurers after the regulator's examination

① Report data



Insurers

*Expense loading
(operating expenses, etc.)*

*Pure premium rates
(Insurance claims)*

⑤ Each insurer calculates the expense loading, based on its own operating expenses, commissions, etc. Regulator's examination and approval is not required but the regulator periodically monitors after the sale.

④ Each insurer makes its own adjustment to reference loss cost rates and calculates the pure premium rates. The rates are required to be notified to the regulator.

Rating Categories by Types of Buildings

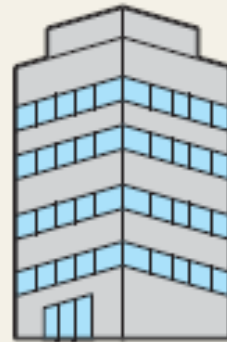


- GIROJ calculates the reference loss cost rates in four categories.
- Each insurance company underwrites the properties using these categories.



Dwelling

Buildings used only as residence



General building

Buildings not categorized into any of dwelling, factory, or warehouse, such as office buildings or schools



Factory

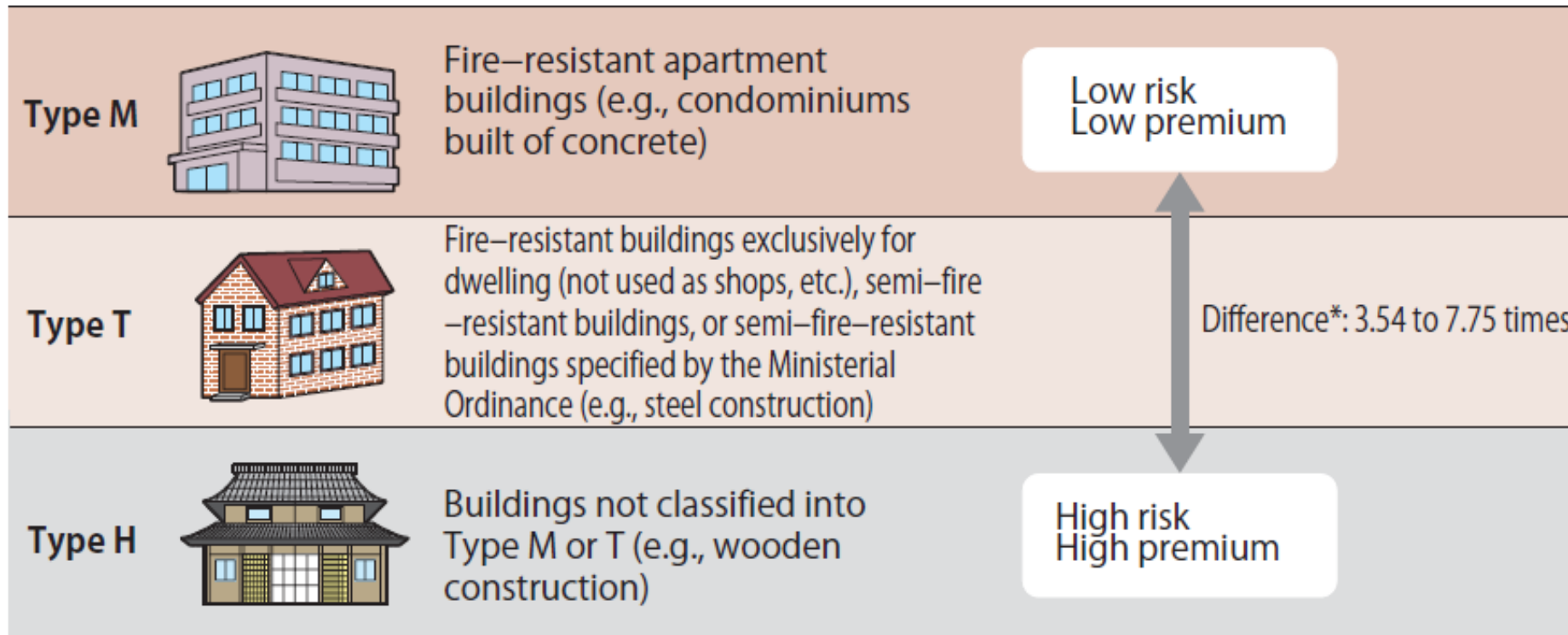
Buildings mainly used for manufacturing and processing of products by use of large amounts of power and electricity, such as food factories and chemical plants



Warehouse

Buildings used by a warehouse operator to store goods received from customers

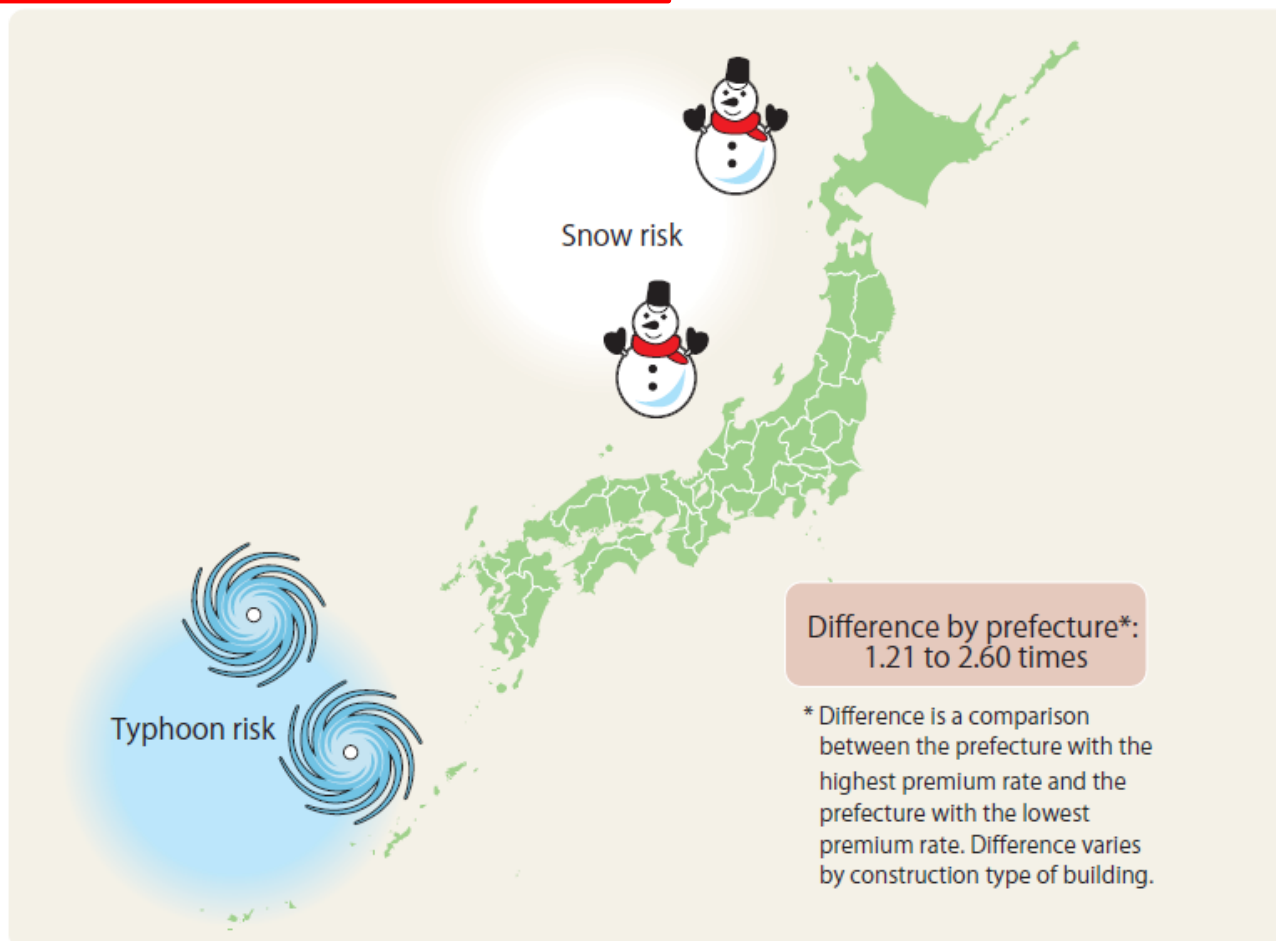
- Rate classification for dwellings in the reference loss cost rates is mainly as follows.
 - Construction type of buildings
 - Location of buildings (Prefecture)



* Difference is a comparison between construction type with the highest premium rate and the lowest premium rate. Difference varies by prefecture where the building is located.

Source: Overview of Fire Insurance and Earthquake Insurance (GIROJ)
[Translated from Japanese]

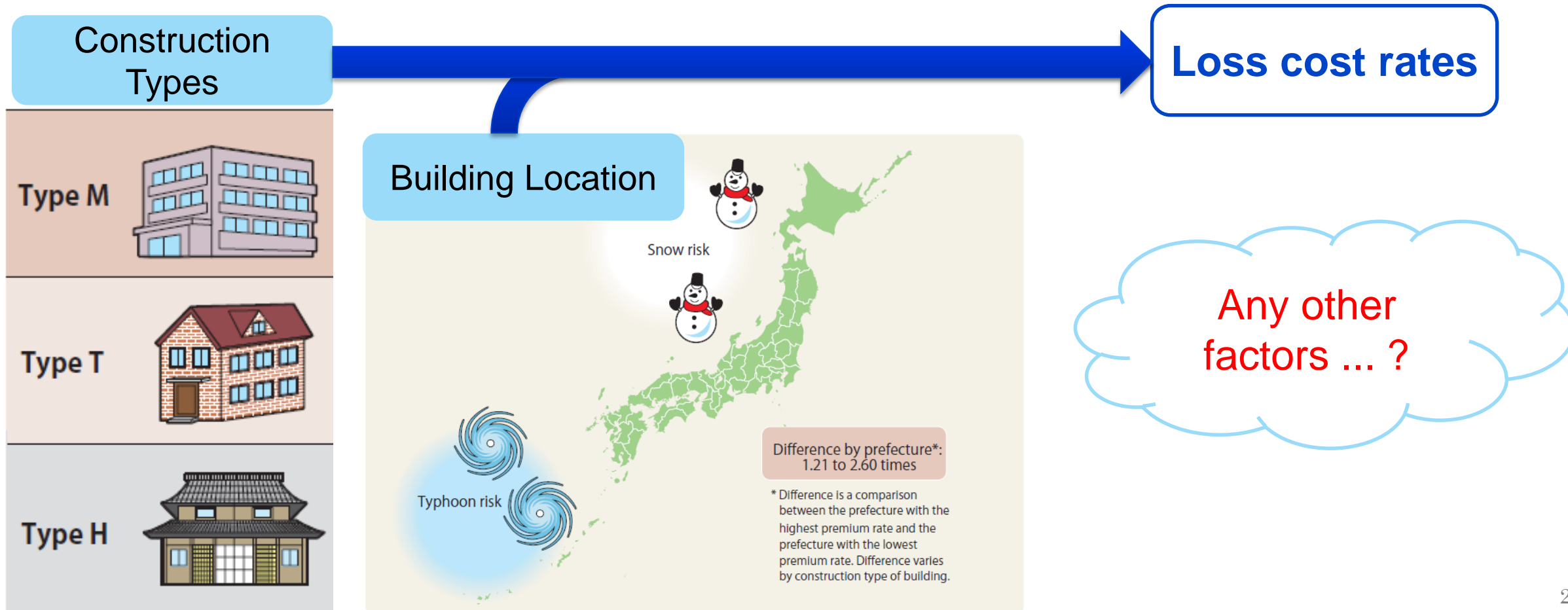
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- As for Homeowners insurance products, their loss cost rates have been determined by using only two main factors: construction types and locations.
- There are other factors that could affect the loss cost rates.



- The recent revisions regarding the reference loss cost rates for dwellings are shown in the table below.

Revision history of Reference loss cost rates for dwelling

Fiscal Year	Increase / decrease	Percentage changes on average (%)
2005	Increase 	Not disclosed
2014	Increase 	+3.5
2018	Increase 	+5.5
2019	Increase 	+4.9

Source: Announcement on Revision of Reference Loss Cost Rates for Fire Insurance (GIROJ)

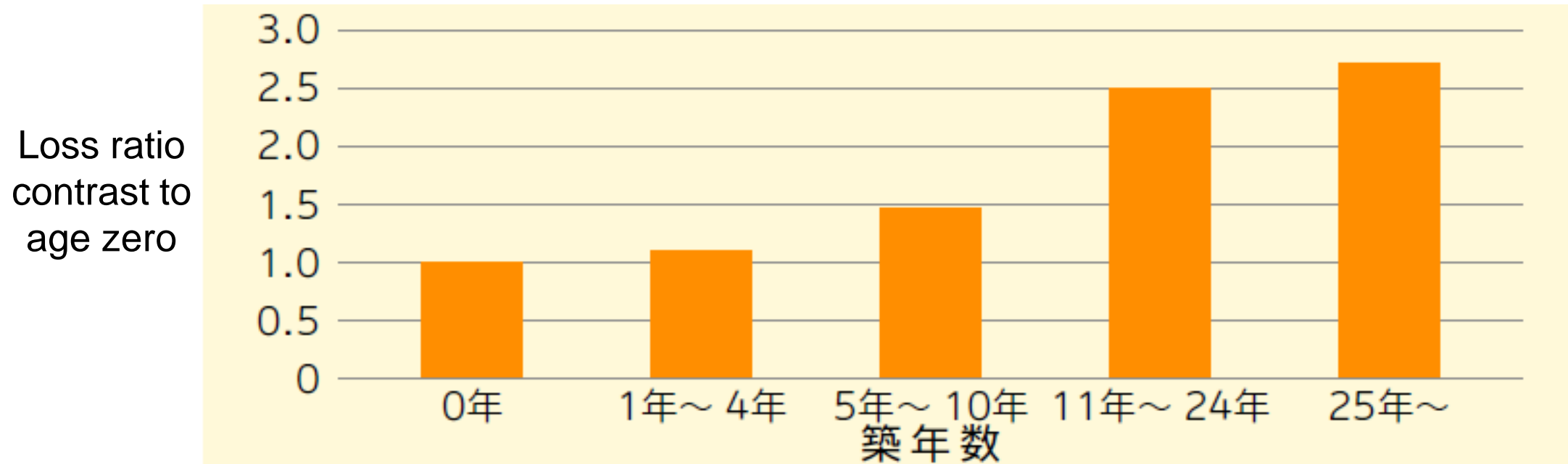
- By reflecting below factors the loss cost rates could be refined.

Building		Location	
1	Age	3	Longitude / Latitude
2	Size		<ul style="list-style-type: none">• Altitude• Distance from rivers• Soil
	<ul style="list-style-type: none">• Past payment results• Building materials• Maintenance status• Disaster prevention equipment		

These three factors are explained
in the following slides.

- Buildings have weakened over the years, so older houses have a higher loss ratio than newer ones.

Image of the relation between building age and loss ratio

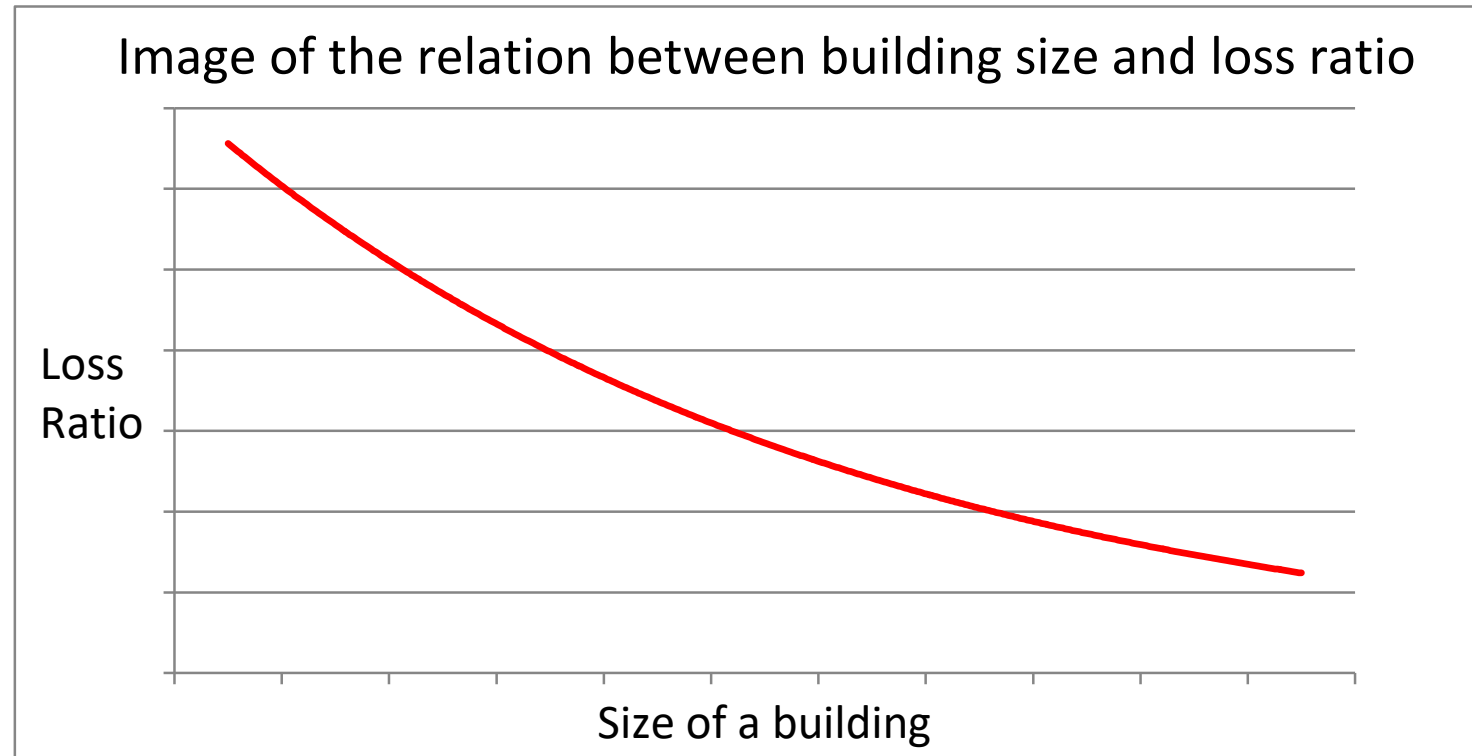


Age of a building Source: Boucher of Sompo Japan Nipponkoa

Status

This factor was introduced by many companies recently. And it was also introduced into the reference loss cost as a new factor by GIROJ in October 2019.

- The larger the size of the building, the smaller the loss ratio.



Status




Some insurance companies started to introduce a rating system based on amount of insurance coverage as a measure of size.

③ Location - flood risk



- The location of the building greatly affects its flood risk.
- However the reference loss cost rates do not take into account regional differences in flood risk.

Status | Some insurance companies started to consider reflecting the regional flood risk in more detailed through the loss cost rates after the heavy rain in 2018.

Granularity	Accuracy of risk evaluation	Implementation difficulty
 Longitude and Latitude	<ul style="list-style-type: none">• High	<ul style="list-style-type: none">• Complex
 Postal Code	<ul style="list-style-type: none">• Medium	<ul style="list-style-type: none">• Might be changed• A bit broader and not precise
 Prefecture	<ul style="list-style-type: none">• Low	<ul style="list-style-type: none">• Difficult to explain rate differential

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I Current Status of the Japanese Fire Insurance Market

- In Japan, natural disasters have resulted in significant amounts of paid claims in recent years, especially in 2018.



II Pricing Methodology in Japan

- The reference loss cost rates for dwellings are determined by two main factors: construction type and location.



III Recent Updates on the Methodology

- Japanese nonlife insurance companies started to introduce new factors (age, size, detailed location) to calculate their loss cost rates.

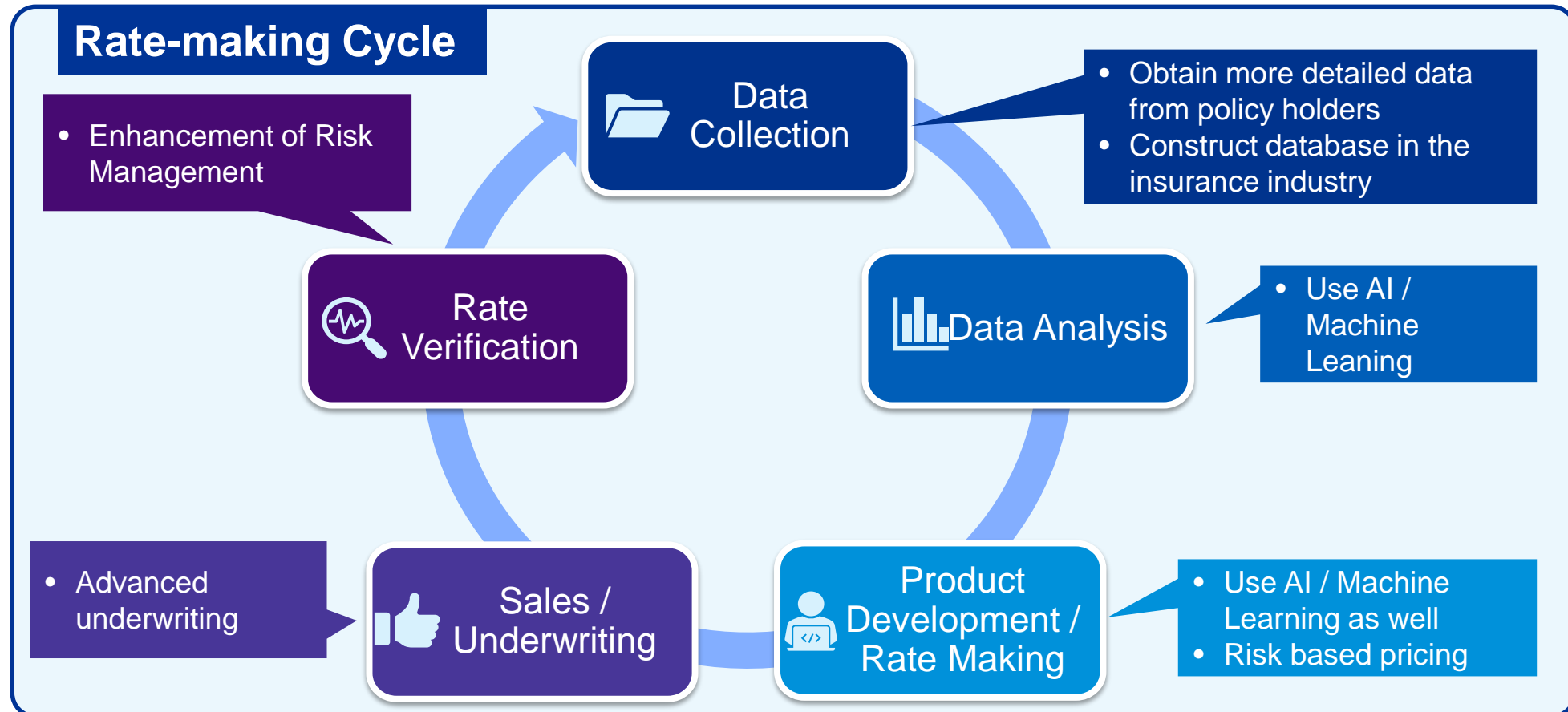


Next step ?

What Should We Do?



- Due to the increase in natural disasters, we should not only introduce the new rating factors but take other solutions into account.
- We propose the following sample solutions we could do as follows:



Thank you.
Any questions?

