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Physical Risks of Climate Change at Tokio Marine, MS&AD and SOMPO

- Catastrophic Natural Disasters and Emergency Contingency Reserve Depletion Scenarios -

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Introduction

According to the German think tank, Germanwatch, Japan was the country most affected by natural disasters in 2018.[1] In actuality, the increase in typhoons and flooding resulted in Japanese property and casualty (P&C) insurers receiving primary insurance claims amounting to 1.5 trillion yen (USD 13.6 billion, USD1=JPY110) during FY2018. Claims are expected to amount to 1 trillion in FY2019.[2]

According to the Japan Meteorological Agency (JMA), the intensity of extremely heavy rainfall in Japan in 2018 was approximately 10% higher than in the past 30 years. The JMA explains that this may be attributable to a long-term increasing trend in the amount of water vapor in the atmosphere associated with a background of long-term atmospheric warming.[3]

As climate change is expected to result in more frequent large-scale natural disasters, it is becoming clear that Japan's P&C insurers are extremely vulnerable to the physical risks of climate change. Yet despite this, adequate information on climate change risks to P&C insurers has not been disclosed.

For this paper, we conducted a rudimentary investigation into the physical risks of climate change at three Japanese leading P&C insurance groups (Tokio Marine Holdings, MS&AD Insurance Group Holdings, and Sompo Holdings). Specifically, based on changes in net insurance claims and the balance of emergency contingency reserves as a result of natural disasters during the past two years, we aim to clarify how high the amount of insurance payments for natural disasters reaches will lead to deplete emergency contingency reserves in the future.

While further in-depth analysis is needed to clarify the physical risks of climate change, we hope this paper will help stimulate discussion and advance efforts relating to this topic.

Emergency Contingency Reserve Depletion Scenarios at Three Leading Insurance Groups

Net insurance claims for natural disasters over the past three years, based on financial statements and materials from the three leading insurance groups, are compiled in Table 1. Net insurance claim is calculated by subtracting the amount recovered from reinsurance cover from the primary insurance claim. In the year ending March 2019, net insurance claims for the three groups totaled 546.3 billion yen, while in the year ending March 2020, net insurance claims are expected to be 392 billion yen.

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1 Germanwatch, Global Climate Risk Index 2020
https://germanwatch.org/en/17307

2 Reuters, "Raising insurance premiums and increasing reserves to handle over 800 billion yen in P&C claims due to large typhoons" (November 19, 2019)
https://jp.reuters.com/article/insurance-typhoon-idJPKBN1XT0ZH (Japanese)

3 Japan Meteorological Agency, "Climate Change Monitoring Report 2018" (September, 2019)
https://www.jma.go.jp/jma/en/NMHS/ccmr/ccmr2018.pdf

Table 1: Net insurance claims for natural disasters (Unit: billion yen)

	Year ending March 2018	Year ending March 2019	Year ending March 2020 (forecast)
Tokio Marine & Nichido Fire Insurance	69.4	199.9	173
Mitsui Sumitomo Insurance & Aioi Nissay Dowa Insurance	48.9	168.6	123
Sompo Japan Nipponkoa Insurance	57.1	177.8	96
Total	175.4	546.3	392

Created by JACSES based on financial statements and materials disclosed by each company

P&C insurers keep emergency contingency reserves in preparation for paying claims for catastrophic disasters, such as damage from major typhoons, which cannot be absorbed by single-year premium income. The size of such reserves has generally remained between 700 and 800 billion yen since the year ending March 2011, but as shown in Table 2, reserves have halved over the past few years – standing at 538.3 billion yen in the year ending March 2019 and at 385 billion yen in the year ending March 2020.

Table 2: Property insurance emergency contingency reserve balance and decrease in balance (Unit: billion yen)

	Year ending March 2018	Year ending March 2019	Year ending March 2020 (forecast)
Tokio Marine & Nichido Fire Insurance	362.9	239.3	140
Mitsui Sumitomo Insurance & Aioi Nissay Dowa Insurance	266.8	163.9	Unknown
Sompo Japan Nipponkoa Insurance	155.9	135.1	Unknown
Total	785.6	538.3	385
Decrease from previous year		247.3	153.3

Created by JACSES based on financial statements and materials disclosed by each company and the Nikkei article, “P&C insurance reserves halved in two years, bane of stable management” (November 19, 2019).[4]

[4] Nikkei, “P&C insurance reserves halved in two years, bane of stable management” (November 19, 2019)

Investigations into net insurance claims for natural disasters and a decrease in emergency contingency reserves (property insurance) during the past two years revealed, as shown in Table 3, that the annual drop in emergency contingency reserves (property insurance) was equivalent to roughly 40% of the net insurance claims in each year.

Table 3: Net insurance claims for natural disasters and decrease in emergency contingency reserve balance for property insurance (Unit: billion yen)

	Net insurance claims for natural disasters (A)	Decrease in emergency contingency reserve balance (B)	Percentage (B/A)
FY2018 (results)	546.3	247.3	45%
FY2019 (forecast)	392	153.3	39%
Average	469.2	200.3	42%

Created by JACSES based on financial statements and materials disclosed by each company and the Nikkei article, "P&C insurance reserves halved in two years, bane of stable management" (November 19, 2019).

The amount of claims at which the emergency contingency reserve balance for property insurance will be fully depleted, based on the trend over the past two years, is shown in Table 4. If claims amount to 916.7 billion yen, the emergency contingency reserve balance will be fully depleted within one year and if the annual amount of claims is 458.3 billion yen, the emergency contingency reserve will be fully depleted within two years. In other words, if natural disasters on the same scale as experienced in FY2018 occur for the second straight year, there will be no money left in the emergency contingency reserve.

Table 4: Level of claims at which the emergency contingency reserve balance for property insurance will be fully depleted (Unit: billion yen)

	Net insurance claims for natural disasters	Decrease in emergency contingency reserve balance
Fully depleted within one year	916.7	385
Fully depleted within two years (annual amount)	458.3	192.5

Created by JACSES based on financial statements and materials disclosed by each company and the Nikkei article, "P&C insurance reserves halved in two years, bane of stable management" (November 19, 2019).

In reality, even if insurance claims for natural disaster are paid at the above-stated level, insurers are

https://www.nikkei.com/article/DGXMZO52359910Z11C19A1EE9000/ (Japanese) expected to urgently accumulate funds by, for example, selling their assets, and thereby emergency contingency reserves are unlikely to be used up completely straightaway. Moreover, major P&C insurers have developed other P&C insurance operations (marine, accident, automobile insurance, etc.) domestically and overseas and so even if insurance claim payments reach a level at which the balance of emergency contingency reserves in domestic property insurance is zero, immediate bankruptcy is unlikely to happen.

However, property insurance as a business in its own right, will struggle to survive in the private sector as climate change becomes more acute. Property insurance serves a social purpose. In the future a semi-governmental scheme may be introduced akin to the earthquake insurance.

For this paper, our investigation covered primary insurers. Reinsurers that cover primary insurers' risks will also face serious issues. In the year ending March 2019, reinsurance claims paid to insurers by reinsurers amounted to 1.2 trillion yen, and reinsurance premiums rose 10% in April 2019.[5]

Question on P&C Insurers' Policy Coherence as Property Insurance Premiums Increases Repeatedly

In response to the sharp increase in insurance claims, insurers increased household property insurance premiums by 6-7% and corporate property insurance premiums by 4-5% in October 2019. Insurance premiums are expected to increase further, by about another 5% and 4% respectively, in January 2021.[6] This premium hike trend is likely to continue in the future as large-scale natural disasters caused by climate change happen more frequently. Insurers are also considering increasing premiums in flood-prone areas.[7] As premiums frequently increase, which imposes more burden on policyholders, P&C insurers are likely to attract more attention to their own initiatives to alleviate climate change.

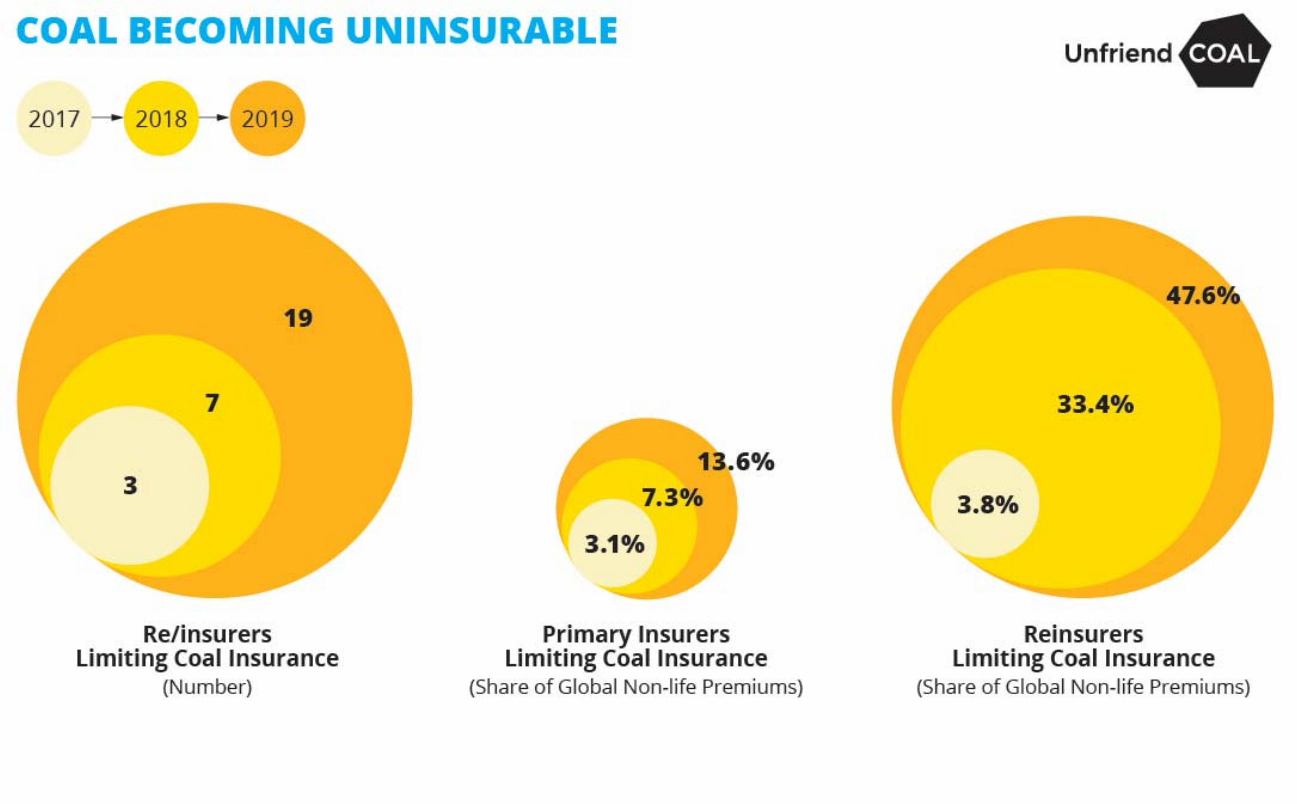
There is currently growing interest in the policy of underwriting coal-related projects. The Paris Agreement, which came into force on November 4, 2016, stipulated that the rise in global average temperature be kept well below 2°C above pre-industrial levels, and that efforts be pursued to limit the increase to 1.5°C. Climate Analytics, an international think tank, has pointed out that in order to meet the goals of the Paris Agreement, coal-fired power generation must be eliminated in developed countries by 2030, and in all

[5] Nikkei, "P&C insurance reserves halved in two years, bane of stable management" (November 19, 2019)
https://www.nikkei.com/article/DGXMZO52359910Z11C19A1EE9000/ (Japanese)
[6] Nikkei, "Corporate property insurance: burden of disasters leads to more premiums hikes in January 2021" (November 12, 2019)
https://www.nikkei.com/article/DGXMZO52073100S9A111C1MM8000/ (Japanese)
[7] The Asahi Shimbun, "P&C insurance industry considering regional difference in flood damage premiums following a series of heavy rainfall disasters" (January 28, 2019)
https://www.asahi.com/articles/ASM193Q6ZM19ULFA00B.html (Japanese)

other countries, including developing countries, by 2040.[8] In general, coal-fired power plants are expected to be operated for several decades after having been built. It is clear that the construction of new coal-fired power plants will not be consistent with the goals of the Paris Agreement given that any plant that commences operation in the future will be expected to be operated after 2040.

19 insurers, including Allianz, AXA, Swiss Re, Munich Re, Chubb and QBE, have a policy of ending or limiting underwriting of coal-related projects. These insurers accounts for 13.6% of the primary insurance market and 47.6% of the reinsurance market. As of November 2018, only seven European insurers had such a policy, but in the past year, ten more insurers, including from the USA and Australia, have established such a policy, indicating that the pace with which insurers are divesting from coal is accelerating (see Figure 1).

Fig. 1: Changes in insurance underwriting policy and market share for coal projects over the past three years (Left: number of insurers who have announced suspension of coal underwriting, center: primary insurance market share, right: reinsurance market share)



On the other hand, major Japanese P&C insurers: Tokio Marine, MS&AD, and Sompo continue to underwrite coal-related projects and do not have coal exit policies. The Unfriend Coal Campaign, an international network of environmental NGOs, published the ranking of 30 leading insurers worldwide for

[8] Climate Analytics, Coal phase-out? global and regional perspective https://climateanalytics.org/briefings/coal-phase-out/

efforts for climate change and divestment from coal. Tokio Marine, MS&AD, and Sompo ranked at the bottom due to their lack of policies (see Table 5).[9]

Table 5: Ranking scores on insurance underwriting policy of 30 leading insurers for coal projects

Rank	Insurer and its headquarters country	Score (max: ten)
1	Swiss Re (Switzerland)	4.0
2	Zurich (Switzerland)	3.6
3	AXA (France)	3.2
4	AXIS Capital (USA)	2.7
5	Generali (Italy)	2.5
6	QBE (Australia)	2.4
7	Allianz (Germany)	2.1
8	Chubb (USA), SCOR (France)	1.7
10	Hannover Re (Germany), HDI Global (Germany)	1.5
12	Aviva (UK), Munich Re (Germany)	1.1
14	Mapfre (Spain)	0.8
15	Ping An (China)	0.6
16	Lloyd's (UK), W.R. Berkley (USA), Tokio Marine (Japan), Sompo (Japan), MS&AD (Japan), Samsung FM (Korea), AIG (USA), Berkshire Hathaway (USA), FM Global (USA), Liberty Mutual (USA), Sinosure (China)	0.0
N/A	Legal & General (UK), TIAA Family (USA), Prudential (USA), MetLife (USA)	

Asking insurance policyholders to take on more burden from climate change risks while significantly contributing to exacerbating climate change by constructing new coal-fired power plants indicates a lack of a consistent policy. P&C insurers will increasingly be pressured to come up with an underwriting policy that is consistent with the long-term goals of the Paris Agreement. The same can be said for insurers' asset management operations.

Column: P&C Insurers Should Prepare for Green Swans Events

Kenji Fuma, CEO, Neural Inc.[10]

Losses and damages of property and real estate due to climate change have been increasing throughout the world. In Japan, physical risks associated with intensifying typhoons and heavy rain are now obvious. In the future, damage from flooding is expected to increase further as sea level rise proceeds.

The property and casualty (P&C) insurance industry would be the first to be influenced by such physical risks from climate change. European and American insurers and reinsurers had started to raise

[9] Unfriend Coal, "The 2019 Scorecard on Insurance Underwriting for Coal Projects was published" http://jacses.org/566/

[10] Neural Inc. CEO. Selection board member for the Japan ESG Finance Award, organized by Ministry of Environment. Signatory of the United Nations Principles for Responsible Investment (PRI). Has a Master of Liberal Arts in Sustainability from Harvard University; an MBA in Global Management from Thunderbird School of Global Management; and a Bachelor of Liberal Arts in International Relations from the University of Tokyo.

concerns about the risks of climate change since early 2010 and it would be certain that the smooth adoption of the Paris Agreement was enabled by the pressure from the global P&G industry.

Preparations for a financial crisis triggered by climate change are already being discussed as a practical matter. Not only the Task Force on Climate-related Financial Disclosures (TCFD), which is already well-known in Japan, but also the Network for Greening the Financial System (NGFS) initiative has been launched among financial authorities and central banks for the purpose of establishing effective prudential policies on climate change risks, led by the Bank of England and the Banque de France. While the Japanese government was not a founding member of the NGFS initiative, the Financial Services Agency and the Bank of Japan later became its members.

As the crisis draws closer, in January 2020, the Bank for International Settlements (BIS) named the risk of a financial crisis caused by climate change “Green Swan” after “Black Swan theory”, a concept which emerged from the 2008 financial crisis. The BIS made it clear that financial authorities should tackle this risk as a major issue head on, and differentiated Green Swans from Black Swans in three aspects. First, “there is certainty about the need for ambitious actions despite prevailing uncertainty regarding the timing and nature of impacts of climate change.” Second, “climate catastrophes are even more serious than…[the traditional] systemic financial crises.” Third, addressing climate change risks is much harder than other risks due to the complexity of its mechanism. The paper is also urging central banks to take the lead in dealing with this potentially severe crisis by involving governments and financial institutions in the process.

As mentioned above, among the broad financial sectors, the climate risks would hit P&C insurers the most. In recent years, payments of insurance claims have caused business concern in solvency margins, which is the essential anchor for insurers. That leads to the question, how much risk reinsurers could take on and whether alternative reinsurance, which sell the risks of insurance companies and reinsurance companies to institutional investors as investment products, and thereby transfer a part of the risks to institutional investors, would be able to continue to work as it does now? There is no doubt that in the future it will become more and more difficult for insurers to transfer risks.

In its Black Swan report, the BIS urges the financial industry to change its behavior by using the arcane philosophical term, “epistemological.” With the word, BIS is persuading the financial sector to change awareness and to abandon common knowledge of the past. And the most important change in awareness is to make the transition from traditional backward-looking risk calculations to forward-looking risk calculations. The BIS notes that calculations of future risks based on past statistics, which was the norm in the financial industry, will no longer function properly. This means that P&C insurers, who have been calculating insurance premium rates based on mathematics with the past statistics, will need to thoroughly renew the way to assess risks.

The success of P&C insurers in the future will depend on how well they would be able to manage risks in both insurance underwriting and investment. In Japan, whereas life insurers start highly integrating ESG into investment, P&C insurers are seemingly still swamped with conventional financial theories. I would like to expect that P&C insurers, who will be more impacted by climate change than life insurers, will take bold action in the face of these risks.

Recommendations to Insurers and the Financial Services Agency

Urgent action is needed before a crisis occurs in P&C insurers' property insurance business. Japan Center for a Sustainable Environment and Society (JACSES) recommends that P&C insurers and the Financial Services Agency, their regulatory agency, take the following actions:

1. **Enhance disclosure of climate change risk information:** A framework to evaluate and disclose the physical risks of climate change to P&C insurers should be developed as uniform criteria, based on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

2. **Strengthen P&C insurer resilience:** It is vital to strengthen the resilience of P&C insurers to large-scale natural disasters. To secure a stable emergency contingency reserve, it is necessary to raise the annual reserve rate as well as the upper limit on the balance in the emergency contingency reserve (reversal guarantee rate).

3. **Set premiums based on physical risks associated with climate change:** The physical risks associated with climate change should be considered to set premiums when underwriting insurance. Raising premiums in areas prone to physical risks such as typhoons and flooding is unavoidable.

4. **Be consistent with the long-term goals of the Paris Agreement when underwriting insurance and managing assets:** Insurers should be consistent with the long-term goals of the Paris Agreement when underwriting insurance and managing assets. In particular, insurers should stop underwriting for new coal-fired power projects that greatly retrogress from the long-term goals of the Paris Agreement, and should withdraw from stock and bond investments in companies planning to construct more coal-fired power plants.

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