GAS Journal of Economics and Business Management (GASJEBM)

OPEN ACCESS

Volume 1, Issue 4, 2024 Journal Homepage: https://gaspublishers.com/gasjebm-home/ ISSN: 3048-782X

The Economic Consequences of the Risk-Reward of Collateral due to Global Warming and the Avalanche of Natural Catastrophes: The Potential Aftermath of the Annihilation of the Market Capitalization of Insurers, Reinsurers, and Banks

David Allen Dodson

E Spread Limited

Received: 15.11.2024 | **Accepted:** 17.11.2024 | **Published:** 28.11.2024

***Corresponding Author:** David Allen Dodson

DOI: 10.5281/zenodo.14237943

Abstract **Meta-analysis Article**

This paper delves into how insurers, reinsurers, and banking institutions must adapt their risk-reward assumption methodologies. This is in response to the current and future disproportionate weather occurrences caused by Global Warming and The Avalanche of Natural Catastrophes. The combined repercussions of these intertwined cataclysmic factors can significantly impact the financial stability of collateral, such as insurance policies for consumers offered by insurers and backed by reinsurers to safeguard loans assumed by banking institutions.

Keywords: Avalanche, Butterfly Effect, Catastrophe, Closed Ge0spae, Collateral, Criticality, Earthquake, Electromagnetic Waves, Flood, Global Warming, Hurricane, Open Ge0space, Risk-Reward, Tornado

1.INTRODUCTION

Identifying the Problem
Economic Scaling of Collateral

Global Warming and the Avalanche of Catastrophes

Global Warming (GW) and The Avalanche of Natural Catastrophes (AoC) are complex catastrophic principles that require our understanding. The AoC, a composite integration of diverse greenhouse causes, metaphorically speaking, results from humanity's inventions and nature's generated calamities. The potential convergence of these catastrophic events poses a significant and genuine threat to the qualitative and quantitative risk-reward of catastrophe modeling capabilities presently employed by insurance and reinsurance. A recent surge in significant weather and geological events has brought these issues of overpopulation, global warming, and the impact of digital technologies to the forefront of what causes catastrophic events. This avalanche of natural catastrophes, such as floods and droughts, earthquakes, hurricanes, and tornadoes, underscores the pressing need to thoroughly reevaluate the current methodologies employed by insurers, reinsurers, and banks. Failure to do so could lead to severe economic instability. Case in point are the named hurricanes Helene and Milton, generating over $50 billion of widespread damage. With its unique characteristic of dumping over 40 trillion gallons of water, Helene generated widespread flooding over many states, underscoring the need for innovative solutions to address such unique attributes.

The floods in Spain, snow falling in the Saudi Arabian deserts, and floods in the Sahara Desert represent the continuation of the avalanche of catastrophes.

Factors of Avalanche of Catastrophes and Global Warming

The intertwining factors of an avalanche of catastrophes and global warming are

1. Global Population Growth.
2. Real Property Density.
3. Increased Land Occupation.
4. The Pivotal Role of Technological Advancements in Global Warming. Technological advancements, such as motor vehicles, agriculture, oil, and gas, play a significant role in global warming. While these advancements have improved our lives, they also contribute to the emission of greenhouse gases, a significant cause of global warming.

5. Nomadic Wireless Apparatuses, which refer to portable electronic devices like cell phones and GPS systems, also contribute to global warming. The production and use of these devices require significant energy, much of which comes from fossil fuels, a primary source of greenhouse gas emissions, and the impact of the immeasurable amount of electromagnetic waves transversing back and forth from global positioning satellites.
6. The Alarming Escalation of Natural Events. Natural Events like earthquakes, floods, hurricanes, and tornadoes are not just happening; they are becoming more frequent, escalating the gravity of the situation.

The consequence of these two components merging will have an economic impact globally on banks' ability to offer loans based on the borrower's collateral sharing the risk. The foundation of insurance and reinsurance is becoming challenged to meet banks' collateral requirements.

Formulaic Layers

AoC and GW, with their financially disruptive potential, will propel the scaling of these intertwined monetary partners' risk-reward collateral, known as a promise in the guise of policyholder surplus or market capital. Inclusive of the AoC is the butterfly effect, a mathematical inspiration for a butterfly flapping its wings and sending electromagnetic waves generated from nomadic wireless apparatus[1], generating atmospheric ripples, generating climatic discord, and contributing to global warming—poetic-sounding but bringing forth the fractal nature of chaos. Now add the natural catastrophic events of earthquakes, firestorms, hurricanes, ice storms, and tornadoes, and we have an unbridled force.

Risk Mitigation

The result of any capitalistic assumption of risk can be stated, as Dr. Jim McGrath writes in The Little Book of Big Decision Making.

*Risk theory provides frameworks that can contribute to mitigating risks, coming to grips with uncertainty, and offering ways to organize society in such a way that the unexpected and unknown can be anticipated or at least dealt with in a reasonable and ethically acceptable way.**[2]***

Given the potential consequences of inaction, the lag in modifying risk-reward models utilized by banks, insurers, and reinsurers brings into question the probability outcomes that project the fiscal impact of global warming and the growing avalanche of catastrophes. The changing catastrophic components defining the planet necessitate an urgent adjustment of risk-reward models to outsource, develop new products, and revamp existing models. This is crucial to reverse the negative risk-reward balance and offset the impacts of GW and AoC, as illustrated in the following graph[3].

Body

Defining the Problem

Matrix

The pressing and problematic issue of global warming, coupled with the increasing frequency of natural catastrophic events such as hurricanes, earthquakes, and wildfires, is positioned to significantly impact the qualitative and quantitative risk-reward of collateral offered by insurers and backed by reinsurers to loans accepted by banking establishments.

The matrix below offers a comprehensive examination of the term' economic scaling of collateral,' a risk-reward concept that encapsulates the significant financial ramifications of the security, the collateral, submitted, backed, and accepted by the various entities involved in its utilization:

1. The insured, the consumer of automobiles and commercial and residential properties, will most likely need *insurance* and a *loan*. The insured will agree to (a) a deductible on the insurance coverage and (b) a down payment for purchasing the automobile or commercial or residential property.

2. The insurer will request a *deductible* and *premium* for the risk from the insured.

3. The reinsurer, a key player in this process, ensures the insurer for per-risk or catastrophic hazards. The reinsurance contract requires a sizeable *retention* (deductible) and *premium* charge, which reflects a pro-rata or excess assumption of the insurer's defined policy portfolio. The banks will deliver a loan as long as their customer, the consumer, and the insured have made an acceptable down payment and have insurance in place.

Cumulative Impact
The Past and Present

Over the last 200 years, the cumulative impact of global warming and the increasing number and magnitude of diverse types of natural disasters (e.g., earthquakes, firestorms, flooding, ice storms, hurricanes, and tornadoes) have generated considerable unforeseen financial damage due to humanity's changing topography and rising use of fossil fuels, electricity demands of the new technologies, human population growth and corresponding geographical density of human properties. The GW and AoC losses will transcend and modify the explanatory power of insurers' and reinsurers' manipulation of their predictive risk-reward catastrophe modeling. Therefore, the market capital of insurers and reinsurers will become vulnerable to the perfect storm of the avalanche of marginal and

significant calamities occurring within a calendar or overlapping years. Over the past several years, the unprecedented firestorms in California and Canada, such as the 2018 Camp Fire in California and the 2016 Fort McMurray wildfire in Canada, have economically impacted insurance availability and cost.

Sample of Result of GW and an AoC

A sample of the combined impact of GW and an AoC are the firestorms that have ravaged California and Canada in recent years and are a stark reminder of the intricate risk-reward web of dependencies in the insurance, reinsurance, and banking sectors. These events have led to significant insurers halting further business for California's automobiles, commercial, and residential properties. The implications for the consumer/insured are profound. When seeking a loan from a banking institution, the consumer/insured relies on the collateral, i.e., coverage known as an insurance policy provided by insurers, who depend on reinsurers' backing. This 'house of cards' scenario illustrates that without the assurance of insurance or reinsurance, a loan for an automobile, commercial property, or residential property, without the collateral of an insurance policy, will not be granted by the bank.

Trend

The trend of disastrous events occurring in larger numbers and sizes each year is a significant societal concern. The invention of numbers by humankind has a pivotal role in our risk-reward models, particularly those associated with catastrophic events. The existing quantitative models do not have explanatory power, raising important questions: Are the liability-to-capital ratios adequate for consumers and entities? Moreover, what are the implications if GW and AoC incapacitate capital? The hierarchical chart below outlines the domain as the Avalanche of Catastrophes (AOC), with sub-features including global warming, earthquakes, floods, hurricanes, and tornadoes.

These cataclysmic sub-features in the collective, not including the size and duration of their devastation, will quickly invalidate the existing risk-reward catastrophe models used by insurers and reinsurers.

Summing Effect

The cumulative effect of global warming and a surge of catastrophes, when experienced within a single calendar year or overlapping years, could result in a scenario where the availability of insurance coverage for the consumer/insured population is significantly reduced. This potential reduction in coverage is a key concern for insurance professionals, policymakers, and individuals interested in climate change and its impact on insurance. The 'perfect' mega-storm, a situation that has yet to occur within a calendar year, represents a potential catastrophe of unprecedented severity. Consider the thirteen catastrophic [1] events listed below and imagine the implications if they were to occur in a single year.

Cost Fatalities Event Type Year
Original $Billion $Billion (2023 unless otherwise stated)

Cost		Fatalities	Event	Type	Year	
Original $Billion	$Billion (2023 unless otherwise stated)					
$360	$488	19,759	2011 Tohoku earthquake and tsunami + Fukushima nuclear disaster	Undersea Megathrust Earthquake, Tsunami, Contamination (Radioactive)	2011	Japan
$197	$393.90	5,502 – 6,434	Great Hanshin earthquake	Earthquake	1995	Japan
$163.60	$163.60	59,259 - 62,013	2023 Turkey–Syria earthquake	Earthquake	2023	Turkey

$148	$209	87,587	2008 Sichuan earthquake	Earthquake	2008	China
$125	$195	1,245 – 1,836	Hurricane Katrina	Tropical cyclone	2005	USA
$125	$155	107	Hurricane Harvey	Tropical cyclone	2017	USA
$113	$127	161	Hurricane Ian	Tropical cyclone	2022	USA
$105	$124	6,511	2020 South Asian floods	Flood	2020	Pakistan
$91.60	$114	3,057 – 8,498[14]	Hurricane Maria	Tropical cyclone	2017	USA
$75	$84	107	Hurricane Ida	Tropical cyclone	2021	USA
$70	$82	451	2019–20 Australian bushfire season	Wildfire	2019-20	Australia
$68.70	$91	233	Hurricane Sandy	Tropical cyclone	2012	USA
$64.80	$81	134	Hurricane Irma	Tropical cyclone	2017	USA
$1,707	$2,308					

Source: List of disasters by cost - Wikipedia

Sample Scenario

A sample scenario of an AoC occurring in a calendar year is a) Earthquake (California, magnitude 7.25, San Francisco Bay) + b) Earthquake (California, magnitude 7.0, Los Angeles), + c) Hurricane (Florida, Miami, Category 4) + d) Tornado (Texas, Dallas, F-5) + e) Earthquake (Japan, Magnitude 7.25, Tokyo) + f) Flooding (United Kingdom) + g) Global Warming (firestorms, Australia, and Canada). The cumulative insurance loss exceeds $3.0 trillion.

Forecast

The significance of this exercise in forecasting the perfect storm, the domino effect, is that nature's edges and humankind's calamities are quickly approaching the outer boundary of the explanatory power of society's mathematical inventions of capital to counter risk. Over 200 years ago, when the world population was approximately 990 million, the world's economic risk was minuscule compared to today's massive threat of global warming by man's inventions and nature's cataclysm due to overpopulation, commercial and residential density, and lack of spread. The financial risk-reward practices of the 21st century require modification. The current financial methodologies are for the starry-eyed users who somehow believe they have more extraordinary powers than nature or generate reparations for man's follies, which they do not. God does not play dice with the universe, but humankind and nature as doppelgangers do until they meet head-on. The potential consequences of not understanding the flaws in David Xi's Gaussian Copula model are dire, as it is a prime example of the failure of statistics to address collateralized debt obligations. This debacle of modeling led to the 2008 fiscal crisis, underscoring the need for a more comprehensive approach by insurers, reinsurers, and banks.

Manifestation of Human Population and Mankind's Nomadic Instruments

World Population

The world population in 1951 was 2.5 billion. Fast-forward to 2023, and the world population is over 8 billion. The invention of computers, nomadic apparatuses, and advancement in statistical methods have given the illusion that these risk-reward tools match nature's edge and man's influence on global warming. Nature did not create the human species'

overpopulation, the density of humans living closely together, or humankind's inventions. The next five years are critical and urgent to prevent societal fallout from the failure of the risk-reward methods presently employed by insurers, reinsurers, and banks.

The consequences of human overpopulation are stark. It has led to a global strain on the demand and supply of foodstuffs, water, gas, and electric fuel sources, and a need for preparation for an AoC event. In simpler terms, the very foundation of the three intertwined collateral-driven mechanisms, insurance, reinsurance, and banking, is now at a critical crossroads.[4]

Global Warming

The chaotic consequence of transitioning environmental warming variables such as carbon emissions from automobiles, animal life, airplanes, cloud technology, cryptocurrency via blockchain technology, and electromagnetic wave activity generated by nomadic wireless apparatuses are revving global temperatures and shifting weather patterns. Although not proven at this point, the impact of electromagnetic waves generated by nomadic instruments, similar to butterflies flapping their wings, causes the opening and closing of the ether from transmitting waves through the atmosphere in limitless directions, disrupting known atmospheric movements that spawn catastrophic weather outliers. These vibrating electromagnetic waves of binary code separate the ether from one nomadic wireless apparatus to another. The ether is the massive body of atoms and molecules that enable electromagnetic waves to connect globally from one mobile instrument to another. The imperceptible amount of electromagnetic pulses emitted into the ether resembles an incalculable gathering of butterflies flapping their wings upwards and downwards by seven billion participants using some wireless apparatus on Earth. The calculation of electromagnetic waves is immeasurable. This electromagnetic digit play will become the most extensive ever generated by humankind. Think of the clapping effect of the ether opening and closing by the movement of electromagnetic waves. The consequence of this movement is that the ether's air streams begin to exhibit unanticipated patterns, resulting in many random directions, such as altering known historical recorded weather patterns. It was 55 degrees in Quebec City, Canada, in the middle of December of 2023! Today's risk-reward method underscores the need for further research and discussion.

Avalanche of Natural Catastrophes Principle Human Populations and Collateral Sliding Scale

The Avalanche of Catastrophes Theory, a concept of profound complexity, delves into the metaphorical release of various greenhouse butterfly modifications of weather patterns by man's inventions. With its intricate combination of weather phenomena and nature and their potential to combine into a series of events within a calendar year, this theory is challenging yet essential for the qualitative and quantitative risk-reward modeling capabilities of insurance and reinsurance companies. This understanding is key to protecting the policyholder surplus, the lifeblood of banking institutions.

The Cluster of Natural Catastrophes

The Avalanche of Catastrophes principle is a cluster of natural minor and mega-catastrophic events occurring during a calendar year or overlapping years. The possibility of many devastating natural events occurring and affecting the modeling and capital base of insurers and catastrophe reinsurers within a calendar year has dramatically increased due to

1. the rising valuation of residential and commercial properties
2. decreasing land mass occupied by residential and commercial properties
3. changing moral and morale hazards, and
4. an acceleration of global warming.

Addressing the complex interplay of the above-mentioned variables is a formidable task. It requires more than just number crunching; it necessitates a deep understanding of the fractal significances. These fractals, each with their unique contribution, must be carefully weighed and ranked in order according to their solution value. This process presents a fascinating challenge that underscores the intricacy of the Avalanche of Natural Catastrophes.

1. The first factor is the rising costs of building and labor.
2. The second fractal is the density of properties within a specific geo-space.
3. The third fractal is the moral morale hazards of insureds and
4. The last factor is global warming's impact on a global basis.

Recognition of density propels the economic value of rising labor and property costs. These two variables influence the moral and moral behaviors of the insuring public financially impacted by artificial global warming generated by man and an avalanche of natural catastrophes.

Avalanche of Natural Catastrophes' Impact on Methodologies

For insurers and reinsurers, because of the intervening variables of global warming coupled with an AoC, the problematic disposition of managing and modulating

catastrophe aggregates for residential and commercial property calls for an evolution in methods for generating the spread of risk. The emphasis centers attention on the insurance and reinsurance mechanisms employed and their shortfalls in pricing and controlling the assumption of catastrophe liability locally and globally.

Furthermore, the emergence of an AoC of minor and mega-catastrophic events generated by global warming is occurring more frequently, and natural events (e.g., earthquakes, flooding, landslides, snowstorms, and tornadoes) at a faster rate, as can be seen in 2023 throughout North America[10], Europe, the Philippines, New Zealand, Syria, South Africa, Turkey, and the United Kingdom.

Sliding Collateral Vulnerability

One of *the most significant financial risk-reward collateral vulnerabilities*, closely tied to an AoC, is the recent and alarming business decision of major automobile insurers to exit California. These insurers have cited the overwhelming claim payments for accidents, which have far exceeded the risk premium collected, as the primary reason for their departure. Moreover, their withdrawal from the private passenger automobile market fails to acknowledge the combined effect of the high frequency of losses coupled with a potential mega earthquake or firestorms, an AoC of losses that could potentially lead to their insolvency. This situation presents a density variable, with too many automobiles within a limited traveling space, a clear indication of overpopulation and the failure of urban planning.

It is important to note that neither the insurer nor the reinsurer is in a position to influence population dynamics or urban planning. As a result, these entities must modify their risk-reward assumption techniques to align with these uncontrollable factors.

Foundational Leakage of Collateral

The insurance capacity to deliver policies for automobiles, commercial, and residential properties as collateral to and for loans from banks is beginning to show signs of failing to address the limits of humanity's population growth and demand. In other words, the public's demand for insurance exceeds the supply. If we focus on the capitalization of the top five insurers and reinsurers as the foundation of the collateral market for banks and compare the sum of the gross liabilities of the insurance population of automobiles, commercial and residential properties … there is a significant imbalance of market capital to collateral demands of the insuring public. The imbalance of demand to supply calls for immediate action or procedure changes to prevent potential societal fallout.

The sample graph below illustrates the significant gap between insurance capacity and a growing pool of liabilities that do not include commercial automobile, general liability, Directors and Officers, and Life, to name a few of the available insurance coverages. Should we be concerned or ignore the inevitable?

Ranking Reinsurance Company Name Gross Non-Life Only Reinsurance Premiums Written Net Non-Life Only Reinsurance Premiums Written Shareholders Funds (2)

Rank	Reinsurer	GWP	NWP	GNP (billions)	NWP (billions)	Policyholders' Surplus (billions)
1	Munich Reinsurance Company	$51,331	$48,550	$36,729	$35,290	$22,638
2	Swiss Re Ltd.	$39,749	$37,302	$23,763	$22,826	$12,809
3	Hannover Rück S.E. 4	$35,528	$29,672	$25,884	$21,637	$9,339
5	Berkshire Hathaway Inc.	$22,147	$22,147	$16,962	$16,962	$480,617
6	SCOR S.E.	$21,068	$17,055	$10,695	$8,782	$5,481
7	Lloyd's	$18,533	$14,162	$18,533	$14,162	$47,766
8	Everest Re Group Ltd.	$9,316	$8,983	$9,316	$8,983	$8,441
9	Renaissance Re Holdings Ltd.	$9,214	$7,196	$9,214	$7,196	$9,111
10	PartnerRe Ltd.	$8,689	$7,544	$7,015	$5,899	$6,288
Totals				**$158,111**	**$141,737**	**$602,490**

Totals $158,111 $141,737 $602,490

Rank Insurer Written Premiums (billions)

Rank	Insurer	Written Premiums (billions)
1	State Farm	77.59
2	Berkshire Hataway	73.09
3	Liberty Mutual	71.84
4	Progressive	52.34
5	Allstate	50.31
Totals		**325.17**

Ranking Bank Assets (trillions) Market Capitalization (billions)

Ranking	Bank	Assets (trillions)	Market Capitalization (billions)
1	Chase	3.38	555.74
2	Bank of America	2.45	297.47
3	Wells Fargo	1.7	209.75
4	Citibank	1.68	119.51
5	U.S. Bank	0.657	64.14
6	PNC	0.554	62.13
7	Goldman Sachs Bank	0.538	427.57
8	Truist Bank	0.535	51.07
9	Capital One	0.469	55.61
10	TD	0.367	104.99
Totals		**12.33**	**1947.98**

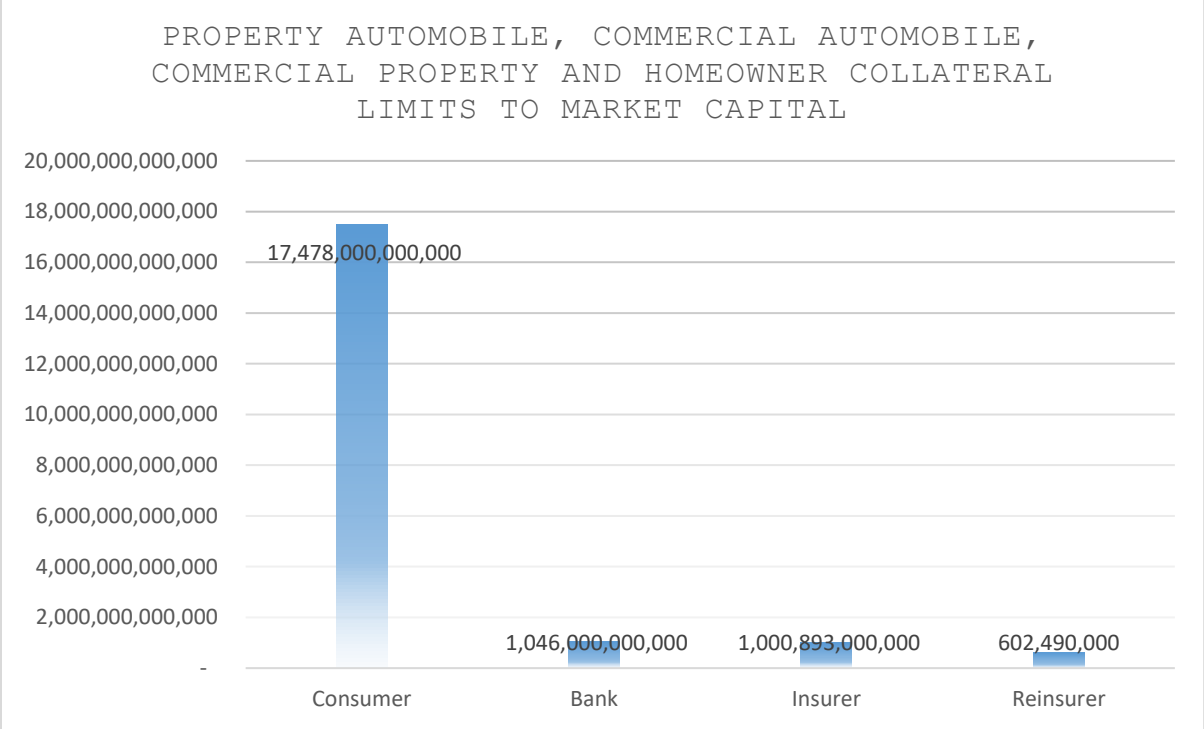
Rank Reinsurer GWP NWP GNP (billions) NWP (billions) Policyholders' Surplus (billions)

Rank	Reinsurer	GWP	NWP	GNP (billions)	NWP (billions)	Policyholders' Surplus (billions)
1	Munich Reinsurance Company	$51,331	$48,550	$36,729	$35,290	$22,638
2	Swiss Re Ltd.	$39,749	$37,302	$23,763	$22,826	$12,809
3	Hannover Rück S.E. 4	$35,528	$29,672	$25,884	$21,637	$9,339
5	Berkshire Hathaway Inc.	$22,147	$22,147	$16,962	$16,962	$480,617
6	SCOR S.E.	$21,068	$17,055	$10,695	$8,782	$5,481
7	Lloyd's	$18,533	$14,162	$18,533	$14,162	$47,766
8	Everest Re Group Ltd.	$9,316	$8,983	$9,316	$8,983	$8,441
9	Renaissance Re Holdings Ltd.	$9,214	$7,196	$9,214	$7,196	$9,111
10	PartnerRe Ltd.	$8,689	$7,544	$7,015	$5,899	$6,288
Totals				**$158,111**	**$141,737**	**$602,490**

Player Collateral Limits versus Market Capital

Player	Collateral Limits versus Market Capital
Consumer	17,478,000,000,000
Bank	1,046,000,000,000
Insurer	843,630,000
Reinsurer	602,490,000

Population Player Value



Population (Million)	Player USA	Value (Trillions)
na	Commercial	8.85
na	Auto	5.08
na	All Property	20.70
Sum		**34.63**
4	Banks	1.046
5	Insurers	1.001
5	Reinsurers	0.624
Sum		**2.71**

CRE-By-The-Numbers.pdf (rer.org)

Rank Insurer Written Premiums (billions)
1 State Farm 77.59
2 Berkshire Hataway 73.09
3 Liberty Mutual 71.84
4 Progressive 52.34
5 Allstate 50.31
Totals 325.17
Top USA Banks
1 JPMorgan Chase New York, USA $554.93
2 Bank of America North Carolina, USA $284.14

4 Wells Fargo California, USA $206.66
9 Morgan Stanley New York, USA $143.83
The banks, insurers, and reinsurers must prepare to deal with the uncertainty of global warming scenarios and the already growing avalanche of catastrophes. The potential consequences of inaction are stark, as illustrated in the following graph. Survival of these entities must urgently outsource, develop new products, and revamp existing models to reverse the negative risk-reward balance and offset the impacts of GW and AoC. The idea of AI as a solution is incomplete if it does not account for overpopulation and the density of exposures in a limited geographical space.[5],[6]

Open and Closed Assumption of Policy Portfolio
The statistical probability, when calculated for quota share or excess property catastrophe, is established on (a) an *unrestricted insurance policy* population assumption (UIP) that is not limited or (b) a *specific insurance policy* population (SIP) that is restricted to size.
Open
Unrestricted Insurance Population (UIP) necessitates a firm reliance on actuarial modeling, a complex process that involves intricate calculations to define exceedance probability curves linked to event loss tables. This modeling is crucial as it forms the basis for the reinsurer's premium charge to the insurer, a charge that is already escalating due to global warming, and the increased likelihood of an AoC, the standard deviation around the mean becomes more consequential, amplifying the downward movement of the reward-risk ratio. With its lack of quantitative boundaries, this qualification is because the policy population is subject to modulation of *non-renewals* and *new business* over the 12-month contract period between the insurer and reinsurer.
Closed versus Open
The specific insurance policy (SIP) calculation mirrors UIL's and has significant implications. For instance, the calculated catastrophe premium for a finite/closed policy portfolio will have a tighter standard deviation around the mean than an open portfolio. The constraint is that the closed policy population cannot increase; it only decreases through non-renewals. To illustrate, at the commencement of the contract period, January 01, 2023, there were 535,250 insurance policies. However, when the contract concludes on December 31, 2023, 470,000 insurance policies remain, indicating a decrease of 65,250 non-renewals in the policy population.
The illustration below provides an overview of an assumption of an insurance policy portfolio for a 12-month excess catastrophe contract. The orange space represents all insurance policies used to calculate ultimate loss by return period. The green space represents new policies and loci written during the 12 months. This hidden exposure (green space) changes the shape of the original policy portfolio.
Figure 6 The above graph uses a sand pile image to portray the transformation from open (green) to closed (orange) ge0spaces applicable to residential and commercial properties. The above sand pile grows until there is an avalanche effect, a supercritical event. In other words, what historically is a 1 in a thousand-year event becomes a smaller ratio … 1 in a 100-year event to a 1 in 10-year event. Consider the first period of 1930 as the first grain, non-critical and highly predictable. The second grain in 1940 was non-critical and very predictable, and until 1980, the sand pile kept getting higher and higher. By 2010 and beyond, the last grain is reaching a supercritical level. The statistical methods of predictability will require significant standard deviations around the means to capture any reasonable loss projection. The question is, "Are there better ways of managing capital to aggregate risk assumption?"

2.CONCLUSION

Solutions
Risk-Reward
The existing risk-reward model employed by insurance companies and reinsurance companies, although on the surface, appears to have low risk-reward returns. However, the reality is different. These two insurance bodies are taking a high-risk-reward position. For instance, their actuarial pricing has been moderately successful in paying losses and covering operating expenses with investment gains, generating profits and gains in their surplus capital. However, the volatility of the equities and bond market, not to mention currency, can lead to significant losses, as seen in the example of an AoC.

Avalanche of Catastrophes Event

An Avalanche of Natural Catastrophes (AoC) event could materially reduce the capital base of insurers and reinsurers to provide primary and reinsurance capacity for residential and commercial property exposures. For example, the 2022 catastrophic occurrence that smashed Florida was a category four hurricane named Ian, a single regional mega event. The economic fallout from this hurricane is estimated to be over $112.9 billion[7], and the insured loss was over $12.5 billion[8], with six insurers declaring insolvency and the drawdown on Florida State's internal excess catastrophe limits linked to bondholders. This hurricane is a single AoC event.
*Risk-return tradeoff states that the potential return rises with an increase in risk. Using this principle, individuals associate low levels of uncertainty with low potential returns, and elevated levels of uncertainty or risk with high potential returns.**[9]***
Conceivable solutions against an AoC are:

1. **Regional Solution:** Use ground-*up quota share catastrophe coverage by an insurer ceding policy strings with similar loss outcomes based on transparency and complete knowledge linked to a closed, finite policy population.*

2. **Regional Meltdown Solution***: an excess catastrophe limit contract outside the insurer's top catastrophe limit. The buffer consists of all new policies written beside the agreed-upon finite policy population assumed.*

3. **Global Solution**: Employ an e*xcess catastrophe limit over reinsurers' retrocession excess program. The buffer includes all new policies written by contract other than the agreed-upon finite global contract population assumed.*

Misconception

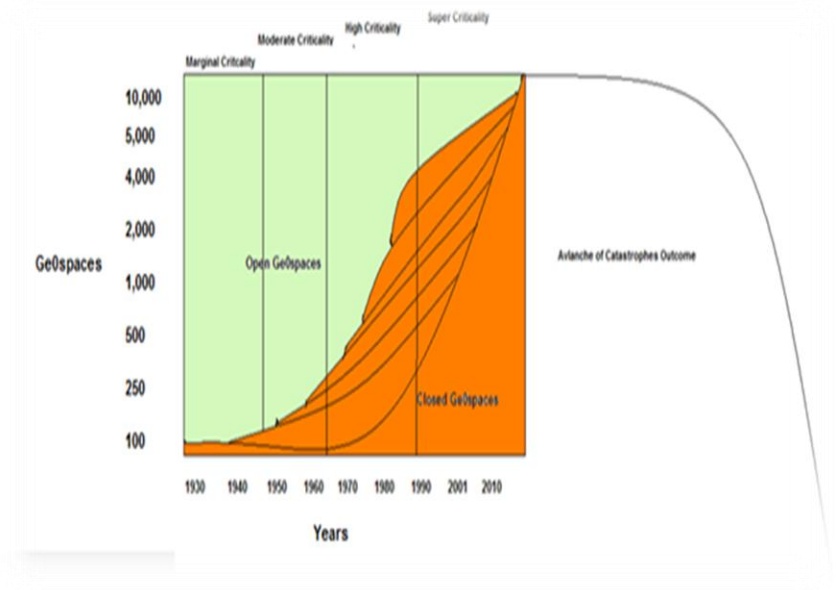
As understood today, the protection afforded by catastrophe coverage provided to the purchaser of catastrophe protection, i.e., the CEO, CFO, and risk manager, assumes the belief that recovery is guaranteed for a catastrophic event when it may not be guaranteed if the loss occurrence is at the end of an AoC and the insurer or reinsurer becomes insolvent.

Collapsing of Open Ge0spaces

Suppose AoC strikes successively closed ge0spaces with moderate to high economic valuations. In such an event, the outcome could quickly become a supercritical event that may affect coverage grants, i.e., recovery of the loss amount promised in the existing catastrophe contract.

The illustration below highlights the collapsing of open ge0spaces converting to closed ge0spaces, hence the greater likelihood of approaching super-criticality an AoC.

Becoming



Moving Towards Super-Criticality

Due to escalating global temperatures and the rapid increase in residential and commercial units, an AoC is poised to become an everyday occurrence. This could lead to a significant surge in insurers', reinsurers', and bank insolvencies. Every day of an AoC, in turn, could push the global capital markets, insurance, and reinsurance enterprises closer to the tipping point, making the frequency of an AoC a common occurrence. As a result, the markets assembling catastrophe coverage are becoming increasingly financially vulnerable, demanding immediate attention and action.

The financial debacle of 2007-2008 was a global affair. However, in AOC, the economic meltdown of the insuring property markets delivering catastrophe coverage could be 10 to 100 times more extensive, influencing capital markets, insurers, and reinsurers' ability to supply property insurance to owners of residential and commercial properties. As a result, the banking industry's capability to deliver loans for residential and commercial properties without collateral insurance will decline dramatically.

The impending onslaught of AoCs, expected to occur year after year, will have a profound and far-reaching impact on the capacity for property catastrophe coverage. This development is likely to significantly hamper the banking industry's loan capability for residential and commercial properties, a scenario that underscores the urgency of finding effective solutions to manage the associated risk-rewards ratios.

REFERENCES

[1]Nomadic Wireless Apparatuses, which refer to portable electronic devices like cell phones and GPS systems, also contribute to global warming. The production and use of these devices require significant energy, much of which comes from fossil fuels, a primary source of greenhouse gas emissions, and the impact of the immeasurable amount of electromagnetic waves transversing back and forth from global positioning satellites.

[2] https://www.oreilly.com/library/view/the-little-book/9781292098388/html/chapter-057.html

Released November 2015, Publisher(s): Pearson Education Limited. ISBN: 978129209838

[3] Van Den Berg, G; Pietersma, P, Key Management Models, 3e., c 2013, p. 221. Reprinted and electronically reproduced by permission of Pearson Education,

[4] The world's population in 1951 was 1951 2,543,130,380 to 2023 8,045,311,447.

https://www.worldometers.info/world-population/world-population-by-year/

[5] According to Statistica, the market size for P&C and Direct insurance is at an all-time high, up to **$843.63 billion**, and up by $22 billion from the previous year in 2023. February 27, 2024

[6] *Source:* Van Den Berg, G; Pietersma, P, Key Management Models, 3e., c 2013, p. 221. Reprinted and electronically reproduced with permission from Pearson Education.

[7] CAPE CORAL, Fla. — According to a NOAA report released Tuesday, Hurricane Ian ranked as the costliest billion disaster in the United States for 2022. The storm racked up a total cost of **112.9 billion dollars**. January 11, 2023

[8] It resulted in catastrophic loss and significantly impacted communities throughout the state. The storm left more than 2.6 million residents without power. Ian's impact on the state's economy was no less intense, with **insurance losses topping $12.6 billion**. July 18, 2023

[9] https://www.investopedia.com/terms/r/riskreturntradeoff.asp. Risk-Return Tradeoff: How the Investment Principle Works By James Chen. Updated March 07, 2023.Reviewed by Gordon Scott, fact-checked by Patrice Williams