

Launching an Insurance Revolution

Changing the Centuries-Old Legacy System As We Know It

Jay Jiyuan Wu, Ph.D.

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Executive Summary

The following ~100 pages can be summarized into one-sentence as our value proposition: We shall make P&C insurance stable, affordable & available by revolutionizing the supply side of insurance.

The breeding ground for past, current and (potentially) future insurance crises are four supply side “pain points:” **Clustered Risks** ⇒ **Risk Overexposure** ⇒ **Insurers’ Dread** ⇒ **Underwriting Jumping On & Off**.

Everything starts from placing multiple risks in a single cluster, thus the troublesome notion of “Clustered Risks” in risk management. This is like a LEGO game with preassembled, ready-to-use bricks. An "all-in-one" policy that cov-

ers everything under the sun for a personal or commercial entity can become the policy incarnation of the clustered risks concept, which insurers dread due to the risk of overexposure. Insurers react by jumping on the bandwagon with easy and bundled policies before catastrophe, but jumping ship after the first sign of catastrophic loss. Consumers suffer from three problems: (1) unstable policy supply, (2) unaffordable premiums, and (3) being forced into the residual insurance market due to insurers' unfavorable risk appetites, which are based on clustered risks.

Our solutions draw inspiration from Super Bowl insurance, where multiple insurers share coverage by dividing the event into smaller risk categories. This approach, called "partitioned risks," stands in contrast to the "clustered risks" model prevalent in traditional insurance.

Instead of supply side "pain points," we will have four supply side "benefit points:" **Partitioned Risks** ⇒ **All-in-All Policies** ⇒ **Insurers' Security** ⇒ **Stable Supply**.

All supply side changes start from treating intrinsically diverse risks as they are and keep them partitioned, either by property parts or by categories of risks. No more "all-in-one" but "all-in-all" policies, which preserve risk diversity. Reduced claim liabilities per policy can improve insurers' sense of security, encouraging them to move away from a "cookie-cutter" risk appetite that rejects all applications with the same risk exposure, regardless of individual loss history.

The next major change is the creation of "RisX" (short for "Risk Exchanges"), a Costco-style, members-only auction-based marketplace that caters to all insurance needs, from underwriting to claims settlement. This step will bring benefits to both the supply and demand sides, and will change the centuries-old legacy system as we know it. Insurers will restructure their organizations into specialized teams or subsidiaries under a single corporate umbrella. Additionally, poli-

cies will be tailored to well-known consumer profiles, with terms and conditions negotiated directly between registered insurers and consumers. Registered insurers will transform into 24/7 risk managers, leading a chartered or commissioned supply chain. This will benefit registered consumers through lower premiums, a more stable policy supply, and better prepared for weathering the next storm of catastrophe.

1 Introduction & Overview

My first white paper “California Proposition 103: Cause or Curse” talked about the regulatory lessons from the debate surrounding Prop 103 and also from the insurance crisis in the 1980s. The latter was driven by inflation, court ruling and unfriendly regulations, all are familiar to us today.

1.1 A Paradigm Shift in Focus

I argue in this white paper that Californians, Americans and in fact people in the entire world, can do better than continuing the historical debate. What we need the most at this point is not to focus exclusively on the past, for example asking whether the market or the state should have played the dominant role.

In a way, despite some meaningful and interesting points being made from the debate, the pro - versus con- 103 parties have been fighting inside a box and not realizing that the box itself needs to be broken — if we want to create a better world, in which *all stakeholders and players*, including regulators, insurers, consumers and InsurTech, work together to revolutionize the centuries-old game of insurance as we know it, and to make all stakeholders better off in the future.

I will cite Cathie Wood of Ark Invest on the 15 big ideas for 2024: “We’re all about finding the next big thing. Those hewing to the benchmarks, which are

backwards looking, are not about the future. They are about what has worked. We're all about what is going to work.”

1.2 Effectiveness First, Efficiency Follows

I share the same zeal for future-focused thinking — without antagonizing backward- or forward-looking perspectives. Sometimes in order to find what the best the future can offer, we must look back, way back if necessary.

I argue that the California insurance crisis we currently witness (1) brings bigger problems than premium hike and sending consumers to the FAIR Plan; (2) has a longer history than Proposition 103 in 1988; (3) is derived from a deeper vulnerability root than climate change and (4) covers a broader scope than insurers' exodus.

From the very beginning and for hundreds of years, insurance companies have been writing “All-in-One,” mostly open peril, over-promised insurance policies with huge claim payout limits (often over \$1 million for a single homeowner policy in California, and typically up to \$2 million for a BOP or business owner's policy). The legacy insurance system has changed little but contains *intrinsic vulnerabilities*. Climate changes only *exacerbate*, but did not *generate*, the vulnerabilities. Climate change also does not work alone but acts as one of the several vulnerable forces faced by insurance.

The biggest hidden vulnerability is insurers' *risk over-exposure*, which explains why insurers simultaneously (1) turn down many policy applications for “**No insurance**”; (2) set many limits and exclusions for “**Under-insurance**”, and (3) sometimes attach coverage for non-existing items for “**Over-insurance**”.

Market competition can do little on risk overexposure as all insurers compete with the same product, and they all chase after “good risks” but eschew “bad risks.”

This means when it comes to insurance, the biggest breakthrough may not come from the AI or InsurTech at this point, but to change the legacy system itself.

The brief history of InsurTech seems to prove it. Counting 2010 as the InsurTech starting year according to Insurance Information Institute (or Triple-I), more than one decade of InsurTech efforts have taught us not to take the existing insurance business model for granted, focusing only on improving its *efficiency* (i.e., “Doing things right!” such as making claim processing nimbler). Instead, we need a revolution that sends seismic shocks to a centuries old industry, focusing on its *effectiveness* (i.e., “Doing the right things!”) first, which then opens doors for higher efficiency.

1.3 Rethinking Insurance Product

Speaking of doing right things, one thing we have not done quite right since Benjamin Franklin in 1752 is to offer a healthy and diverse portfolio of insurance products, commonly known as “policies.” As I mentioned above, the current and legacy insurance business model has not only been old, but boring, anemic and most of all, risky, by constantly offering one giant “All-in-One” policy for everything under the sun in a home, for the entire business entity, and for all the autos one owns (and if you are Jay Leno, that could be a fleet of expensive autos). All-in-One policies always come with hugely promised claim payouts that expose insurers to great financial, legal, political and even existential risks.

It is this risk over-exposure, more than natural catastrophes, climate change, inflation (both economical and social inflation), and unfriendly regulations, that contributes to insurers’ apprehension, explains why private insurers are highly selective, often rejecting policy applications considered ‘high risk,’ and perpetuating an availability crisis.

1.4 Changing the Insurance 4Ps

One easy way to understand the changes is to organize our discussions about the famous “4Ps” in marketing: **Product, Price, Place** (distribution) and **Promotion**.

1.4.1 Changing Insurance Product

The first and the most meaningful change is to add “All-in-All” insurance policies to the existing portfolio of “All-in-One” products. Instead of one giant policy, we offer independent, separate policies, one for a particular *part* of the property (e.g., roof, walls, floor, bathroom, deck, garage, fences, garden, kitchen or other detached structures for home insurance; body, windows, engine, batteries, tires, sound system or trunk for auto insurance), or one for a particular *risk* (e.g., slip and fall, libel & slander, cybersecurity, property damages, workers compensation, compliance risks, intellectual property and business interruption for commercial insurance.)

Once we revamp the insurance product, other changes follow naturally.

1.4.2 Changing Insurance Promotion

Starting from promotion. Changing insurance *product* ignites changes in *promotion*, which is essentially a part of new product design.

For example, the current promotion system offers reward for *bundled* policy packages. For the commercial line, we have the most popular Business Owner’s Policy (BOP) that combines business property and business liability insurance. Personal line examples include “Life + Auto,” “Life + Home,” and an auto policy offering discounts on covering multiple vehicles.

These policy packages add or exacerbate risk overexposure and will be discontinued. Instead, promotion will be based on membership loyalty and length

of staying with the same insurer to promote relationship-based exchanges, not discount at the cost of higher risk exposure.

1.4.3 Changing Insurance Pricing

Now, consider the new pricing model. Under the new system with independent and separate policies, we still rely on the two fundamental factors for setting premium rates: the *frequency* and the *severity* of (expected) loss costs, but with several advantages.

First, compared with the “All-in-One” policy, independent policies each will deal with lower frequency of losses and also lower amount of losses from any particular property part (e.g., roofs, walls, floors, porches, swimming pools) or particular category of perils (e.g., slanders, slip and falls), for the simple reason that we no longer provide comprehensive coverage for everything under the sun. This reduces insurers’ risk exposure, which will translate not only to *lower premium* but also *increased price transparency*.

Pricing for registered member consumers will also be easier after we establish a risk profile for each consumer to make premium *individually tailored*, no more “cookie cutter” or “average” price. It is also easier to collect loss cost data for individual items or individual risk.

For example, finding a history of all the roof damages in an area is not only easier than assessing the losses to all parts of houses, but more meaningful for a roof insurer. Similarly, finding the loss from “slip and fall” alone, or from “libel and slander” alone, in all businesses of a state, is easier and more meaningful for an insurer specialized in one risk or peril than finding losses from all sources.

Finally, membership based premium also *save the time* in policy renewal or switching insurers — as long as users stay on the RisX marketplace. They do not have to repeat their private info to a stranger, as they have left a footprint on

record in the online marketplace.

1.4.4 Alternative Pricing & Coverage Type

The current pricing or ratemaking process is also too rigid. It (implicitly) presumes a degree of certainty: Insurers only have one chance to set the premium and the payout limit well ahead of time. Once a premium and a coverage limit are determined, neither insurers nor consumers can change them.

One can argue that insurers deal with fundamental uncertainty in estimating future losses. Consider the well known World Trade Center's claim after the 9/11 terrorist attacks, which faced litigation regarding whether the two towers reflected two events or a single event.

Instead of pretending a certainty, we may want to admit and add uncertainty to premium and payout limits. With consumer's consent, insurers may collect a "baseline" premium and set a "preliminary" payout limit on the initial policy, but make post-loss adjustments to collect more funds from the consumer to pay for the full cost of repairing. This can be called "Two-Step" pricing. Details are subject to negotiations and trial-and-error, so I won't have detailed discussion here.

A quick note in passing: The idea of two step pricing is similar to the parametric disaster insurance that is known for fast claim settlement. Words from NAIC (National Association of Insurance Commissioners) will be quoted below:

"The term parametric insurance describes a type of insurance contract that insures a policyholder against the occurrence of a specific event by paying a set amount based on the magnitude of the event, as opposed to the magnitude of the losses in a traditional indemnity policy. An example is a policy that pays \$100,000 if there's an earthquake with a magnitude of 5.0 or higher."

Parametric insurance eliminates the need for an adjuster after disaster, since

insurers only cover occurrence of a disaster, as the severity of disaster is predetermined (e.g., magnitude 5.0 or higher earthquake). The downside is that consumers may suffer a total loss of the property with a 4.9 magnitude of earthquake, and risk no payment from insurers. Two-step pricing can avoid this problem.

Alternative pricing is not the only thing possible, alternative P&C coverages can be proposed as well. The current system sets the entire house or property either on a “replacement cost” or “actual cash cost” basis. But that does not have to be so, as separate policies can add flexibility to homeowners: They can choose to put the roof on a *replacement cost*, but walls on *actual cash cost* or vice versa. They can even choose a part of the home (e.g., a shed) to be self-insured for added flexibility — if that is what the homeowner wants and subject to mortgage lenders’ approval. Consumers can also skip the coverage of “vandalism” for a roof, which rarely occurs, but do keep it for wall & windows. If they prefer, they can also skip “freezing of plumbing” for California, given the warm weather and low risk.

1.4.5 Changing Insurance Distribution

Last but not least, insurance distribution will be fundamentally different. Legacy distribution and legacy product are designed for each other. Whether it is face to face, office calls or online conversations, agents earn more from selling multiple policies. This is a seller side economy of scale.

The bad news is that agents add little value to consumers, nor do insurers want them to. Policies are unilaterally drafted “cookie cutters” for entire domain of property (e.g, auto or home). Insurers just want agents to “produce” (i.e., writing more policies to more consumers, which is why agents are also called “producers”), not “create” along the way.

Shifting distribution online changes little, as agents are still selling the same old policies.

It is likely that with RisX, we can eventually get rid of insurance agents, independent or captive, altogether, as selling separate policies are much easier than selling All-in-One policies, demanding no more complexity beyond the capacity of a generative AI agent. As a result, insurers can save big from not having to pay for agents.

The saving can be substantial. Captive P&C agents earn 5-10% of the entire premiums paid for the first year, while for independent agents it is 15%. Life insurance agents receive 60-80% of the premiums. Finally, health agent earns 5-10%.

On the other hand, consumer brokers will become indispensable or essential, as they will represent consumers to negotiate with insurers for policy details and more importantly to assemble a complete coverage using the “All-in-All” or “elementary” policies, guiding users through the underwriting process, assist claim settling and handle special requests, complaints and interactions.

1.4.6 Open vs. Named Policies

In terms of what policies are being sold by agents, I have been using the names of “separate” or “All-in-All” policies. The more professional term is “named” peril policy, where a “peril” is “an event that may cause damage to your home or belongings, typically covered by insurance policies,” according to Perplexity.AI.

Similarly, “All-in-One” policies are professionally “open” peril policy. Unlike a named policy, which spells out risks or property to cover, an “open” policy covers *all* perils unless otherwise listed as exclusions.

Once again, what is “named” in a named policy can be *risks* (e.g., wildfire, theft, slip & fall, vandalism) or *property* (e.g., tires, auto-body, windshield, roof, walls, floor, porch, garden, swimming pool, personal property). Sometimes the two can be combined, such as fire peril on roof; flood risk on carpet or basement.

Importantly, most legacy homeowner policies (except the HO-1 and HO-2 Forms, although HO-1 is no longer offered in most states) are open policies in terms of properties, meaning they cover pretty much everything under the sun in a home. The term “named policy” refers to named risks, not properties. For example, HO-2 is a named policy as it will cover dwelling structures and personal belongings, but may not cover loss from sewer backup and slow leaks.

Similarly, existing auto liability policies cover the entire auto owned by others, from front to back end. However, depending on drivers’ choice, it may not cover all risks or perils, such as collision and comprehensive (e.g., theft, vandalism, fire, natural disasters, falling objects, and animal damage).

On the other hand, all RisX homeowner policies will be named policies in both property and perils, there is no “open to all” coverage for *all* properties and *all* perils on RisX.

1.5 A “Costco of Insurance”

At this point, we can work on two things: establishing a membership based marketplace called “Risk Exchange,” spelled as “RisX” in a single word. RisX works like Costco in the sense consumers must be registered members, and they meet on the marketplace to negotiate insurance coverage. Unlike Costco, both supply and demand sides will be membership registered.

Also, different from Costco, RisX is an online auction marketplace and insurance transactions are done through online auctions in up to three rounds, every time with a new price, new partner or new terms. Offers are generally seen by all registered users & insurers.

Registered consumers are self-auctioneers who can end the auction when they see a favorite offer, with details worked out on a policy, so others can stop bidding and save time. Or they can put auction to a halt while negotiating details

of an offer, resume if the negotiation fails to reach policies.

Insurers and suppliers can re-assemble “on the fly” to form a new team & make new offers between rounds of bidding. Or they can do that off-platform for team reshuffling & re-assembling. For example, a roof insurer may find a new floor insurer and bid together in the future. A new team can be formed just for a particular policy, or otherwise it can stay as stable partners for writing future policies in future auctions.

This will be a brand-new way of doing insurance business that operates online 24/7. We will recruit uninsured homeowners, business owners as registered consumers, starting from uninsured small business owners first, whose business entities are left out by the legacy system, thus a natural test-ground for named policies. We then cover their personal insurance needs and wants, and their employees.

On the insurer side, we will talk to Insurtech firms first, but also legacy insurers to get them involved in the revolution. We will also recruit suppliers (plumbers, electricians, constructors and contractors, chain retailers) to help form a supply chain for catastrophes.

Registered consumers will each have a “risk profile,” a “Catastrophic Tolerance profile” and a list of “Special needs and wants” to be stored in the online database. They will remain encrypted and confidential, only known to registered insurers and suppliers. When the consumer wants to switch insurer, as long as the new insurer is also registered on our marketplace, there is no need to repeat his/her personal info to a stranger, and quoting and underwriting will be smooth and fast.

For an initial annual fee that is reduced at renewal, commercial consumers will have a personal broker providing VIP services to them. It will streamline the entire processes from quoting & underwriting to risk prevention, claim manage-

ment and supply chain leadership, making insurance a one-stop service.

Registered consumers have the power to ask for coverage tailored to their unique needs and wants, not just passively accepting policy offers by the insurers. The policies signed on RisX will eventually be “smart contracts,” a self-executing program stored on a blockchain that automates the actions required in an agreement or transaction. It operates based on predetermined conditions, often following simple “if/when ... then ...” statements written into the code. This removes the need for intermediaries, making transactions more efficient and reducing potential time delays.

All legacy policies are *adhesion* contracts (i.e., prepared by the insurer, while the consumer accepts the given terms and conditions without any negotiation) and *unilateral* (i.e., insurer makes an enforceable promise, while the insured only pay premiums but no other formal promise to the insurer) that leave consumers the only option to accept them or else no coverage at all.

These will be changed with RisX to allow consumers to have some say on terms and conditions. Sometimes the registered consumers will demand certain preferences, terms and conditions for the registered insurers to take into consideration.

The followings summarize why would anyone pay a “Club fee” for Insurance:

1. Lower premium from “member’s only” discounts & perks.
2. Personal brokers act as policy consultant & eliminate seller agents.
3. Member profiles saved:
 - Risk profile.
 - Catastrophic resilience profile.
 - Special needs/wants profile.

4. Privacy: Member profiles only accessible by other members.
5. Policy flexibility: Renew or rewrite policies anytime, no fixed renewal dates.
6. Multiple quotes for the same need/want from different insurers or same insurer but different terms and teams.
7. Save on "Catastrophic Taxes:"
 - Insurers' supply chain inventory management.
 - New focus on loss prevention.
8. Free annual inspection by registered insurers & contractors.

1.6 The "Non-Fringe" Benefits

This is the place to summarize the major benefits from the new insurance marketplace. Some benefits from RisX are easy to see, while others are less obvious and may require some digging.

1.6.1 Saving in Premium

The biggest benefit is to reduce insurers' risk over-exposure, by shrinking the size of future claim payouts for each independent policy, which reduces the coverage limit. With All-in-One policy, the average homeowner coverage limit in California is \$500,000 for dwelling, \$50,000 detached coverage, personal property \$250,000, liability \$300,000. Adding these up, we have a total of \$500,000 + \$50,000 + \$250,000 + \$300,000 = \$1.1 million for one household.

For commercial line, most businesses buy BOP (Business Owner's Policy) at \$1 million/\$2 million, meaning insurer pay up to \$1 million in coverage per claim and up to \$2 million aggregate over the lifetime of the policy (usually one year).

Of course, coverage limit is not actual claim payout. In California, the average homeowner insurance claim payout is \$207,000, far less than the limit. That said, the limit is still scaring in and of itself. The reason: in a catastrophe, the peril can cause loss in **any part**. Total destruction of property is entirely possible, as we have seen in several recent wildfires in California.

RisX policies will greatly reduce coverage limit. Think of the average cost for a roof replacement in California: \$15,000 for a 1,700 Square Feet roof, which is only 3% of the dwelling limit of \$500,000.

Now that insurers have a smaller claim payout liability, the premium for each separate policy will also be reduced, given the well known link between premium and insurers' loss cost.

An interesting and crucial question is whether consumers will save in the end after adding up all the separate policies. For example, say an All-in-One homeowner policy costs the policyholder \$1,500 a year in California. If the premium for All-in-All policies of roof, walls, floor, bathroom, kitchen and all other parts of the house add up to \$1,500 a year (or even more), there is no saving for the consumer — after all the extra hassle of working with multiple policies.

I doubt that would be the case for several reasons. First, there will be an economy of scale for each part of the property (e.g., roof) and each category of perils of the loss (e.g., slip and fall), in the sense that the frequency of loss from each part (and each risk category) is potentially much lower than that from all parts and all risks.

Another reason for lower premium is to get rid of over-insurance that often appear in current policies, where the offer includes coverage for properties that do not exist, such as a shed or a secondary residence unit. Writing separate policies for different properties will eliminate that, as no consumer will ask for coverage for property that does not exist, or they do not own.

One practical underwriting problem we will run into is that the existing ratemaking for All-in-One policies is based on losses from *any parts* and *any risks*. For example, when an insurer reports that it has a loss ratio of 60%, it means for every \$100 premium it collected, \$60 has been spent on all claims (and the associated adjustment cost.) That \$60 cover all claims, ranging from a completely broken house to a broken window.

For All-in-One policies it is fine to gather all losses into one loss ratio figure because they do not care, nor differentiate, losses from different parts of the property. When we break the loss ratio down into parts and risks, we expect a scarcity of relevant data, simply because losses naturally distribute among parts. To use the above example, it is unlikely for the \$60 claim all caused by roof loss or all by auto theft.

Since premium is determined by (expected) loss cost of insurers, without sufficient data for loss associated with one particular part or one particular risk, we will have an issue of underestimating losses, which translates to an underestimated premium, leading to insurer's underwriting loss.

For example, a roof insurer may have a hard time to find historical loss data on roofs only.

We may solve the problem by initially using the loss data from the legacy system as the best estimate of the latter, paying special attention to the "total loss" incidences, where all parts of the property were destroyed beyond repair.

Using the above example of \$60 loss, say \$39 is caused by total loss, in which the entire house collapsed. This means the loss ratio based on total loss will be 39%. That figure will be our initial estimate of loss for all parts or all risks — until more data become available.

This procedure is logically resonant, as a total loss means all parts are extensively damaged beyond repair. If we feel that is an overestimation of loss for a

particular part or a particular risk for a local jurisdiction, we can make adjustment based on national data, which are more readily available than in a state or a smaller jurisdiction.

The other problem is the source of loss. In a wildfire, the ignition point that sets the entire house on fire could be the roof or the porch, for example. This information does not matter for All-in-One policies, as all parts and all risks are treated the same. With the All-in-All policies, however, the ignition part has a higher risk than the passively burning part. This information can help set future premiums and claim payout — if there are devices of the Internet of Things (IoT) on site to record the facts. If done right, this will make the policy more scientific and serve justice better: The insurer responsible for the ignition part should shoulder more claim payout than the passively burned parts.

1.6.2 Innovation Friendly

Once an insurer focuses on one particular part of the property, or one particular risk of the losses, they are poised to think of better ways of doing things. A roof insurer will be better prepared for roof related R&D and breakthrough, while a kitchen insurer will keep their eyes open for kitchen related new products.

The followings are the highlighted directions in an Innovation Centric Insurance:

1. Smart on-site risk assessment for assessing tolerance of roofs, walls, floors, detached structures to fires, earthquakes, hurricanes & floods.
2. Smart on-site value assessment using tools for market value, replacement cost value and actual cash values of properties & liabilities.
3. Smart loss reduction technologies & innovations: E.g., wildfire resistant paint, fire net, fire-resistant solar panels, mold resistant paint & wind hail

resistant roofs.

4. Smart claim processing.

1.6.3 Underwriting for Personable Insurance

RisX registered insurers know the registered consumers better, which will lead to extra savings for risk-averse behaviors. This is not only good in premium but serves justice better to the extent that the premium is better reflecting risk and offering reward to loss reduction behaviors.

The following highlight what is personable insurance:

1. One policy fits one individual or entity.
2. Policy taking into account risk profiles of all registered insured on social, behavioral, attitudinal & preferential domains.
3. Individual premium P determined by: $\forall i \in I, j \in J, P = \Sigma(\omega_i \times \phi_j)$ where ω are I weights & ϕ are J factors or dimensions (E.g., a family with "pride of ownership" deserves better premium than an identical house but a careless owner. Legacy cookie cutter policies focus on properties ignore owner variables.)
4. Registered consumers gains more freedom to skip a property or liability from coverage. They can also choose between replacement cost value or actual cash value for different parts of the property.

Registered consumers can save and upload all relevant info to prove themselves "good risks." They can use audio, video, electronic and other forms of evidence. Personal references in audio, video, electronic from neighbors and friend are also acceptable. The more info sent, the more personalized policy.

Here is a real-life example that works in the opposite direction: A woman in Ireland loses her \$823,000 auto injury claim after a photo showing her winning

a 2018 tree-throwing contest after she told doctors of back and neck pains. We expect fewer incidents like that among registered consumers.

Based on consumers inputs, RisX can calculate a quick scale based on:

- Honesty as evaluated by insurer.
- Pride of ownership based on user provided evidence.
- Reference scores.
- Neighborhood score.
- Claim history.

Those with scores 4 & 5 (the good risks, assuming the simplest scale of 0 or 1 for each dimension, where 1 denotes good and 0 not so good) will show up on the user profile for everyone to see.

Allowing consumers' inputs in drafting policies has a **hidden benefit** to likely reduce the chance of lawsuit against insurers later on, for the simple reason that people feel some shared responsibility when they are involved in decision-making.

Speaking of lawsuit, the problem of social inflation could also be alleviated. Plaintiff are commonly more motivated by defendants with a "deep pocket." A policy that promises up to \$1 million dollar claim payout is far more attractive than another policy with only \$15,000 limit of claim payout. This is also why policies should be independent of each other, with "policy firewalls" for the same owner, so plaintiff won't get a wrong impression that if they sue, insurers will use all the resource to cover the legal cost.

1.6.4 Catastrophic Ready

How will RisX reduce "Catastrophic Taxes," a term I use to mean any additional demand surge and price gouging?

Let us first see what others have proposed along this line. The Agentsync website talks about climate resilient infrastructure: “To protect their citizens and land, some coastal cities are investing in climate resilient infrastructure. The Dutch coast hasn’t flooded in years thanks to wave blocking infrastructure built in the 90s. In Boston, a system of floating wetlands designed to reduce coastal flooding and offset rising ocean levels is in the works.”

The next step is reexamination of zoning laws: “Planning and zoning ordinances could reduce the amount of lives lost, properties damaged, and land destroyed in disaster-prone areas. After Hurricane Sandy caused major flooding in New York, the city developed new zoning rules to help buildings better withstand and communities quickly rebuild after natural disasters. However, many communities are resistant to reexamining zoning laws and land-use practices for various economical, social, and political reasons. Progress will require community support and innovative solutions.”

Next comes controlled fires for wildfire: “controlled fires are actually extremely effective for wildfire suppression. Controlled burns rid forested areas of dead leaves and debris without posing a threat to the public... While controlled fires remain an essential tool in preventing destructive wildfires, climate change is making the practice riskier. The hotter, drier conditions brought about by climate change increases the chance for controlled fires to spread outside of planned areas. In 2022, the federal government inadvertently started New Mexico’s largest wildfire when a controlled burn got out of control.”

These are all interesting and by now largely familiar ideas at least to industry insiders. What RisX will add is catastrophic inventory management. Registered suppliers will have schedules of peak & off-peak labor forces. For inventory management, they set up regional warehouses for different disasters. All warehouses must be earthquake safe and flood safe. All warehouses are subject to

re-evaluation after each catastrophe.

Demand forecasts will be based on registered user risk profiles. It will encourage & develop innovations for catastrophic prevention and treatment. We can work with partners of national retail chain networks like Home Depot as well.

1.6.5 Reducing Policy Denial

Insurers will be willing to write more policies and to reject fewer applications. The best way to illustrate it is to consider a hypothetical case: a 2-year-old roof sitting on a 150-year-old house.

Without separating the roof from the house, the house is very likely rejected by many insurers due to its age. But if the roof is only 2-year-old, this is unfair to the new roof. A part of the reason is that with the All-in-One policy, insurers must come up with one premium for the whole house, which is hard to do it right.

On RisX, a roof insurer is more likely to write a policy for the roof only. But what if the new roof falling because the old house fell apart? This is a real risk given the age of the house. The answer is to negotiate with the consumer and charge a higher premium for the roof because it sits on an old house.

1.6.6 Internal & Targeted Consumer Marketing

Registered insurers can run internally targeted, RisX approved (or RisX pre-noticed) commercials for registered consumers. They can also set up client referral promotion program to attract more consumers (new members must also register with RisX).

Registered insurers, strictly with the consent of the registered consumers, can record and keep detailed records of transactions and, strictly with another consent of the consumers, make the content public info (to RisX registered in-

urers) to speed up the quoting and underwriting process. Before sharing with others, insurers must send the record for the consumer’s review to ensure accuracy. Consumers can also enter their ratings of the insurers and make that a part of the shared info on the record.

Instead of either “none” or “all” choices, meaning consumer’s private info is either completely non-disclosure or completely disclosure, RisX can add another option (or even make it the default to allow automatic opt-in by consumers) of partial disclosure of basic info, including basic demographics and basic property info. This will speed up the underwriting process substantively.

The final option, especially for those privacy-sensitive consumers, is to allow them to open their profiles to one or a few selected registered insurers for a short period of time, like one day or one week.

RisX is likely to curtail the impact of insurance cycle effect, as registered consumers and insurers know each other better and are easier and more willing to work together for a deeper — and more stable — customer relationship, which leads to more stable business transactions.

1.6.7 Supply Chain Leadership

To promote the idea of insurers as supply chain leaders, each insurer can have affiliated suppliers and contractors and these affiliated members must also register on RisX and are then allowed to promote their own lines of business directly to registered consumers. As the chain leaders, insurers will proactively arrange for the necessary material supplies and labor forces before the next catastrophe to reduce the risk of demand surge and price gouging.

The idea of insurers collaborating with supply chain is not new. This McKinsey report in 2023 tells us that

“Insurers are well aware of the benefits of building deep customer relation-

ships that increase insurers' average product density per customer.”

“Within the US pet insurance segment, for example, our analysis found that eight of the top ten personal-lines insurers rely on pet insurance factory partners to grow and expand in the segment.”

“The advanced-analytics enhancement of claims can also help personal carriers meet customers in a seamless way and mitigate the hassle of overseeing claims processing. For example, a motor insurance customer may receive a steady stream of automated repair-status updates delivered in their preferred channel, or a property customer may visit their insurance company's online claim hub to see photos and videos of their roof repair and communicate directly with emergency mitigation services.”

“Finally, insurers can reduce pressure on margins driven by rising claims costs—for example, on car spare parts—by dedicating more attention to claim prevention, powered by telematics capabilities. As examples, sensors in buildings can alert owners and insurers when temperatures get low enough to freeze pipes and can automatically trigger integrated smart thermostats, or smart homes can automatically deploy hurricane shutters based on weather notifications. In doing so, customers and insurers will become partners in loss prevention and build a relationship that goes beyond accidents and negative events.”

The ideas of telematics and remote sensors detecting extreme temperatures are all excellent and practical supply chain solutions benefitting insurers and consumers.

This Forbes article adds some good points: “If insurers can improve users' abilities to navigate and engage with any aspect along the insurance value chain, they are more likely to satisfy their expectations and complete sales...put information directly into customers' hands, anytime, anywhere.”

“Part of this evolution will require insurers to form partnerships or make

investments with other companies and startups. Creating a mutually beneficial flow of data between ecosystem players, competitors or not, can help insurers reach new audiences, expand product offerings and enhance service at every stage of the customer journey.”

The above discussions all highlight the notion of “partnership” rather than “leadership.” This is where RisX goes further. As far as I know, no one has proposed insurers as the sole leader of supply chains. I feel more confident in my understanding after consulting both Gemini and Perplexity. As Gemini states, “There haven’t been any widespread or prominent proposals for insurers to become the sole leader of entire supply chains. However, there are a few interesting developments and concepts that explore a more integrated role for insurers within supply chains.”

Perplexity also says, “Insurers are now focusing on enhancing their supply chain capabilities, redesigning claims supply chains, and building ecosystems of strategic partners to improve efficiency and performance.”

To be sure, the notion of *integrated* rather than *sole* leadership sounds more attractive and more balanced. However, this is only true when we consider the existing organization structure of legacy insurers, and when we have the entire global supply chain in mind.

I expect neither will hold in the future with RisX. Once the existing insurer breaks down to specialized teams or subsidiaries, they will be in an excellent position to manage a supply chain as a *leader*, not just a *partner*. This is partly because RisX aims at building a commissioned or chartered, one-of-a-kind supply chain fitting the needs and wants of insurers, especially for being “catastrophe ready.”

I find the following Gemini answer interesting on what effective supply chain leaders would focus on:

- Strategy: Aligning with business goals.
- Data: Making data-driven decisions.
- Innovation: Continuously improving and finding creative solutions.
- Risk Management: Planning for the unexpected.
- People: Leading and developing the team.

These fit the reorganized insurers well. Let me illustrate using a hypothetical roof insurer called “Solid Roofs” that will write roof policies and settle roof repair claims. “Solid Roofs” will align business goals of the supply chain members easily because there is little conflict of interests between “Solid Roofs” and the local roofer (with its own local suppliers). They will all gain from fast and good roof repair services. Unlike a roofer, “Solid Roofs” knows its clients, including their unique needs and wants, better and have access to historical data. This puts “Solid Roofs” in a unique position, much like a prescribing physician, who shapes and controls the demand for prescription drugs. The same holds for “Solid Roofs” to coordinate innovations for roofers and suppliers. By finding the best and most efficient roofers and suppliers, and by forecasting the demands from the next catastrophe, “Solid Roofs” can make the entire chartered supply chain catastrophic ready by doing proactive jobs in risk management.

The following summarize supply chain based insurance.

1. A fundamental role change for insurers: From selling policies to selling 24/7 services; From middlemen to risk management chain leaders.
2. Chain leadership works through:
 - Direct integration of the best suppliers, or long term partnerships (E.g., Partnership with Home Depot or Lowe.).

- Regional warehouses stockpiling inventories based on forecast of catastrophic demands.
- Labor force coordination within the region on & off seasons.
- A database of registered properties on catastrophic tolerance & risk profiles, which will prove useful for inventory management for the next disaster.

1.6.8 Promoting Prevention

What is prevention focused insurance?

1. Insurers no longer focus on settling claims but 24/7 risk managers.
2. Smart contracts remind replacement or review properties/entities.
3. A database of "risk registers" for all users to highlight major risks.
4. Prevention through education: RisX newsletters on safety tips; webinars on risk management; knowledge quizzes, awards, surveys, case studies & legal updates.
5. Risk monitor & reviews.
6. Loss minimization skills & tools (E.g., LeafFilter for clog-free gutter protection system.)

To promote the idea of loss prevention, RisX platform will provide free inspection on house, auto and commercial property at least once a year, at least remotely, but only by registered insurers and their partners. The results will be recorded online and reflected in a certificate of inspection. Insurers will make repair recommendations and talk to the consumers for repair issues they identified.

Inspection is voluntary, but those completed will receive up to 10% discount in the next renewal or new policy. In order to reduce the hassle of consumers, home insurers should try their best to schedule the inspection of different parts on the same day if possible. For autos, this is easy to do, as auto inspection is normally done in one shot.

Florida seems to move in the right direction. This report says “Florida Senate unanimously cleared a bill Wednesday to put \$100 million into the ‘My Safe Florida Home’ program, which could help people lower their home insurance costs... Homeowners are eligible to apply for up to \$10,000 in grant funds. That money could be used for new doors, windows, or even a new roof. All of which would help lower your insurance costs.”

But government (and funds) can only do so much, specialized insurers can do more. For example, a roof insurer can lab test & compare materials for fire safety for setting premium. Roof materials (e.g., clay vs wood shingles) are more relevant to wildfire tolerance than house styles (e.g., Colonial or Victorian).

Science driven insurance demands national & local loss history databases. For example, a 30-year-old roof is riskier in the snowy Wisconsin than in the dry California. More data over time allow more scientific policies.

1.6.9 Insurers Organization Rejuvenation

The marketplace RisX will help rejuvenate insurers’ organization structure. Currently, an insurer is organized by a headquarters that designs, modifies, promotes and updates all the policies, and all the distributional “legworks” are done by insurance agents.

We can follow the same organizational structure of consumer goods, where a company is made of many brands, each doing its own marketing and R&D independently or semi-independently.

I will cite a few familiar examples, all from consumer goods and services industry, all have many brands under one company roof. Let us begin from this Wikipedia page on Nestle:

- **Beverages:** Sweet Leaf Tea, Nescafé, Nespresso, Taster's Choice, Arrowhead.
- **Cereals:** Milo cereals, Shredded Wheat, Nestlé Corn Flakes, Golden Nuggets.
- **Frozen food:** California Pizza Kitchen, Hot Pockets.
- **Frozen desserts:** Dreyer's, Drumstick, Häagen-Dazs, Nestlé Ice Cream.

From this homepage of P&G or Procter & Gamble on its brands:

- **Baby care:** Pampers.
- **Fabric Care:** Tide.
- **Feminine care:** Whisper.
- **Grooming:** Gillett.
- **Haircare:** Head & Shoulders, Herbal Essence, Pantene.
- **Oral Care:** Oral B.
- **Skincare:** Olay, Old Spice.

Now, consider high-tech firms. From this Wikipedia page on Google product lines:

- **Search tools:** Google Search, Google alert, Google Assistant, Google Bard, Google Flights, Google Scholar, Google News, YouTube, Google Patents.
- **Advertising services:** Google Ads, Google ADSense.

- **Communication and publishing tools:** Google Meet, Google Classroom, Google Groups.
- **Productivity tools:** Gmail, Google Calendar, Google Account, Google Charts, Google Drive, Google Keep, Google Translate.

Last but not least, this website lists all Apple product lines.

- **Hardware:** Apple TV HD, Apple TV 4K, Apple Watch, iPad, iPad Air, iPad mini, iPad Pro, iPhone, MacBook Air, MacBook.
- **Current accessories and peripherals:** AirPods, AirPods Pro, Apple HDMI to DVI Adapter, Apple Pencil, Apple USB Power Adapter, Apple World Travel Adapter Kit, EarPods, Lightning Digital AV Adapter, Lightning to USB Cable, Smart Battery Case, Smart Keyboard, USB-C Charge Cable.
- **Current operating systems:** iOS, iPadOS, macOS, tvOS, watchOS.
- **Current software and services:** App Store, Apple Business Essentials, Apple Developer, Apple Fitness+, Apple One, Apple Music, Apple News+, Apple Store, Apple TV+, FaceTime, iTunes Store, iCloud, iMessage, iMovie, iTunes, Mac App Store, Photos, Safari.

Such an organization pattern makes sense to insurers, as insurance is fundamentally a consumer good. Insurers registered in RisX will change their organization structure to more diversified, decentralized, brand-centric entities like other consumer goods with multi-brand, multi-product lines, as listed above.

One commonality shared by these famous consumer goods/services firms clearly points out that having multi-brands under one company roof is a good way to grow size, profitability and value, whether we talk about *accounting based* measures like return on equity (ROE), return on asset (ROA) and return on investment (ROI); or *market based* measures like earnings per share (EPS), price

to earnings ratio (P/E); or *cash flow based* measures like discounted cash flow (DCF) and internal rate of return (IRR).

Following this line of thinking, an insurer can have a brand or a team of experts for roof, another for floor, still another for kitchen, etc. The same applies to risk categories. We may have a brand for slip and fall, another for libel and slander, still another for cyberattacks. Some insurers may find it necessary to set up a coordination department to better connect its branches or brands.

Specialized “line insurers” may not only wait for innovations coming to them, but also lead innovations actively, just like they lead the supply chains as discussed earlier.

Insurers’ re-organization can be the slowest moving part of the revolution. This is one of the key reasons our startup “runway” will be five years. To speed up the process, we may work with InsurTech entities to set up an example for the transition. A more realistic solution is to let traditional insurers write separate policies to get the change off-ground quickly, before they divide into brand teams.

The rest of the white paper will begin with a section on availability crisis, followed by a discussion of risk overexposure. We then move on to solutions, and end with the discussion on the “Super insurance” model associated with the Super Bowl insurance and a call for co-founders.

2 Revisiting the Availability Crisis

An insurance crisis always has two sides: Insurance unaffordability and insurance unavailability. My earlier white paper urges regulators, insurers and public to pay more attention to the latter than the former. One reason is the dire consequences of the latter than the former. When insurance is unavailable, consumers can’t get insurance at *any* price, so they either end up “flying naked”

without coverage or paying a higher price in the residual market (i.e., insurance of the last resort). In a pure affordability crisis, consumers can still get coverage from the private insurers if they are willing and able to pay a higher price.

Unfortunately, it appears that regulators often pay more attention to insurance unaffordability by imposing low rate on insurers or moving toward a rate suppression. Insurers on the other hand are generally too weak to fight rate suppression. They often obey — until the rate becomes intolerable. At that point they react with non-renewals, not accepting new policy, or leaving the jurisdiction altogether, as we have recently witnessed in California and Florida.

Speaking of Florida, the Sunshine State has made progress in shrinking the size of its residual market with a plan of transferring 338,000 policies to the private insurance market over the course of 2024, while the Golden State has yet to see any legislature move in 2023.

From the above, the availability crisis is described as a “Mouse-Cat game” between regulators and insurers, which is an interesting way to tell the story but is partially misleading, to the extent that it hides a bigger, deeper and harder cause of why insurers would deny policy applications in the first place. Let me explain why, beginning from why insurers should accept most policy applications.

2.1 Should Insurers Accept Most Policy Applications?

Let us begin with why insurers should have accepted most, if not all, policy applications. Common sense says insurers will deny policies *only* when the risks are too big to be compensated by *any* premium.

But that common sense hardly makes sense, because if insurers can charge *any* premium they see fit, no loss will be too big — it can always be compensated by a theoretically infinite premium. In such an “idealistic” market, no insurers would deny any policy application and all will be accepted.

I put the word “idealistic” in quotes because it is only “idealistic” for insurers, not for consumers. No consumer will pay an infinite premium because, for one thing, if they had the resource to pay an infinite premium, why would they buy insurance in the first place? They can always insure themselves.

The above reckoning is not always optimal because self-insurance foregoes the opportunity to leverage the money one has. For example, say a high-net-worth homeowner has a \$5 million mansion. To cover the property by himself he would have to set aside another \$5 million to ensure quick replacement or rebuilding in the event of total loss. The additional \$5 million could have been invested elsewhere for better returns — if the owner chose to buy a homeowner policy or policies.

The good news for both insurers and consumers is that insurers do not have to charge an infinite premium to survive and to thrive in the market. Remember, insurance is a risk sharing business, which means policyholders silently but constantly cross-subsidize each other without being asked for it. That is, they do not have to give written consents for insurers to use their “paid but unused” premiums to help cover losses suffered by less fortunate members in the risk pool — losses from accidental events that are individually difficult or impossible to cover by themselves. Here, a “risk pool” is an insurer’s “book of business” or all the premium-paying policyholders who subscribe to the services of the same insurer.

In symbols, the risk pool can maintain the underwriting breakeven condition when the following equation holds, in which L_i denotes the insurable loss suffered by the i^{th} member of the pool, E_i is the expenses used to handle the loss of the i^{th} member, and P_i the premium collected from the same individual:

$$\{(L_i + E_i) > P_i\} \leftarrow \{[\sum_{i=1}^N (L_i) + \sum_{i=1}^N (E_i)] = [\sum_{i=1}^N (P_i)]\} \quad (1)$$

Eq. 1 says *if* the total premium in the risk pool is equal to the total loss for all members or policyholders, then some members' premium can be *smaller* than their claim losses — as long as other members' premium is *larger* than their claim losses — up until the total premium drops down lower than total loss.

Imagine an extreme scenario where all policyholders have paid exactly the same matching premium as their claim loss, and the insurer would have no problem to breakeven. For example, say every policyholder will incur a loss of \$5,000 and every one paid \$5,000 as premium, everyone will break even or will have a balance, all that insurers can make is to invest policyholders' premium to earn investment income.

In another extreme scenario, say half the policyholders under-paid premium than their claim loss, but the other half over-paid premium than loss, together we can still break even or achieve parity at aggregation, even though at individual level we won't see a balance.

Neither of the two scenarios is realistic, but you get the idea. This is how cross-subsidy (i.e., risk sharing) provides the breathing space for an insurer to handle the inherently unequal probabilities of loss among policyholders.

We can call it the "First line of defense." The nice thing is that insurers do not need to do anything special to make it work. It is a part of normal business model.

So far, we have reckoned as if insurers had only premium income to work on. Here comes a better news: Insurers do not have to maintain a perfect underwriting balance or surplus — although it is best if they do — as insurers have two income sources: underwriting income and investment income, as the previous white paper talks about. Even if an insurer has an underwriting loss, its investment income may help them stay afloat in the challenging times or even achieve a small net profit.

In symbols, using I_i for the investment income derived from the i^{th} member's premium, we have a total breakeven condition by jointly considering both incomes:

$$\{(L_i + E_i) > P_i\} \leftarrow \{[\sum_{i=1}^N (L_i) + \sum_{i=1}^N (E_i)] = [\sum_{i=1}^N (P_i + I_i)]\} \quad (2)$$

Eq. 2 says as long as the total (premium + investment) income of the entire risk pool breaks even with, or is equal to, the total loss, one or a few members can have losses larger than their premiums.

The investment income can be called the “Second line of defense,” which essentially expands the size of losses insurers can tolerate based on risk sharing. For an illustrative example, say risk sharing (i.e., risk cross-subsidy) alone may allow an insurer with 300,000 premium-paying policyholders to break even when 40%, or 120,000 members, had losses that exceed their premiums. Now, with investment income the same insurer may allow 80%, or 240,000 members to have such big losses.

With these two lines of defense, it is a safe bet that insurers would not ask for an infinite premium, not only because they can never collect it from anyone, but also because they don't need an infinite premium to survive.

2.2 Why Do Insurers Reject Policies?

Are the two “defense lines” sufficient for insurers to accept most if not all policy applications? The current situation in places like California and Florida would make most people think twice before answering “Yes” — after seeing many people's policy applications get rejected by insurers.

Let us call risk-sharing and two sources of income (from underwriting and investment) the factors that weakly (i.e., \geq) encourage insurers to issue policies

rather than not to issue policies. Other things equal, insurers should accept most if not all policy applications.

However, other things are never completely equal, and the reality is that private insurers often deny many policy applications — too many rejections that they may run the risk of making themselves *irrelevant* when people need insurance the most, as I will discuss later.

The key question then is “Why do insurers frequently reject policy applications?” Since we know accepting policy applications helps increase both underwriting and investment incomes, there must be *discouraging factors* that turn insurers away from a source of income.

It turns out that there are several discouraging factors. To put it in a dramatic — but still realistic — way, there is a constant “tug-of-war” between coverage-discouraging and coverage-encouraging forces for insurers.

2.2.1 Insurers’ Dread

The shortest answer to why insurers reject policy application is one word: “Dread.” Insurers are filled with dread for connected (internal and external) reasons. If we can remove or more realistically reduce insurers’ dread, policy rejection is likely going down.

But before we proceed, let’s first make sure dread does exist. We will see dread has shown in the court, with adjusters in the field and in the aftermath of wildfire.

Consider the case of Tom and Tamara Conry from the first white paper. The conry’s house was barely touched by the Camp fire according to this NPR report in 2019, and yet their insurer, after providing coverage for their living in a hotel and then in a rental apartment, as promised by the policy, notified the couple in December 2019 that it would not renew their policy.

In a more dramatic legal case from Florida, a homeowner insurance company takes dozens of Southwest Floridians to court for breaking their policies by repairing their own homes after Hurricane Ian. “People’s Trust sued Mary Stewart in September, 2023, nearly a year after Ian. She still lives with the damage in her Port Charlotte home and the suit centers around her trying to get her home back together.”

But one fact remains that the insurer’s “rapid response team could not get to their repairs for a period of eight to 12 months in varying degrees from different clients.” Apparently, the supposedly “rapid response” was not that rapid at all.

In another long-lasting legal case reported by Newsweek on February 12, 2024, a Californian’s homeowner policy was cancelled after being burned down completely to ashes, as it “was still under construction... the case was settled out of court in March of last year,” according to the report.

The same report cites another case of “Alyson Dutch, another California homeowner, has struggled for nearly three decades to buy insurance on her Malibu home because it’s considered a ‘high risk’ area.” Similar stories have essentially happened to more than 300,000 homeowners currently in the FAIR Plan in California.

Having confirmed the existence of dread, its drivers or sources must be conferred. I will discuss its regulatory source of rate suppression, followed by the mother nature role of catastrophes. Social inflation or legal challenges really should have been the next, although it will be skipped as it has been examined in the last white paper. Instead, the focus will be on how insurers see catastrophes, in association with terrorism, reinsurance and catastrophic bond, which has not been discussed before.

Note I will leave the deeper topic of “risk clusters” to the later section, when I introduce the “Super Insurance” model for mega events like the Super Bowl.

2.2.2 Source of Dread: Rate Suppression

Rate suppression has been discussed in my first white paper, so I will be quick this time.

One issue is related to compliance cost, which may have been considered as another coverage discouraging factor. As this article points out, “Insurance is one of the most heavily regulated industries in our economy. Regulatory changes occur frequently and are to be expected... there are often adverse effects of changing rules that P&C insurers must deal with. They’re often left scrambling to meet new compliance standards, even if it adds more red tape and administrative work to their already busy workloads.”

I tend to see compliance cost as something too general, however, with a direction too difficult to predict. Sometimes it encourages coverage, while others discouraging. We can also do too little about it, given regulatory changes will always come as time goes on, and most businesses will see them as “necessary evil.”

If we must single out one thing, then the most crucial coverage discouraging factor must be “rate suppression.” At the beginning of this section, I’ve already used the “Cat-and-Mouse” metaphor to describe the game between state regulators and insurers. The “Cat” wants to see lower rates, so it will suppress the rate as much as possible, before insurers go broken. The “Mouse” on the other hand wants to keep the rates as high as feasible, subject to regulator approval — unless the rates become unbearable and then they quit all the renewals.

So, the Cat-and-Mouse game is a game between “rate suppression” and “no renewal.”

The best discussion on this comes from a widely cited study by the Nonprofit organization First Street Foundation on September 20, 2023. It confirms the game of rate suppression and no renewal, although this time with a focus more

on the homeowner policies than on auto policies. In its own words:

“When risk increases across that portfolio, the increases in insurance payouts often begin to outpace allowed premium rate increases and require a **risk correction** which must come in the form of increased policy rates for homeowners. As homeowners see growing insurance rates tied back to their increasing climate risk, their **cost of homeownership for the property** increases. However, regulations in places such as California, Florida, and Louisiana have suppressed insurance prices for years. As a result, the insurance industry is limiting and withdrawing coverage in high-risk wildfire areas due to state regulatory policies, increasing risk from climate change, and recent economic shifts.” (Emphasis added).

I like the notions of “risk correction” and “cost of homeownership.” Premium rate increases are largely a sign of risk correction — in a market without rate suppression — unless the court proves otherwise. Cost of homeownership simply means, among other things, the extra cost incurred from paying higher premiums to cover the loss from climate change — either for paying a higher renewal rate or paying a higher price in the residual (i.e., FAIR Plan) market.

First Street Foundation points out the risk on the consumer or homeowner side in terms of homeowners’ ownership cost — in the sense that the quick price correction makes many homes overvalued. Here is how it works:

“... in some areas of the country where rates are increasing, and private insurance companies are effectively labeling areas as uninsurable, ..., homes in those areas and property values will deflate.”

If the above is not easy to understand, this news report by CNBC.com on February 5, 2024, should help. It quoted First Street Foundation as saying that “research in California concluded that ‘the moment that an individual gets a non-renewal letter from the private insurance market, they essentially lose 12% of

their property value.”

This has been proven with real data. This latest report on February 27, 2024, tells us that “Condo prices in Jacksonville dropped nearly 7% year over year, while Miami’s decreased almost 3%. Meanwhile, average U.S. condo list prices are up over 8%, according to Redfin.”

In other words, rate suppression never really works. People with rate suppressed end up going two places: They either pay a higher rate after price correction, or they go to residual market where the price is also higher than before. The difference is that in the latter situation, some areas will be deemed “uninsurable” by private insurers, which will decrease the market value of the affected homes.

“In California, ..., the most impacted at-risk wildfire areas have seen a nearly 800% increase in insurance-initiated non-renewals, which “is not related to growing climate risk associated with wildfire alone.”

The same First Street Foundation report tells us how big the uncounted “at risk” market can be, as its Wildfire Model results reveal “the growing risk of wildfires for nearly 4.4 million properties, 23.9 million properties for wind, and 12 million properties for flood across the US not included in FEMA SFHAs.”

Since these properties at risk of wildfires, winds, and flood have not been included on the maps of FEMA (Federal Emergency Management Agency), their market value is inflated and once we count in the hazards they face, their value will inevitably go down. This is what First Street Foundation calls “a growing climate bubble which is just starting to be recognized and quantified.”

This about sums up the regulatory impact on insurance coverage. We will look at the other discouraging factors: Natural disasters, climate change and reinsurance, with social inflation skipped not because it is irrelevant but more for space consideration. Simply put, insurers are afraid of two things, disasters from mother nature, and legal disasters from society. My first white paper has

discussed both, so I will only add a few points related to catastrophes.

2.2.3 Source of Dread: Catastrophic Challenge

Outside regulations, catastrophes, sometimes shortened to “Cat,” are the most important factor discouraging insurance coverage.

This makes little sense at the first glance, because one key feature of the so-called “insurable risks” is “not catastrophic,” according to this Investopedia article: “Standard insurance does not guard against catastrophic perils.” This is true, P&C policies commonly exclude coverage for certain perils such as war, nuclear incidents, and earthquakes. Homeowners policies generally exclude damage from flood, earth movement (including earthquakes), war, and nuclear incidents. You need special insurance programs, such as the National Flood Insurance Program (NFIP) for flood insurance; and California Earthquake Authority (CEA) for earthquakes.

To understand why catastrophes still present a serious jeopardy for insurers, we need to set a few issues straight. First, not all catastrophes were born equal, nor should they be treated that way. For one thing, even the same catastrophe (e.g., hurricane) won’t be the same in the eyes of insurers, depending on where you live and the specific policy coverage terms.

As this well written article from Market Watch.com points out, “Standard home insurance coverage provides several protections for damage you might see following a hurricane... For example, if a windstorm passes through and blows shingles off your roof, your homeowners insurance will usually cover the damage... if debris blows through your window and rain damages your carpeting, your homeowner’s insurance might cover you. If the storm damage is so severe that your home becomes uninhabitable, your home insurance policy will also usually provide loss of use coverage.”

These sound great, right? Yes, but remember a hurricane not only comes with wind but also rainfalls, usually heavy ones. Therefore, here comes the bad news, “no matter where you live, your policy will not cover flood damage. Flood damage is usually defined as water damage from a source outside your home. For example, while a standard homeowners policy covers water damage if a pipe bursts, it will not cover you if a storm surge causes a local body of water to overflow into your basement.”

We may note in passing that there are five hurricane prone states: Florida, Louisiana, North Carolina, South Carolina, and Texas. However, with climate change other states may become hurricane vulnerable as well.

Now, consider wildfire. This Investopedia article tells us that “A standard home insurance policy from state-approved insurers typically includes wildfires among the fires they cover. Still, things are changing. Since 2017 and the increase in wildfire damage across the west, insurers in high-risk states are boosting premiums.”

This Allstate entry warns that “some insurers do not sell homeowners policies in areas where wildfires are common.” Do not take it lightly as it is one of the largest insurance issues in California.

But if your homeowner policy does include wildfire, then it will cover your dwelling or “your home and attached structures, such as a garage or deck. If your home is damaged by fire (or another covered peril), dwelling coverage may help pay for repairs or rebuilding.”

Your homeowner policy will also cover your belongings (e.g., furniture, clothing and electronics), plus the cost of reasonable increased living expenses, “such as renting a home while your home is being repaired, if a fire leaves it uninhabitable.” Finally, it may also offer “limited coverage for plants, shrubs, trees or lawns damaged by a covered peril, such as fire.”

In sum, although theoretically insurable risks do not include catastrophes, not all catastrophes were born equal. McKinsey report rightly uses the term of “quasiuninsurable risks.” Hurricane and Wildfire are not completely off limit in all states, and hurricane is treated differently in the hurricane prone states versus elsewhere. It also explains why less than 2 percent of California homes are insured against floods: After 20 years of drought Californians do not see the need for flood insurance.

2.2.4 How Insurers Define Catastrophes

Although insurers may cover wildfire and hurricane (not comprehensively, only partially and conditionally), we still need to see how insurers define catastrophes. This matters, as you will see later, insurers see catastrophes more as shared risk exposures than as shared tragedies, and this has direct bearing on insurers’ dread.

This Investopedia article divides cat events into two types. “The first is present whenever all or many units within a risk group, ..., are all be exposed to the same event.” The examples listed by the article include nuclear fallout, hurricanes, or earthquakes.

This means a cat is defined by an indiscriminately large number of exposures to a risky event by people sharing a risk group membership. This is more general than any specific events listed above, like nuclear explosion and earthquake. As a quick example, we can say all youth in the age group of 18-35 are exposed to the marriage event, thus making up a “social catastrophe.” Of course, marriage is normally not seen as a “risky event,” although marriage does carry its own risks.

I therefore prefer this dictionary entry that says a catastrophe is “a momentous tragic event ranging from extreme misfortune to utter overthrow or ruin.”

That said, let us still keep in mind how insurers see cat: It is defined by homogeneous risk exposures more than tragic loss. This makes sense, as insurers are fundamentally dealing with future losses, not existing ones. Insurers do not want to wait for “momentous tragic event” to occur, but want to proactively work on selecting the best risk and avoiding the bad ones. The real test of “insurable” versus “non-insurable” is the expected size of shared exposures, which directly determines the loss costs.

2.2.5 Dynamic Catastrophes & Terrorism

Another feature of catastrophes in the eyes of insurers is its *dynamic nature*. That is, the same natural or social disasters may not be called a catastrophic event by insurers at first, but later on it may make the list of catastrophes. Terrorism serves as a good example.

The aforementioned Investopedia article calls the second kind of catastrophes “involves any unpredictably large loss of value not anticipated by either the insurer or the policyholder. Perhaps the most infamous example of this kind of catastrophic event occurred during the terrorist attacks on Sept. 11, 2001.”

I would add that at least international terrorism is theoretically predictable, given the location and the limited number of terrorist entities in the world. The unpredictability refers to the size and severity of its losses by both insurers and consumers.

According to NAIC or National Association of Insurance Commissioners, “Prior to the Sept. 11, 2001, attacks on the World Trade Center and the Pentagon, terrorism coverage was usually included in general insurance policies without an additional cost to insureds. After the attacks, coverage became prohibitively expensive, if offered at all. In response, the U.S. Congress (Congress) passed the Terrorism Risk Insurance Act (TRIA) in 2002... TRIA requires insurers to make

terrorism coverage available to commercial policyholders, but it does not require insureds to purchase it.”

But covering terrorism does not fit into the general framework of insurable risk, as NAIC points out that “acts of terrorism are intentional acts designed to maximize damages and are not accidental insurable risks.” Another feature of terrorism is their geographical concentration, “making it difficult to spread the risk and increasing the chance of insurance company bankruptcies.”

The second feature is not fatal, as insurers can buy reinsurance that is designed to help spread the risk across geographic areas. The first feature does raise a more interesting conceptual question, as insurance is designed only for accidental or “pure risk,” not in the realm of intentional acts.

Neither NAIC nor the Triple-I discuss this further. I believe an easy explanation is that terrorism is intentional or premeditated by terrorists, but not by consumers or policyholders. Therefore, terrorism fits the second type of catastrophes discussed earlier, being “not anticipated by either the insurer or the policyholder.”

Instead of calling terrorism a “cat” event normally *excluded* by most standard commercial and homeowners’ policies, a more accurate definition of terrorism is from this NBER (National Bureau of Economic Research) paper that calls terrorism an “unnamed peril.”

If you are familiar with the insurance terminology, there are two types of insurance policies: “Named” versus “Open” perils, discussed in Section 1. The former is more restrictive and covers only specific perils named on the policy and nothing else, while the latter is less restrictive and covers all perils unless specifically excluded.

Therefore, as an unnamed peril, terrorism is presumably covered in an “Open peril” policy since it is not explicitly excluded.

The NBER paper also explains why terrorism was treated as an unnamed peril

before the 9/11 attacks in the East Coast in 2001, “insurers in the United States did not view either international or domestic terrorism as a risk that should be explicitly considered when pricing their commercial insurance policy, principally because losses from terrorism had historically been small and, to a large degree, uncorrelated.”

That has been changed dramatically by the 9/11 attacks, which “killed over 3,000 people from over 90 countries and inflicted insured losses currently estimated at \$32.5 billion that was shared by nearly 150 insurers and reinsurers worldwide.”

Note the NAIC article quoted the Triple-I figure of \$47 billion (in 2019 dollars) for the 9/11 attacks, much more than the NBER figure in 2004. Either way, it remains “the most expensive terrorist incident in U.S. history, as well as one of the largest single insured loss events in history.”

2.2.6 Reinsurance & Cat Bond

My first white paper has visited reinsurance in some details. I will only add a few points not previously covered here.

This article from Agentsync makes a good point and is a good way to explain the unique value of reinsurance: “Reinsurance works because of the underlying principle that risk is often limited to one geographic area. If a hurricane causes massive property damage on the east coast of the United States, it’s unlikely that an insurer operating out of the midwest would be dealing with similar losses.”

So far, so good, except climate change brings new challenges to reinsurance, as “the surge in natural disasters across the U.S. brought on by climate change could put even reinsurance companies in a bind. Multiple catastrophes occurring back-to-back across multiple geographic regions could push reinsurance to its limits and create compounding losses that are just too high.”

I have not talked about Cat Bond and here is a good way to understand the idea: “Like reinsurance, CAT bonds allow insurers to transfer risk, only this time it’s to investors. By opening investments to the financial markets, CAT bonds expand an insurer’s potential risk-taking capacity... As climate change risk increases so does the cost of insuring against it. Investors who typically buy CAT bonds because they see the risk as being overpriced might look to invest their capital elsewhere after they lose their principle due to severely underpriced risk.”

Cat is sometimes written as “NatCat” to denote “natural catastrophes.” But later on we will see insurers created many categorized “quasi catastrophes” not of natural origin.

To work with non-natural cat, we cannot just think of climate change and blame everything on that. It’s more productive to think about cat by breaking it down to its components. A good example comes from wildfire. It is best to think of people moving to the Wildland-Urban Interface (WUI) and how it can impact pure natural catastrophes (e.g., more and bigger wildfires and stronger hurricanes).

According to this report by the conversation.com based on a study published in February 2022 on the population change in the WUI, “the population of those high-hazard areas grew from 1 million in 1990 to 2.6 million in 2010 ... That’s an increase equivalent to the current populations of San Francisco and Seattle combined.”

According to data compiled by the industry-supported Insurance Information Institute (III), California has more than 1.2 million homes at risk for extreme wildfire, far more than any other state. This has something to do with the fact that more Californians are moving into fire-prone areas of the state, called wildland-urban interface (WUI), combined with rising costs of repairing or replacing houses either damaged or lost to fire — leads to increased insured losses.

3 The Root Problem of Risk Overexposure

The last section talks about why insurers reject policy applications and lists several external drivers such as cat and rate suppression. This section will unpack the hidden root cause of the unavailability crisis.

Let's begin with a good report by KQED dated November 13, 2023, which updates us on the latest situation in California insurance crisis. Interestingly, the term "InsurTech" never even showed up once throughout the entire report, despite years of InsurTech efforts and numerous startups.

3.1 Insurance as Truckloads of Cash

The first thing I noticed from the KQED report is an interesting metaphor of insurance. The author, Danielle Venton, says insurance is like "an ambulance full of money to help people back onto their feet."

Thinking of insurance as truckloads of cash delivered by insurers after a disaster is understandable but *inaccurate*, at least in property and casualty (P&C) insurance. Life insurance policies do pay lump sums to beneficiaries after the death of the insured, but P&C insurance companies rarely write a single check for the entire amount of claim payment.

After a catastrophe or a loss, an adjuster will evaluate or assess the accurate amount of losses, and then the insurer will issue several checks over time, with the first before work begins so you can hire a contractor. As the work progresses, they will typically release more money, and the rest will be released once the job is finished and the home passes inspection. Sometimes insurers, especially health insurers, pay service providers directly with no money going through policyholders at all.

3.2 Frauds Incentivized By Insurance Policy

But the real issue is not so much of the accuracy of the “truckload of cash” metaphor but its ramifications. We must focus on the unintended, detrimental or even dangerous consequences. For one thing, the large amount of money promised for the future may incentivize insurance fraud, because some people will read the insurance policy like a lottery ticket.

That is right, the potential of receiving a large sum of cash from insurers may have contributed to the cheating and deceiving behaviors by some policyholders, agents or entities for illegitimate gains. These include false insurance claims, exaggerated losses for a higher settlement, or staged accidents to claim compensation for injuries that did not occur.

This real life story from the CDI (California Department of Insurance) website tells us a shocking story of the alleged “family and friend” organized auto insurance fraud ring in the San Francisco Bay Area.

According to the report, there are 33 faked auto accident claims filed by parties knew each other but acted as strangers in a loss involving at least 40 different vehicles, some purchased with damages on them, and some sustained damages in staged collisions. They ran the scheme for four years.

At the federal level, according to the FBI, the total cost of insurance fraud (non-health insurance) is estimated to be more than \$40 billion per year, costing the average U.S. family between \$400 and \$700 per year in the form of increased premiums. This is why insurance fraud is a serious crime that can result in legal consequences, including fines, prison time, and other negative personal and professional outcomes.

Rampant abuses and insurance related frauds, together with social inflation, explain the sweeping tort law reform bill passed and signed into law by the governor in Florida in March 2023. But keeping the link between insurance policy

and fraud in mind will offer the precognition to see things before they emerge.

3.3 Insurers' Risk Over-Exposure

A truckload of cash payment also creates a compilation of problems called “risk over-exposure” for insurers. The term refers to the situation where an individual or organization is exposed to an *excessive* level of financial risk.

Risk overexposure comes from both *external* (e.g., fraud and social inflation) and *internal* (e.g., All-in-One policy) sources. The two were not born equal, as we can argue that the latter arises before the former. The large claim payout obligation is created by insurers themselves since the first day of the insurance business and has changed little ever since. Denied insurance, under-insurance and all the way to the current insurance crisis are all deeply entrenched in this.

As I point out earlier, the insurance crisis in California — and elsewhere — has been in the making far earlier than 2023, even earlier than the Proposition 103 in 1988. Furthermore, the crisis also has a deeper root than climate change, as the seed of the problems can be traced back centuries ago when the first fire insurance firm started operating in Philadelphia. It brings up bigger problems than premium hike, and covers more aspects than insurers' exodus.

3.4 The Unique Future Payment Promised by Insurers

Although insurers, especially P&C insurers, rarely send a big lump sum check to clients, they do all promise a large amount of payment sometime in the future, when the clients suffer a loss that is covered by the policy.

All financial services involve money, often big chunks of money. But when it comes to paying loss-contingent, legally binding cash to clients, there is no other service like insurance.

Banks for example will only guarantee (up to an upper bound \$250,000 per depositor through FDIC) the return of the deposit principle and accrued interest through the date of the insured bank's closing, while investment will never guarantee a fixed amount of return in the future. Real estate may see the value of a property ballooned, but again there is no guarantee and the same property may drop in future value just as well.

Only insurance offers, or promises to offer, a future cash payment that may be substantially larger than one's premium payment. For example, Bankrate.com tells us that the state minimum coverage in auto insurance in California only costs an average premium of \$636 per year. In return, that minimum policy promises to pay \$15,000 for the death or injury of one person, \$30,000 for the death or injury per accident, plus \$5,000 for property damage, for a maximum total of \$50,000, which is \$49,364 more than the premium one pays.

Most auto insurance policies provide coverage from the moment the policy is in effect. If someone buys a policy and gets into an accident on the same day, the person's loss is covered — unless the policy specifies a later effective date. In the event of a total loss within the first year of ownership or before reaching 15,000 miles, some insurers like Liberty Mutual will even pay you to purchase a brand new identical car, minus the deductible.

Such a cash payment, in and of itself, could remind us of the windfall gains in a casino, where paying a premium is like buying casino chips to enter the game. Of course, the fundamental difference is that being lucky in a casino means winning a big amount of cash, while luckiness in insurance means you have zero loss and never have to file any claim. That said, in case you must file a claim, the good news is that insurance cash offer is guaranteed by the law and is written in a legally binding contract known as a "policy."

3.5 How Do All-in-One Policies Make Sense

But the tricky part is that insurance companies have been following a seemingly flawless logic in doing what they have been doing for centuries: collecting premiums from all policyholders and in return offering, or promising to offer, coverage up to the legally binding limits for covered losses. Just ask this question: Without offering or promising coverage claim payment, who would pay a premium for loss that has yet to occur?

This explains the fact that insurers have been writing essentially the same insurance policies since the very first property insurance firm in North America: the Philadelphia Contributionship organized by one of the founding fathers Benjamin Franklin in 1752 and incorporated in 1768 — except that back then the fire policy lasted several years, saving the trouble of annual policy renewal like we do today.

3.6 A Problem That Should Not Have

Theoretically speaking, having to pay a large claim amount does not necessarily create risk — if we understand how insurance is designed to work as indemnification, meaning to compensate a person or an entity for damages or losses incurred due to a specifically covered accident, incident, or event. If there is no loss, or having a loss that is not covered by the policy, there will be no compensation, period.

Indemnification can be both a procedure or a principle, the latter is more fundamental for insurance. It states that an insurance policy shall *not* compensate the policyholder more than their loss. In other words, policyholders shall not be made *better off* by the insurer than they were before the loss.

For example, if your house suffers a total loss from a wildfire that requires

\$500,000 to repair or rebuild, an insurer will pay you that much — unless the coverage limit is below \$500,000. You can rest assured that no insurer will pay you anything more than \$500,000 because, among other things, doing so is against the indemnity principle.

3.7 Human Greediness Gets in the Way

If everything works as the idea or as the contract says, insurers should have no risk overexposure. Although they must pay large sums of cash in light of heavy loss, they can also get a sufficiently large pool of clients and screen out highly risky individuals to make themselves safe and remain profitable.

However, humans are generally known as greedy, and that greediness can drive them to be “creative.” Some may see the coverage limits listed on the contract as a “reward” to their “creativity” — even though they understand perfectly that they must have a legitimate loss to qualify.

I watched an interesting 2021 movie “*Adieu Monsieur Haffmann*” (“*Farewell Mr. Haffmann*”). One review summarizes the movie well: “A brilliantly told ‘small’ story set against a backdrop of WW2 evil and terror... it focuses on individual relationships that are shaped by human nature, survival instincts and massive external factors.”

To share what strikes me the most in the movie, I will briefly introduce the plot and characters. In Nazi-occupied Paris in 1941 a talented Jewish jeweler, Joseph Haffmann, arranged for his family to flee the city but was unable to escape himself. He offers his non-Jewish French employee, François Mercier, to take over his store for free until his future return after the war.

Now, I won’t forget the words from the female character, François Mercier’s wife, Blanche Mercier, who told Haffmann that ever since her husband received the free shop, he’s getting greedy and want more and more stuff.

So true. It doesn't matter that François Mercier received the shop as a gift under the special circumstances — he did not earn it by himself, and it doesn't matter he must return it to its original Jewish owner when situation returns to normal. Being the nominal shop owner is enough to awaken his internal greediness that drives him to want more.

3.8 How Insurers Formally Deal with Risk Overexposure

Risk exposure is a normal part of life for insurers, given that insurance is in the “risk transfer” business, which involves the contractual shifting of a risk from one party to another for an exchange of money. Therefore, the question is not whether insurers can get away completely from risk but how they successfully handle risk. The answer is to be found in a few formulae.

We can start with the “loss ratio,” from which we can calculate “combined ratio” and then the “underwriting profit”.

$$L = \frac{C + A}{P} \quad (3)$$

or in words

$$\text{Loss Ratio (L)} = \frac{\text{Insurance Claims Paid (C) + Loss Adjustment Expense (A)}}{\text{Premium Earned (P)}}$$

As the name implies, loss ratio measures financial loss, not gain or profit, for the insurer from their insurance business. Achieving financial success means to reduce the loss ratio or to make it as small as possible.

From Equation (1) we can see there are mainly two ways to reduce the loss ratio, one is to make the denominator, premium earned (P), larger, while another is to make the number of insurance claims, (C), smaller.

Other things equal, having more policyholders will make the pool of premium bigger, thus reducing the loss ratio. This is why insurers always compete to enroll more policyholders, which is called to “grow the book of business.” Of course, raising the amount of premium would also help, although with competition insurers cannot set premium as high as they would like.

The other way to lower the loss ratio is to reduce the number and amount of insurance claims. It pays for insurance companies to recruit people who are less likely to file a claim. This explains why insurers always ask a bunch of questions before they offer you a quote.

Once we know the loss ratio, the other two ratios are easy to understand. Expense ratio is a measure of the portion of an insurance company’s premium income that is spent on operating expenses. It includes expenses like agent and broker commissions, employee wages, and advertising. They are collectively called “Total Underwriting Expenses” and the expense ratio is:

$$ER = \frac{E}{P} \times 100 \quad (4)$$

or in words,

$$ER = \frac{\text{Total Underwriting Expenses}}{\text{Net Premium Earned}} \times 100$$

Once we have the loss ratio and the expense ratio, underwriting profit is

$$UP = NP - (L + A + ER) \quad (5)$$

Where “UP” on the left-hand side means “Underwriting Profit”, “NP” mean “Net Premium”, “L” means “Loss,” “A” is “Adjustment Expense” and “ER” is “Expense Ratio”.

For example, say an insurance firm has a loss ratio of 70%, meaning 70%

of the premium money is used to pay claims; the same insurer has an expense ratio = 25%, meaning the firm spent 25% of the premium money on ads, agent commission and employees wage. This makes its combination ratio of 95% and the underwriting profit will be $100\% - 95\% = 5\%$.

So here we are to see all the formal strategies insurers have done and will continuously do to keep the loss ratio low: They all want to grow their books of business to recruit as many policyholders as possible; but they will also pick and choose the best candidates who are less likely to file a claim during the policy period. When the policy ends, all they have received is the peace of the mind but no financial compensation from the insurer, or one or two small claims that no more than their premium.

The story is not static, as insurers keep a close eye on what policyholders do to their properties over time, such as home improvement. This report from Yahoo Finance does a good job explaining why home remodeling and renovations can make insurers worry, and would want to increase your premium. I will quote the report directly, "Imagine the owner of a \$400,000 home updating their kitchen and bathrooms, spending \$80,000 on the project. Before the work was done, the minimum 80% coverage level for full replacement was \$320,000. After the improvements, the home's new market value increases to \$480,000. However, the old insurance coverage of \$320,000 covers just 67% of the home's new value. To meet the 80% rule, the homeowner's insurance policy should be increased to \$384,000 worth of coverage."

Note the 80% is a guidance, not a rule. It means your homeowner policy coverage needs to equal at least 80% of your home's full replacement value. Note the Yahoo report made a mistake by referring the 80% rule to 80% of a home's current market value. The rule protects replacement value, which can be significantly higher than the market value due to increased construction costs, building

code updates, and location-specific factors.

Finally, we have only talked about underwriting loss (or underwriting gain), and ignored the potential gain from investing the premium money. It is not unheard of that an insurer may have an underwriting loss, but the loss is more than made up for by investment gain.

3.9 Insurers' Informal Dealing with Exposure

So far we have only talked about insurers' textbook strategy in dealing with risk exposure. Are there "off-record," nuance and subtlety strategies or tricks insurers used but not talked? Consider the following examples.

This report on November 23, 2023, says "Florida public adjuster says insurance companies are increasingly denying legitimate claims." Although public adjusters generally represent consumers rather than insurers, their views are an essential part of an objective picture of insurance reality on the ground.

This legal blog on November 21, 2023, asks an interesting question: If a brand-new home is completely destroyed by a fire just a day after the homeowner moves in. Then its actual cash value should be no different from the replacement cost value, as there is no depreciation for a brand-new home. Insurers however may still argue not to cover certain part of the cost, when they should have treated the house like it is under the replacement cost value.

Another example insurers are careful with type of coverage: "in Midwestern states where wind and hail damage is common, insurers may not offer replacement cost coverage on roofs, instead requiring actual cash value coverage or roof depreciation schedules."

When "a part of a building component is damaged (such as part of a roof) and the issue is whether the insurer can pay only to replace the damaged portion or must pay to replace the entire component so the damaged portion matches

the undamaged portion. Insurers have broadened policy language to make clear that they ‘will not pay to repair or replace undamaged property due to mismatch between undamaged and new material used to repair or replace damaged material.’”

3.10 A Hidden Crisis of Relevance

At this point, there is another theoretical issue concerning the relevance of private insurers. Few have talked about this, but it still helps to ask if private insurers will become *irrelevant* in the modern societies.

Just imagine the scenario when *every* consumer goes to the residual insurance market (i.e., the FAIR Plan in California) or decides to insure themselves (see more discussion on this later). At that point, all private insurers have essentially moved in sync to force out all consumers — making themselves irrelevant in the market.

Of course, we are unlikely to see that to happen — as long as private insurers keep offering cheaper policies than “insurance of the last resort.” That said, it is also true that every consumer denied by private insurers is moving closer to the residual market.

This remains a remote possibility today, as most insurers are doing fine and are recovering if not yet growing in the post-Pandemic era. According to this 32 page McKinsey Global Report for P&C Insurance 2023, “In 2022, the insurance industry surpassed \$6.5 trillion in GWP, with P&C representing almost one-third of total revenues.” Note GWP means “Gross Written Premium” above, the total amount of money an insurer collects from its customers in exchange for insurance policies, before any deductions for reinsurance and ceding commissions.

But the “risk of irrelevance” is real for private insurers — if the current trend continues for them to skip all the households in a wildfire zones in California,

or hurricane zones in Florida. Consumers have the right to ask why do we need private insurers at all, if all they are doing is to push people into FAIR Plan or other residual insurance model.

The above Mckinsey report tells us that “in developed economies, current risk frameworks are lagging the proliferation of new and evolving risks, from cyber to natural catastrophes (NatCats) to shifting mobility habits.”

“As demand for personal P&C insurance grows, insurers are even shying away from addressing the most critical protection needs. Indeed, insurance carriers are crucial to the communities and businesses in regions experiencing more severe climate events, but they are becoming increasingly uninsurable.”

This is what McKinsey report calls the “protection gap” by personal P&C insurers.

3.11 No Business Model Is Forever

The All-in-One policies have been working for so long that insurers thought there was no other way of doing business or no other policies are possible.

But just because it has a long history and is commonly adopted does not mean it can't be changed. It is well known in the business world that no business model lasts forever, as this Harvard Business Review article tells us, and the most dangerous trap for any manager is complacency.

Another HBR article in 2011 says there has never been as much interest in business models as there is today, with seven out of 10 companies trying to create innovative business models, and 98% modifying existing ones.

4 Toward Solutions of Insurance Crisis

After the long discussion on risk overexposure and ideas of changing the existing insurance model, we are finally ready to talk about solutions.

This white paper has an unusual order of presentations. Section 1 already discusses the new ideas in sufficient details, making it hard to say more without repetition at this later point. This section will take notes on what managerial consultants have suggested on handling the challenges faced by the P&C insurance, followed by a “fake solution” of self-insurance, or more generally known as “risk retention,” and end with a high level “Super Insurance” model that serves as the best way to illustrate what we want to achieve through RisX or Risk Exchanges. This last subsection stands out with its theoretical/conceptual rigor, as it examines scholarly discourse on risk management in general, limited liability for corporate management.

4.1 Thoughts of Changes from Consultants

There have been discussions on reforming insurance business, mainly by managerial consultants. Their ideas do not exactly match ours, but that is only natural, as not all consultants are entrepreneurs. Nonetheless, our diagnosis of existing problems and proposed solutions share some common ground.

Some media have seen problems, including the KQED report. For example, it points out that “the industry is in serious trouble. Climate disasters around the state, especially worsening wildfires, **threaten the current business model** and millions of middle-class Californians.” (Emphasis added).

This view that climate disasters “threaten the current business model” differs slightly from ours, as we argue that the business model has intrinsic vulnerability of its own even before climate change. But it is always good to see media talking

about business model.

Managerial consultancies generally see deeper than the media. In the aforementioned McKinsey Global Insurance Report on Personal P&C in 2023, the authors point out that, “To regain relevance and fuel growth, personal P&C carriers need to focus on capturing market tailwinds—namely **new or new-product innovations**—as well as on addressing four key success factors of distinctive capabilities: perfecting capabilities within specific **distribution channels**; enabling cross-functional collaboration and faster feedback loops between claims, actuarial and pricing; modernizing claims through advanced analytics and automation; and innovating to address an evolving risk landscape and to fully monetize customer relationships.” (Emphasis added.)

Their points of regaining relevance through new product and new distribution channels are well taken.

In another place of the report, “we see five main forces driving challenges for the personal P&C insurance industry—inflation, new entrants, business model and distribution innovation,..., Insurers must **recalibrate their products, distribution**, and technical models for a customer base and an employee pool with higher standards than ever.” (Emphasis added).

I am glad to see new business model, new products and distribution innovations are part of their vision.

Finally, I agree with the outlook that, “Going forward, insurance carriers can reignite growth by reclaiming their crucial role in society, covering risk where they are most needed, and enlarging the addressable market.”

I also like the words on protection gap and insurers not exhibiting sufficient value to consumers:

“To start, the industry’s current protection gap is clear evidence that traditional personal P&C products available today are not meeting consumers’ full

spectrum of needs. In some cases, **customers may not see sufficient value in the available products**; in others, insurers are shying away from addressing areas that need protection (for example, NatCat).” (Emphasis added).

McKinsey is not the only people thinking changes of insurance. This PWC report lists several personal line P&C carrier challenges, including insurance products: “Costly, labor-intensive claims process that alienates customers; Dis-jointed distribution; **Products that don’t meet customer needs**; Climate-related threats and Responsible use of analytics and automation.” (Emphasis added).

Let’s keep in mind that consultants often focus on problem-solving and proposing solutions; while entrepreneurs often push boundaries and pursue bolder, riskier options. Consultants may not go all the way or break all the paths as entrepreneurs would, but their distinct approaches offer valuable contributions.

4.2 Is Self-Insurance the Way Out?

Instead of proposing various reforms, and questioning if private insurers have a value-added position in the society, one “solution” at the other end of the spectrum is to go self-insurance.

This article from the Insurance Journal on December 22, 2023, talks about the rise of self-insurance. “At the heart of insurance lies the principle of risk transfer. However, with rising costs and limited coverage, consumers are questioning the value of their insurance investments, with many now turning to self-insurance, where individuals assume the financial risk rather than relying on traditional insurance policies.”

There are pros and cons of self-insurance. But neither Perplexity.AI nor Gemini.AI initially mentioned the savings from insurance or risk transfer model. The good news is that upon my direct request, both agreed that self-insurance forgoes the potential for savings from risk sharing.

“In Florida, 20% of homeowners are adopting this approach, seeking respite from shouldering the nation’s steepest insurance premiums.”

Clearly, not everyone can take the self-insurance as a viable option, as “only those who fully own their homes without any outstanding mortgage qualify to explore self-insurance options.” This is because mortgage lenders often require insurance.

“In areas prone to extreme hazards like hurricanes or wildfires or uninsurable zones such as coastal areas, high-net-worth (HNW) individuals, despite the capital to purchase such properties, often find themselves facing unavailability or exorbitant costs of insurance. Hence, many opt for self-insurance. While these individuals possess the means to acquire such beautiful properties, they might lack the resources necessary to maintain them however, due to the technology used inside, high-ticket building materials, supply chain taxes and more. This disparity pushes some property owners to reconsider their options.”

The above raises a good point that even for High-net-worth families, building properties in the risky areas without insurance is bad. Everyone should reconsider property in harm’s way — with or without insurance.

The next paragraph is important: “There’s a misconception among ultra-high-net-worth individuals that their investment in expensive properties will attract numerous insurance companies – the reality is far from it. The real estate market often fails to disclose the risks associated with such properties, leaving potential homeowners unaware of the implications. It is the broker or financial advisor’s job to step in and warn their clients of any overlooked pitfalls associated with purchasing a particular property.”

While the property owners see high value, insurers see high risk. The misconception among the UHNW (Ultra-High-Net-Worth) is not their fault, but more of the broker or financial advisor, who should have sounded the alarm of the high

risk involved in building expensive properties in risky areas.

The financial suffering left by Hurricane Katrina in New Orleans is a shocking example of how uncovered damages stay: “In the event of a disaster, the financial burden could soar beyond expectations, leaving the uninsured stranded. More than 18 years later, the financial scars and impact of Hurricane Katrina are still being felt in New Orleans, where thousands of abandoned homes still sit.”

The point of contractors preferring insured properties is also worth-noting, which puts the self-insured homeowners in a weaker position for post-disaster recovery: “Contractors prioritize insured properties when catastrophes strike. Self-insurers might face difficulties in coping with catastrophic losses, like the complete destruction of their home, an event that could occur unexpectedly anywhere. This means that in a neighborhood affected by a storm, those without insurance might find it challenging to secure immediate assistance for repairs.”

“Self-insurance fails to offer certain protections... The absence of an insurance policy also severs the connection to a broker, ... When a claim arises, self-insurers are left to navigate the process solo. While some can manage self-insurance, many prefer the traditional insurance option for the invaluable expert advice and aid that it offers during unforeseen circumstances.”

The article finally offers detailed, well-meaning advice: “All homeowners — regardless of their insurance policy mandates, but especially if they choose to self-insure — should prioritize fortifying their properties and belongings. This might involve clearing areas prone to wildfires or securing roofs using hurricane straps. Implementing mitigation strategies like fire-resistant landscaping, installing water sensors and enhancing home cybersecurity can notably diminish risks and enhance the chances of obtaining insurance coverage. Furthermore, safeguarding valuables by utilizing controlled environments with specific temperature and humidity levels is also recommended.”

5 Follow the “Super Insurance” Model

I am not a fan of American football but this year’s event is impossible to escape the news, with the shooting near the stage at Union Station just moments after the Chiefs Super Bowl parade ended.

The news got me thinking about insurance for mega events like the Super Bowl. Luckily, my curiosity paid off, as I found the perfect case to illustrate RisX and its advantages over the legacy insurance model. Let me explain.

5.1 The Largest Event Insurance in the World?

The following summarizes the key features of covering the mega event.

- **Multiple insurers:** We don’t know the names of insurers covering the event but we know for sure that there are multiple insurers in the game, as the loss and coverage are potentially too big for one insurer.
- **Multiple policies:** This blog lists the following policies:
 - General Liability and Excess (limits may exceed \$100 million).
 - Property.
 - Media Liability
 - Event Cancellation.
 - Weather Insurance

The same blog also lists the following sources of risk exposures for Super Bowl insurance, sparking curiosity about whether it’s one of the most complex coverages in the world.

- The event itself, including field, stands, and surrounding parking lots for the normal exposures of slip/trip/fall, crowd management, and security.

- Preparation for potential terrorist attacks, including prevention and response.
- Halftime show with all the people on stage and fireworks.
- Pre-game airplane flyover.
- Adverse weather that prevents participant and ticketholder arrivals and departures, including postponement and cancellation contingency plans.
- Surrounding activities such as pep rallies, parties, entertainment events, etc.
- Collapse and other liability resulting from temporary event structures such as stages, bleachers, platforms, tents etc.

But even the above list is incomplete, as it focuses on the events and properties — not so much on the people. We have to worry about coverage for the athletes, including health and safety protection mandated by the collective bargaining agreement between the NFL and the NFL Players Association. This includes coverage for injuries, future liabilities, and worker’s compensation.

Additionally, football players can purchase insurance policies against the loss of future endorsements, off-field disability, and contractual bonus coverage. The league and the teams also carry liability and disability insurance to protect against catastrophic on-field incidents.

Given its scale, social significance, and uniqueness, I call this special event insurance a "Super Insurance" model, which offers two key takeaways relevant to general insurance for homeowners, autos, and businesses.

5.2 Single Event, Multiple Carriers

The first lesson is collaborative coverage by multiple insurers. While this might seem straightforward, it marks a departure from the traditional “solo in-

insurance” practice, where a single insurer or carrier handles coverage for the whole event or whole entity.

If we’re serious about adopting the Super Insurance model, we need to ditch the single-carrier habit and try more collaborative coverages with multiple carriers.

We do have multi-carrier policies outside the Super Bowl. The most common one is the Difference in Conditions (DIC) policy, typically issued by a residual insurer (like California’s FAIR Plan) and a private insurer jointly. This companion policy provides additional and expanded coverage for homes and businesses in disaster-prone regions, filling the gaps in the FAIR Plan’s more limited protection.

DIC policies aren’t exactly a model of collaboration between *equal players*. The wildfire coverage is provided by the FAIR Plan, setting the prerequisite for the DIC policy to work. Private insurers will not join DIC unless the risk of wildfire has been taken care of by someone else (i.e., FAIR).

The key takeaway from the DIC story lies not in simply replicating its steps to offer shared risk insurance, but rather in establishing a precedent for multi-carrier insurance as a means to address the concerns of private insurers. We don’t need a FAIR Plan to achieve similar beneficial outcomes as the DIC program. The revolutionary RisX allows private insurers to help each other in a genuine collaborative model of equal players, lowering the cost of collaboration.

5.3 Partitioning Clustered Risks

The second lesson we can learn from the Super Insurance model is not to treat independent risks as a “cluster,” but compartmentalize or partition them — even for ordinary home, auto and commercial policies. We just need to think outside the box of Scale Determinism. Here is what I mean.

When we talk or think about the Super Bowl, its sheer scale makes it natural

or even obvious that no insurer would want to treat all risks as one and write a single policy for this large-scale sporting event. Instead, insurers will divide risks into *parts* (e.g., field, stands, and parking lots) or *risk categories* (e.g., terrorism, half-time show and adverse weather) and then negotiate coverages among themselves.

But the same idea of risk partitioning can be applied to ordinary home, auto, and commercial insurance policies. What applies to the Super Bowl can also be applied to smaller events or smaller entities because the stakes in a single homeowner, auto, or commercial policy, often with claim payout limits at six or seven digits figures, is significant enough to warrant a breakout approach.

Financial stake is not the only thing making partitioned risk *sine qua non*, the variety of properties and risk categories also necessitates partitioning. Think of it: A modern home is a miniature of the Super Bowl venue, much smaller but not much simpler. The main dwelling is like the main stadium, and the detached structures are like the parking lots and shuttle services, so to speak. Furthermore, homes are exposed to a wide range of risks, similar to, albeit to a lesser degree than, the Super Bowl event. These risks include terrorism, vandalism, theft, adverse weather conditions, earthquakes, floods, hurricanes, and wildfires.

Lumping all risks associated with a home, autos and business entity into a single policy effectively treats multiple risks as a single one, thus the name “clustered risks.” Note the term will always end with an “s” to signal multiple risks viewed as a one. This is logically the same as a single insurer covering the entire Super Bowl, except that the massive payout limit (up to \$100 million) and diverse risk landscape from the Super Bowl make it easy to see the infeasibility and impracticality, but not so with a single homeowner, auto and commercial policy.

Two features of risk clusters are sizes and dynamics. A cluster can be an

as small as an auto and as large as a Super Bowl event. An old cluster in the past can turn into non-cluster, just like a non-cluster can turn into cluster. For example, when a neighborhood had a heavy loss from the wildfire, that entire neighborhood becomes a cluster in the future and most insurers won't write any policy to anyone in that neighborhood.

Insurers loath clustered risks and because of that, they see many risks as clustered. This is the largest concern behind rejection of policy by insurers. Rejecting all policy applications in a high risk region however is logically the same as turning down the offer for covering the Super Bowl, a golden opportunity that no insurer would want to skip.

The only right approach is to follow the "co-insuring split risks" model of Super Bowl, where insurers work together to insure partitioned risks for a "win-win" result. Instead of one insurer covering the entire property, entire business entity, or all types of risks, we first split them apart into elemental risks, each for one property part or one particular category of perils, and then we work with each other to offer diversified coverage to consumers at the place and time when they need insurance the most.

In the following sections, I will discuss two primary examples where clustered risks have played an essential role: homeowners association (HOA) master insurance policies and insurers' risk appetite guides. The former simply applies clustered risks, while the latter expands and consolidate the power of clustered risks.

6 Rethinking the HOA Master Policy

Given the common practice of one insurer issuing a single policy to multiple consumers, we must show its inherent vulnerabilities. The master insurance pol-

icy used in HOA (Homeowners' Association) Insurance provides a prime example of these vulnerabilities.

6.1 One Policy for Hundreds of Policyholders

There are basically two types of HOA, one is for single family homes (and planned neighborhood or master planned community), another for condo residents. The master plan for the former has more limited — but not necessarily cheaper — coverage as it covers only shared or communal spaces like parks, gym, sidewalks, elevators, playgrounds, tennis court, golf court and pools, leaving all families to find their own individual homeowner insurance, typically with an open peril HO-3 Form.

The master policy for a condo HOA covers more properties, including the building's structure and foundation that hold multiple condo units. It also offers liabilities and property damage coverages in public or common spaces. An individual unit owner will buy their separate condo insurance (HO-6 Form) that typically covers only what's inside the unit (may even exclude the fixtures like appliance, countertops and cabinet, see below).

Not all condo master policies were born equal. As this article points out, "Master policies can differ to what extent of property damage is covered. They generally fall into one of two categories of coverage: 'all-in' or 'bare walls.' An all-in policy includes each unit's structure – the walls, ceilings, floors and fixtures like cabinetry and appliances that was originally designed. In contrast, a bare walls policy only covers ceilings and floors, not fixtures." Apparently, the "all in" type has more risk exposures than the "bare walls" type.

HOA master insurance policy is no comparison to Super Bowl insurance in terms of the number of people involved and the value of the properties. That said, a lot is still at stake. Let us look at some statistics.

According to this HOA Statistics 2024 website, “Homeowners’ associations in the United States manage 355,000 communities, with an average of 22 new associations forming daily... 53% of all homeowners live in HOA communities... 40 million housing units are part of HOA communities... Roughly 8,000 new HOA communities form each year... Homes in HOAs are worth a collective \$9.2 trillion.”

Now, if we use this website’s numbers, there are more than 75.5 million people living in an HOA, and the latest estimate in 2023 says there are 365,000 HOAs in the nation. Putting the numbers together, we can calculate the average residents per HOA: 75,500,000 total people divided by 365,000 HOAs to get 206.8.

6.2 What Makes HOA Master Policy Risky

There are people believing HOA master policies as the perfect solution for condo communities. This article argues that for HOA insurance, with little doubt “the most efficient way ... is to have a single master policy covering all of the units/lots and to have each separate unit/lot owner carry only liability insurance and personal property insurance covering the contents of their unit dwelling or office, as well as payment of the master policy deductible amount.”

While “a single master policy + numerous condo policies” do eliminate policy conflicts and gaps in coverage, from a risk management perspective, we should not overlook sources of risk exposures in a HOA master policy.

6.2.1 Hundreds of Policyholders

The first issue is the large number of policyholders. The master policy written by one insurer for the HOA will be responsible for covering risks/perils exposed to typically more than 200 people in the single community.

Let us compare the HOA master policy with policies in high density neighborhoods, as reported in this local news that why insurers don't like high density residents, making homeowners in Orleans, Jefferson, and St. Tammany Parish difficulty to find coverage.

Insurers have a good reason to do that. One financial professional in Louisiana points out that "insuring many homes in one small, dense area is a much bigger risk for companies than spreading out their policyholders over a larger area...., 'In the event of a hurricane or tornado,' he said, explaining the companies' thinking, 'I'm gonna get killed, because I have all my eggs in one basket. I need to spread them out.'"

But a master planned residential community also has a high density of people. If insurers don't want to write policies in high density communities, they face the same risks in a HOA master policy.

One may argue that a HOA master policy is a single policy. But that is the case only in theory and on the surface. To be sure, the HOA master policy has only one policyholder, the Homeowners Association. As this legal article correctly points out, the condo HOA master policy is "usually written in the name of the board of managers or condominium association and any insurance is typically payable to the board for each of the unit owners in the percentages established in the declaration."

In practice, however, the master policy premium is collected from all families in single family homes or all unit owners in a condo. In other words, the insurer is financially and legally liable to *every* resident, who is a risk source, either in the sense of someone's kid falling and getting injured in the playground, or in the sense of a water leak from a unit causing damage to the building structure and other units. Either way, each unit stands behind the master policy as a risk source. It is not exaggerating that in a community of 200 residential units, there

will be 200 sources of risk.

6.2.2 A Long List of Diverse Risks

And there is another source of risk exposure: Although the HOA master policy will not cover all *properties* under the sun in the community, it will cover a long list of *risks*, more complicated than a typical homeowner policy because the master policy is a commercial insurance policy, in which the HOA is rightly treated as a business entity.

The following list of covered risks or perils is directly from this Business Insider article:

1. Property damage in shared spaces. If common areas like a gym, pool, or lobby are damaged, your HOA master policy will pay for repairs.
2. Directors and officer liability: Protects the HOA's board of directors if they are sued for actions they take on behalf of the association including breach of contract, violating HOA governing documents, and failing to buy enough insurance.
3. Worker's compensation: Protects the association if its employees are injured on the job.
4. Employee dishonesty: Protects the HOA from liability if an employee steals from a resident.
5. Discrimination: Protects the HOA in the event that a condo owner sues for discrimination.
6. Commercial general liability: Protects third parties who are injured on the HOA's property.

7. Commercial umbrella policy: If the cost of damage or injuries exceeds the coverage amount of the HOA's master policy, an umbrella policy will pay the difference.

Note each risk category listed above contains multiple risks itself. Take “property damage in shared spaces” for an example, the gym, pool, elevator or lobby are each subject to the same or different risks. The only thing common is that each shared space constitutes a source of risks.

6.3 Insurers Response: Jumping On and Off the Bandwagon

These risk sources (hundreds of policyholders and a long list of risks) should make insurers think twice on writing a single policy for the entire community. In reality, however, what we have seen is that insurers are willing to write master policies as long as the community is not considered “high risk.” Once a wildfire visited the community, or once a hurricane made damages to the units, insurers jump to rejecting all homeowners’ renewals, based solely on whether properties have *shared exposures* to catastrophe, without taking into account the actual loss status. The best example is an insurer refusing to renew a policy for a family that perfectly survived the Camp Fire.

Insurers’ shifting gears is understandable because in a catastrophe, it happens so often that when one local unit is destroyed, we expect other local units to be vulnerable as well.

Nonetheless, just because insurers’ moves are *understandable* does not mean they are *optimal*. Insurers can do better than “jumping on the bandwagon” before a catastrophe hits and then “jumping ship” after a catastrophic event making property damages and/or human casualties, whether in HOA master policies or individual homeowner/condo policies.

7 Rethinking Risk Appetites

HOA Master policies are not the only example involving clustered risks, insurers have a more common and more active way to embed clustered risks in daily operations: their risk appetites that guide underwriting decisions.

Unlike HOA master policies that simply apply clustered risks to underwriting, risk appetites exacerbate the challenges associated with clustered risks by creating an illusion of certainty for the sake of uniform implementation, despite the inherent uncertainty of risks.

7.1 Overview of Risk Appetites

Risk appetites are detailed, proprietary, dynamic, industry- or SIC- (Standard Industry Classification) specific underwriting guidelines. They mix reasonable and common sense based rules with heuristic, predetermined thresholds for agents to follow strictly, not subject to negotiation.

Not all P&C insurers offer HOA master policies, but every insurer has its own risk appetite in house as a key document outlining the types of risks or entities they are willing to insure — and exclusions they are not interested in covering. The latter play a crucial role in rejecting applications.

Insurers' risk appetite guides can significantly — but often silently — expand the scope of clustered risks in underwriting by including rules from any dimensions insurers deem appropriate. They work silently because insurers may choose to keep their appetites confidential, as regulators typically do not demand appetites to be public information — unlike insurers' assets, liabilities, and capital adequacy, premiums written and losses incurred for different lines of insurance, reinsurance arrangements and complaint data. Meanwhile having a rule book accessible to agents is essential, otherwise agents will have to call the un-

derwriting department every time they need a quote.

Reading appetites is one of the fastest ways of getting to know an insurer. An insurer may bill itself as the world's best and largest insurer, and they may be right — until you see their appetites and find that they only cover a few risks and have many (common or uncommon) risks excluded — with or without proven evidence.

7.2 A “Plain Vanilla” Appetite Guide

Most consumers have never seen an appetite before, or not even aware of it. Here is a hypothetical, simple and straightforward guide, highlighting the coverage exclusions.

For the State of California and for Accounting and Auditing services, the insurer provides coverage for general liability, which is a part of the Business Owner's Policy or BOP, and it covers third-party bodily injury, property damage, and personal and advertising injury. The guide spells out typical coverage limits that go from \$300,000 to \$500,000 and up to \$1 million.

This sample appetite guide excludes the followings from the general liability coverage for a restaurant business:

- Contractual liability is not covered, which means the financial responsibility that arises from a breach of a contract.
- Damage to your property, your product or your work is excluded as this is a liability policy to cover the third party.
- No liquor liability is covered.
- No medical payments for bodily injury to you, your partners.
- No personal and advertising injury from oral or written publication.

- No recording and distribution of material or information in violation of law.

7.3 A More Realistic Appetite for Restaurants

Most people are familiar with the restaurant business, so I will show a more realistic example of the minimum acceptability requirements in the restaurant business. More specifically, for “Restaurants - Full Service - Casual Dining less than 35% Alcohol Receipts” with a SIC code 5812, which denotes “Eating establishments where customers order from and are served by wait staff at table side. Food is paid for after eating...”

Bear in mind that all the conditions must be mandatorily satisfied simultaneously, nothing is subject to negotiation, as we can see from the wording of each requirement that is full of “must” or “cannot:”

1. Buildings must be in good conditions regardless of age, although they often do have a building age limit as well.
2. Each facility system (e.g., electrical, HVAC, plumbing) must have been installed new or updated within 30 years.
3. Electrical, HVAC, plumbing and roof must be specifically designed for local conditions and business operations.
4. Prior restaurant management experience must include directly relevant experience to the new business (e.g., overseeing liquor service, full kitchen service, dining room service, working as a kitchen manager or chef on staff).
5. A verifiable loss history in past three years. Claims history subject to evaluation and check for acceptability.
6. Catering sales cannot exceed 30% of total annual receipts.

7. Regular live music not allowed.
8. Operations requiring cover charges or bouncers not allowed.
9. All alcohol servers must receive formal alcohol training with written procedures in house.
10. No alcohol service after 7 PM.
11. Late evening Happy Hours unacceptable.
12. Free drink promotions or drinking games not allowed.
13. Separate bar areas open past 11:55 PM not allowed.

There are many (rigid and detailed) conditions demanded by the insurer before it offers coverage. Some conditions are common sense, such as the business establishment in good condition and all the major system (Electrical, HVAC, Plumbing and Roof) updated in the last 30 years. Other conditions are understandable, such as having verifiable loss history for the length of time the applicant has been in business or three years, whichever is less, given how important loss history is for insurers. Finally, we also have good condition for loss prevention, such as asking all alcohol servers to “receive formal safe alcohol service training and written procedures must be in place.”

But there are also demands or restrictions that make us wonder what a restaurant will do to meet the demand, such as at least two years of management experience *and* the prior restaurant management experience must match the needs in the new business. It is likely that agents will not strictly follow in quotes. The same applies to a mandatory condition of catering sales less than 30% of total revenues.

7.4 The Quantitative & Named Thresholds

The downside of risk appetites can be quickly seen from two simple examples:

1. No auto policy to anyone under 5 years of driving experience.
2. No pet policy to dogs in certain breeds considered aggressive, like pit bulls or Rottweilers.

For the dog case, it has been pointed out to be a myth, such that “the CDC follows the number of bite incidents and how severe they are but not the breeds involved because the organization believes it is irrelevant to the issue.”

For the young driver case, while it is well known that younger drivers or people with fewer years of driving experience do have a higher risk of accidents, appetites that categorically cut off by a fixed number of years (e.g., 5 or 3) to all policy applicants hardly make sense. Graduated Driver Licensing or GDL can help with staged licensing system, starting from a Learners’ permit to Intermediate license and finally to Full license. Furthermore, as this report by National Highway Traffic Safety Administration points out, “Individual variability among drivers has long been an interest in transportation research and industry.” Therefore, two drivers with both 3 years of driving experience can differ markedly in their risky levels.

7.5 Clustered Risks Quantified with Fake Certainty

Of course, the far more important question is whether the fully quantified thresholds, such as 2 years restaurant management experiences and below 30% of total revenues from catering sales, really separate the good risk from the bad one. I doubt they do. Instead, I believe what is really going on is that insurers in their risk appetite have been trying to turn fundamentally uncertain risks into fake certainty in the guide, so that they feel less dread in their daily operation.

More quantified “risk appetites” exist for the same restaurants business. It covers almost every aspect of business activities. I provide the following sample list for readers to get a picture:

- Revenue limit typically below \$2 to \$5 millions.
- Property vacancy typically no more than 60 to 90 days, which automatically exclude seasonal operations.
- Floor location typically below 5 stories.
- Age of buildings typically 25-30 years with utility or roofing updated in 10-15 years.
- Venue size typically smaller than 30,000 to 35,000 SQF.
- No onsite unprotected fuel tanks.
- Limit on deep-frying, catering or grilling typically less than 25-30% of revenues.
- Typically no more than 2 claims in 5 years.
- Location away from the coastline in half to 1 mile.
- No franchise multiple locations.

Once again, the same question remains: Are these criteria all relevant for identifying good risks from the bad ones, especially when they must ALL be satisfied simultaneously? Insurers are unlikely to have definite data backing up these appetites. Nonetheless, quantified criteria help address insurers’ dread, and create a (fake) impression that they have risks under complete control.

Notice that some InsurTech/FinTech firms may have more quantified criteria than legacy insurers, presumably to speed up the online underwriting process.

Until tested and confirmed by loss data, insurers should keep a lower number of predetermined quantitative thresholds in the appetite. Instead of putting down a random threshold to make it appear like certainty, we should rely on two things: flexibly ranged thresholds and qualitative but more accurate and more informative data obtained from membership based online marketplace.

Here is a seemingly unrelated but actually relevant example. I have a T-shirt from Wisconsin that reads, “UW-MADISON: The BEST 5 or 6 years of your life.” I do not quite understand why it puts down specifically “5 or 6 years.” A better way is to say, “The BEST X years of your life.” That would offer time flexibility to all students graduated from UW-Madison, whether in 4, 5, 6 or long years. The same idea of using the “X” instead of a fixed digit applies to the risk appetite thresholds.

8 Risks & Risk Management

Risk appetites are among the most important tools for insurers’ risk management, which is the continuous process of identifying, assessing, and controlling potential losses or harm to an organization or individual. It is therefore most natural now to switch to a conceptual discussion of risks and risk management.

I start from a search of both Gemini of Google and Perplexity on the “industrial rules” in risk management. This time the answers from the Gemini are much better, while Perplexity only highlights the seven “cardinal rules” of *risk communication* by EPA (Environmental Protection Agency), which, although relevant, is narrower than *risk management*.

8.1 Industrial Rules in Risk Management

Like most other generative AI chatbots, Gemini does not give the sources for its answers like Perplexity.AI does. I will quote Gemini's "general principles" first:

1. Proactive Identification: Actively seek out and identify potential risks before they occur, rather than reacting after their impact.
2. Comprehensive Assessment: Evaluate the likelihood and potential impact of each identified risk thoroughly, considering various factors like severity, financial implications, and reputational damage.
3. Prioritization: Not all risks are created equal. Prioritize risks based on their potential impact and likelihood, focusing on addressing the most significant ones first.
4. Cost-Effective Mitigation: Implement control measures to reduce the likelihood or impact of prioritized risks. Choose controls that are cost-effective and proportionate to the risk they address.
5. Continuous Monitoring: Regularly assess the effectiveness of your risk management controls and adapt them as needed based on changing circumstances or new information.
6. Clear Communication: Communicate risks clearly and transparently to all stakeholders, including employees, management, and investors, ensuring everyone understands potential risks and their mitigation strategies.

All rules listed above are highly desirable goals, although I find them too general, rich in common sense but weak in depth, nuanced views. They are also mediocre in actionable details.

I followed Gemini's recommendation and checked the COSO Enterprise Risk Management Framework, a well known and widely implemented framework with the following capacities:

1. Aligning risk appetite and strategy – Management considers the entity's risk appetite in evaluating strategic alternatives, setting related objectives, and developing mechanisms to manage related risks.
2. Enhancing risk response decisions – Enterprise risk management provides the rigor to identify and select among alternative risk responses – risk avoidance, reduction, sharing, and acceptance.
3. Reducing operational surprises and losses – Entities gain enhanced capability to identify potential events and establish responses, reducing surprises and associated costs or losses.
4. Identifying and managing multiple and cross-enterprise risks – Every enterprise faces a myriad of risks affecting different parts of the organization, and enterprise risk management facilitates effective response to the interrelated impacts, and integrated responses to multiple risks.
5. Seizing opportunities – By considering a full range of potential events, management is positioned to identify and proactively realize opportunities.
6. Improving deployment of capital – Obtaining robust risk information allows management to effectively assess overall capital needs and enhance capital allocation.

One weakness is they largely ignored the human side subjective story. Risk is not only objective but also subjective, as discussed in this academic paper in 2021, which defines objective risk as “the relative variation of actual loss from

expected loss, while subjective risk is the uncertainty based on a person's mental condition or state of mind.”

I would add that in general, objective risks are more amenable to management than subjective risks are.

One example of subjective risk is insurers' dread as we discussed earlier. A complete framework of risk management must consider both objective and subjective risks, and how the two interact. Insurers' risk appetites are one way for insurers to deal with dread, especially the quantitative (e.g., 3 years of driving experience) and named thresholds (e.g., no pit bull breed dogs) that work on a subjective fake certainty even through risks are fundamentally uncertain.

8.2 Risk Management from Economics

The economists have offered relevant terms for managing risks. Once again, the Gemini's answer is better than Perplexity:

1. Risk aversion: Preference for avoiding risk and choosing less risky options even if they offer potentially higher rewards.
2. Expected value: The average outcome of an event, considering the probability of each possible outcome and its associated value.
3. Risk-return trade-off: The inherent relationship between risk and potential return – higher potential returns typically come with higher risks.
4. Diversification: Reducing risk by spreading your investments across different assets or activities, which reduces the impact of any single failure.
5. Hedging: Using financial instruments to offset potential losses from another investment.

6. Cost-benefit analysis: Evaluating the expected costs and benefits of different risk management strategies.
7. Utility theory: Examining individual preferences and risk tolerance regarding decision-making under uncertainty.

One strength of the economics perspective is to bring human subjective side into the equation, through the concepts of risk aversion, expected value and utility theory. I also find the idea of risk diversification useful (see more discussion later).

8.3 Risk Management: “Risk” First, “Management” Next

But the economists share the same weakness as the industrial/business perspective: They are all busy talking about how to manage risk without first getting a solid grip of what exactly risk is. In other words, they take the risk concept for granted or as given, even though risk concept deserves more attention than it is getting now.

This is not saying risk identification and assessment are completely missing. We do have categories or anatomy of risks such as “strategic risks (related to achieving organizational goals), operational risks (associated with day-to-day operations), financial risks (related to financial performance and stability), compliance risks (related to adherence to laws and regulations), and reputational risks (associated to the organization’s image and perception).” Insurance for example only covers “pure risk” (i.e., loss only, no possibility of gain) and never “speculative risk” (i.e., both loss and gain possible, like in the gambling).

But risk categorization cuts in the surface. It is not the same as an atomic understanding of risk. We need a deeper conception to really understand how efficient risk management works. This is where partitioned risks come to show its

value, especially in insurance and especially when combined with diversification.

9 Risk Management with Partitioned Risks

Speaking of risk management, among all the strategies, diversification stands out in terms of feasibility, low cost and sustainability, a defensive strategy that can potentially increase risk-adjusted returns of a portfolio.

I will show how partitioned risks and diversification lay the foundation for the insurance revolution in this section.

9.1 Diversification & Investment

Diversification is not a new concept for insurers, nor are they resistant to it. In auto insurance, for example, insurers have a long history of diversification, employing two primary methods. The most popular way is for each insurer to write policies not just in the pool of “good risks,” but also of “bad risks,” as this article explains to us:

“Most states require insurance companies to keep high-risk drivers on the books, often in proportion to the total amount of policies they write.”

Another far less popular way is to allow private insurers to only write policies in the pool of good risks, and throw the “bad risks” to a separate pool managed by a non-profit insurer. “North Carolina and New Hampshire use reinsurance facilities instead. Those allow insurance companies to take high-risk drivers off their own books and send them into a pool of risky drivers operated by the facility.”

Dividing all drivers into just two bins of “good (or low)” and “bad (or high)” risks is not the best thing to do in terms of risk management. We can do better when we introduce partitioned risks.

More on this later. But for now, I just want to say that writing insurance

policies is similar to investing in the stock market — investors and insurers always chase after the “good risks” and avoid bad ones, and they also don’t put all eggs in the same basket. If you are brand new to the stock market, the first advice almost every veteran investor will give you is to diversify your money across categories of assets. It is common sense that the best way to keep your risk exposure low is to keep a diverse portfolio.

Although diversification is a classic risk management strategy, simply talking about diversification is not enough. The crucial question is, "Diversification of what?" Most people will say "diversification of risks," but that’s insufficient and here is why.

Centuries of experience with the legacy system prove that “diversification of clustered risks” differs markedly from “diversification of partitioned risk.” The former has always been the prevailing practice, in which the smallest unit of risk is a cluster of risks. When an insurer believes “Family A” is a bad risk while “Family B” is a good risk, the insurer is really talking about a whole bunch of risks, never a single one. We want to switch to diversification of elementary or partitioned risks.

Consider the North Carolina auto insurance case again. Private auto insurers in that state do not have to deal with the bad or high risk drivers because they can throw them into another pool to be taken care of by a nonprofit entity. In other words, we are seeing a diversification of two giant clustered risks that are financially related because the good drivers will pay a surcharge in their auto premiums to help keep the nonprofit entity solvent for covering the pool of bad risks. It is a system of within state cross-subsidy.

The system is not as stable as North Carolina state lawmakers would like to see, as they are questioning whether reforms could help improve the system and save people money.

In this local report on January 30, 2024, it was found that, “Rep. George Cleveland, R-Onslow, said he discovered his policy was put into the high-risk pool after he turned 80 years old, and that his insurer told him it was solely because he had turned 80.”

“But that seemed illegal, Cleveland said Tuesday, so he complained to the attorney general’s office, which sent him to the facility, which confirmed his initial suspicion that his insurance company shouldn’t have done that. Yet when he later went shopping around for new insurance, he claimed, many companies told him they automatically put all drivers age 80 and up into the pool — seemingly either not knowing or not caring that they shouldn’t be allowed to do so.”

This is a case of treating drivers in clusters based on shared exposures, rather than on actual loss. A search on Gemini confirms that, as the federal law Age Discrimination in Insurance Act (ADIA) prohibits unfair discrimination based solely on age in the pricing of property and casualty insurance, including auto insurance.

But the root problem is that insurers only can choose between two pools in that state, a highly limited diversification that implicitly but surely encourages insurers to make wrong moves.

The difference can be made obvious in math. We know in permutation and combination, treating each digit as an independent number will produce more unique combinations compared to treating two digits as a single number.

For example, if you have the digits 1, 2, and 3, treating them independently would allow you to form 6 different numbers (123, 132, 213, 231, 312, 321) because $3! = 6$. On the other hand, if you treat two digits as a single number (e.g., 12 and 3), you would only have 2 unique combinations (123 and 132) as $2! \times 1! = 2$, in which “!” means factorial.

Having more combinations facilitates true diversification. In fact, one may

argue that diversification of clustered risks is not true diversification, as some risks have been locked together. I will use LEGO games to illustrate the point.

9.2 Two LEGO Games

The regular LEGO games use numerous individual and independent bricks to form a theoretically unlimited number of combinations (i.e., shapes or objects). Now, imagine we have a new vendor selling a new version of LEGO, all made of the “ready-to-use” parts, such that when you open the box, you see a locomotive, tracks and cars. An average five-year-old would figure out it is a train set and could start playing it in 5 seconds.

But the new LEGO game takes the fun out of assembling the game yourself. Worse still, since the bricks were locked together, you can only use it the way it was made for, no creativity allowed whatsoever and no diversification, either.

In a way, the legacy insurance system has been acting like the vendor selling the preassembled, ready-to-use train set, while the mission of the insurance revolution is to return us to the traditional or regular LEGO games with individual and independent LEGO bricks. The revolution also fixes the problem in previous discussions, which talk about “risk management” all the time but with a real focus only on the “management” part, leaving the risk concept inaccurately defined, as if clustered risks and elementary risk worked the same.

The difference is that diversification of partitioned risks is a real diversification, while diversification of clustered risks is not because the unit is too big.

9.3 How Diversification of Partitioned Risks Works

We have already seen the problems working with clustered risks, ranging from enthusiastically recruiting policyholders in the low risk neighborhoods to

indiscriminately rejecting policy applications or renewals in the risky communities. How do we expect diversification of partitioned risk to work differently?

Since we talked much about HOA master policies before, it makes sense to revisit it — this time with partitioned risks. Following the “co-insuring split risks” model from the Super Bowl, or diversification of partitioned risks, one insurer may cover the roofs of the condo buildings, another for the playground or park, still a third for the elevators.

Another possibility is for one insurer to write policies for a few condo units, while other insurers cover other units. The idea is the same: Each insurer has one or a few pieces of the total risks in the condo community, instead of one insurer for everything.

Diversification can also be worked out on different risk types or categories: One insurer may cover “slip and fall,” another for cybersecurity, and a third for theft and so on, just like we would do for other commercial policies.

The idea is simple: Each insurer takes a smaller piece of the pie in each community, each home, each business entity, either by covering only a part of the properties or one type of risks/perils. This reduces the risk exposure in any particular location or jurisdiction at any particular point of time. Each insurer is then incentivized to diversify its portfolio by taking on risks from diverse geographic locations and across different time horizons.

9.4 Diversification Works with Intrinsic Diversity

This may sound redundant, but diversification works best when there is intrinsic risk diversity, lack of which makes diversification feeble. This by the way has been the story with the legacy insurance, which ignores intrinsic diversity within and across properties, units, parts, entities and risk types, and lumps everything together into a single risk. We have learned from the legacy system

that risk diversity exists first, diversification comes next to leverage it.

This is also how the Super Insurance model works, where insurers do not treat the entire event as one risk. Instead, they break it down into risks and share them among themselves. As we discussed earlier, the same idea should work on a home, a business or the entire community, because doing otherwise can reach a level of absurdity, when insurers turn down *everyone* in the same region. This has been the number one reason for insurers to deny policies.

The question is, do we have intrinsic risk diversity in a home, an auto, a business or a real estate community? The answer is “yes.” Going back to our condo community for example, risks vary across different parts (e.g., risks at the playground differ from those in the elevators) and different units in the same condo building (e.g., Austin’s ground floor unit is more susceptible to water damage from leaks, flooding, or foundation issues, while Jane’s top floor unit is prone to roof leaks, wind damage, and non-functioning or insufficient escape routes in case of fire.)

More generally, each property or entity has its unique vulnerable or risky spots. For one home it may be the kitchen that often causes troubles, while for another it is the roof (or bathroom, basement, floor, walls, garden or porch, etc.) that give the owner the headache.

Similarly, because risks can be both objective and subjective, we must consider homeowners’ and business owners’ concerns. For a business entity, it may be the business properties that are the top concern, while for another it could be consumer liability that keeps them up at night. For still the third one, keeping the business income steady is what they care the most.

We just need to open our mind to the intrinsic risk diversity and take different risks as they are. Once we do, diversification works its magic. However, the opposite holds true at the other extreme. Risk partitioning never even made

the list of cardinal rules or essential tools of risk management, likely because the popular Enterprise Risk Management (ERM) framework presumes risks are inherently interconnected and best managed as a whole.

A smart policy tailors itself to different risk types faced by different entities or people. It also addresses different vulnerabilities within a single entity, home and auto. For a business housed in an old building, the most vulnerable part could be the roof or the floor, while for a business renting a brand-new building perhaps the most risk comes from not having all the amenities or infrastructure in place, such as internet access, signage, or landscaping, construction defects or malfunctioning systems. These should all be taken into policy considerations.

Lumping all the risks together and offer a single policy to each business, and the same policy for all businesses in the same industry, cannot serve the clients well because the premium will have to be based on the average of businesses, pretending they were all the same when in fact they are not. It also does not serve insurers well, as it fails to address consumers' most important concern in the policy.

With diversity existing, insurers' job gets easier. They "spread thin" in any particular policy or any particular location to lower the risk associated with any single policy, but spread out broadly to reduce the overall portfolio risk.

By holding a variety of policies, especially risks they are not highly correlated, the poor performance of one can potentially be offset by the better performance of another, leading to a more consistent overall underwriting return. Other benefits include reducing asset-, location-, and time-specific volatility to achieve healthy long term growth.

9.5 Pros & Cons of Partitioned Risks

I have been promoting partitioned risks thus far, but just like anything else in the real world, we must also see the weaknesses of partitioned risks.

This academic article in June 2023 raises a few good points. “Limited liability enables corporate parents to avoid financial responsibility of their subsidiaries... groups can better *compartmentalize risks* by incorporating more of their units as legally independent subsidiaries... This paper highlights two channels—risk compartmentalization and *subsidiary autonomy* — through which limited liability laws affect organizational outcomes.” (Emphasis added).

Although the paper talks about enterprise headquarters and subsidiaries, the ideas work in the future when each insurer breaks down to specialized teams or subsidiaries covering different property parts and risk categories. Limited liability at the headquarters level would result from compartmentalized or partitioned risks and also from subsidiary autonomy.

In the spirit of keeping an open mind to both sides of risk partitioning story, I specifically asked Google Gemini about the pros and cons of partitioned risk. Here is the answer I received:

1. Improves focus and clarity: Partitioning can separate complex risks into smaller, more manageable categories. This can help teams focus on specific risks and develop appropriate mitigation strategies.
2. Increases accountability: Assigning ownership of specific risk partitions to dedicated teams or individuals can foster accountability and ensure clear lines of responsibility.
3. Simplifies communication: Communicating risks within smaller, well-defined partitions can be easier for stakeholders to understand and engage with.

4. Enables tailored mitigation: Different partitions might require different mitigation approaches. Partitioning allows for customized strategies based on the unique characteristics of each risk category.
5. Enhances risk monitoring: With smaller sets of risks to track, monitoring and identifying changes or emerging risks within each partition can be more efficient.

I believe these benefits are self-illustrative, so I won't spend much time on them, except that if we change the term "team" from the above to "insurer" it would fit in perfectly.

Now, the potential drawbacks of partitioned risks according to Gemini, with my comments in the parenthesis:

1. Oversimplification: Complex risks might not neatly fit into pre-defined partitions, potentially leading to overlooking interconnected risks or their cumulative impact.

(**My Comments:** This says partitioning risks is not always easy, especially with complex risks. But in the P&C insurance business, risks can be easily split by property parts because all properties, including homes, autos and businesses, are naturally made of non-overlapping and tangible parts. Risks can also be partitioned by risk categories because these categories are long and clearly defined by the legacy system, so we do not have to "reinvent the wheel" so to speak. These do not mean oversimplification is impossible but do mean it is less likely than say in health insurance where someone's death was caused by interrelated illnesses and complications working simultaneously, and we try to single out one cause through partitioning and ignore all others.)

2. Coordination challenges: If partitions become isolated, communication and collaboration across teams managing different partitions might be hindered.

(My Comments: Partitioned risks do not have to be isolated in P&C insurance, as there are ways to avoid it. In the example of a two-year-old roof sitting on top of a 150-year-old house, the premium can be set to reflect the extra risk associated with the old house that makes the new roof more vulnerable than a new house. This in spirit is connecting different parts while in assessing risk of each part. We will also have the Internet-of-Things or IoT devices to monitor and to separate *active* from *passive* destruction parts and settle claims accordingly. In the case that one insurers owning several specialized teams, the headquarters can still maintain a certainty degree of control and work out coordination problems when the needs arise.)

3. Redundancy: Depending on the chosen partitioning method, duplication of effort or overlap in responsibilities across partitions might occur.

(My Comments: This challenge is similar to the first one above, and my answer there applies here.)

4. Loss of holistic view: Excessive focus on individual partitions could result in overlooking the overall risk landscape and potential interdependencies.

(My Comments: This is also related to the first challenge of oversimplification. Once again, I must point out that in the P&C insurance, it is easier to overlook separate risks and parts beneath the whole property than losing a holistic view, simply because properties naturally exist and function as a whole. This explains why, for centuries, insurers have never questioned the model of clustered risks.)

Gemini then points out that the effectiveness of partitioned risks ultimately depends on:

1. Nature of the risks: Partitioning might be more beneficial for managing well-defined, independent risks than interconnected or cascading risks.

(**My Comments:** Yes, centuries of experience tell us that partitioned risks are more beneficial to insurers and consumers alike than clustered risks, especially with naturally separable risks.)

2. Organizational structure: Clearly defined roles and responsibilities within the organization are crucial for effective communication and collaboration across partitions.

(**My Comments:** Organizational revamping within each insurer, with or without formally establishing subsidiaries above and beyond functional teams, will help raise the efficiency of communication and collaboration across teams or subsidiaries, under the general assumption that within entity collaboration is at least as efficient as between entity collaboration, if not more efficient.)

3. Implementation approach: Defining clear partitions, assigning ownership, and establishing communication channels are essential for successful implementation.

(**My Comments:** This is related to the organizational structure, and the same comments apply here. Note, even functional teams without formally establishing subsidiaries will have their ownership structures clearly assigned.)

10 Why You Should Join the Insurance Revolution

If you are affiliated with the University of California (UC) system, including but not limiting to the Berkeley campus, you should definitely consider joining the insurance revolution. Affiliation is broadly defined, including an exchange

student from a foreign country, an undergraduate or graduate student, an alumni who graduated so long ago that you don't even remember exactly the year of graduation, a faculty or staff member.

Insurance revolution calls for more people to join because a revolution needs first and foremost the human power.

10.1 Two Reasons to Join

You want to join for two reasons, one is cliché while another personal. The cliché part is to “change the world.” I call it cliché not because it is fake but because so many startups have used the cliché to recruit or to incentivize people. That said, it remains a fact that insurance, especially P&C insurance, is both boring and exciting.

It is boring because it has been largely commoditized with standardized products offering similar coverage for basic risks, with minimal differentiation in terms of the actual protection provided. Regulations further drive it toward that direction. Price, not brands, has been the key differentiator. Furthermore, consumers may prioritize convenience and price as well.

Commoditization also results from the nature of insurance being mostly mandatory either by the state for auto insurance or by mortgage lenders for homeowner insurance. Commercial insurance is not federally required, except workers compensation for entities with one or more employees in California.

Therefore, unlike financial professionals working in investments with glamorous titles like CPA (Certified Public Accountant) or CFP (Certified Financial Planner), insurance is perceived to be boring and a dog-eat-dog game characterized by intense competition and a ruthless pursuit of self-interest.

On the other hand, insurance is also exciting, especially if you are a “people person,” as insurance involves more people and their financial security day in

and day out. Not everyone has the surplus money to invest in the Wall Street, but every family (unless you pay your home in cash or has paid off your mortgage) will deal with homeowner insurance and auto insurance.

Insurance is also exciting because it is not just financial operations but involves legal, political, economical, natural (climate), business, mathematics (actuarial, data science, probability and statistics), and all branches of science (natural, social and formal). It cuts across past and future with profound uncertainty.

But if “changing the world” is not your thing, there is another reason entirely personal: Changing your life to make it more interesting. Not everyone has the chance to be involved in a revolution, especially for an industry that is as old as 1752. You have a good reason (or reasons) to be proud of yourself.

Unlike attending a college, participating in a revolutionary startup is something you can't plan for. As a chance event, it will just happen, and you might encounter one. In Chinese, it is called 可遇而不可求.

Finally, you have to ask yourself how to best survive the Generative AI (GAI) era. One thing common for all Generative AI stuff is that they have all been trained on the existing or past data. If the only battlefield were related to the past, we will have to surrender because GAI can do far better than us in terms of memories and speed of learning.

One thing we humans can still maintain an edge over GAI is the forward-looking innovations and creation. Here we can use our human imaginations to figure out ground-breaking things that GAI may not be able to do, or as many of their hallucinations show, not as good as we humans can.

10.2 You Are Automatically Qualified

A startup is unlike a college, where you learn to play a symphony. Instead, doing startup is like singing one song, which is considerably simpler and faster

to learn. Another difference is a focus on doing, not just learning and talking. We learn from doing and do it again with newly gained knowledge, unlike attending a seminar where we talk and exchange knowledge with little action involved.

You will not be judged by your college major, age, gender and ethnicity. We don't care what your GPA is or was. This startup has a business focus, especially in marketing, emphasizing common sense and everyday interactions. The most important qualification is people skills, able and willing to talk to strangers, regardless of their age, sex, position, status and reputation.

One unique advantage for any college based startups is to have access to all the talents on campus. If you have a technical background, fine and welcome! We can use your talent to build up technical stuff, such as designing and maintaining web or mobile Apps, establishing a customer database and even blockchains. But if you are in humanity or arts, fine and welcome as well! We hope you like talking to people — or are willing to learn that skill from the team!

10.3 Myths Busted

One myth is that once you join the startup, you must have a lifetime commitment. Not true, a startup is just like other jobs and quitting is allowed with no questions asked: Lost interest, lost time, lost fun, lost favorite teammate(s) and lost resources, these are all legitimate reasons to quit.

Another myth is that you need to be incredibly intelligent to join a startup. This isn't true either. The best startups tackle complex problems that are ready for change. They avoid fabricating or exaggerating problems, and they don't pursue unrealistic solutions prematurely. All viable solutions share a key characteristic: their core ideas are simple and make intuitive sense, not requiring an exceptionally high IQ to understand.

Here's a real-life example demonstrating that an insurance revolution is timely.

This III article tells us in a discussion on reinsurance that, “After Hurricane Andrew hit Southern Florida in 1992, causing \$15.5 billion in insured losses at the time, it became clear that U.S. insurers had seriously underestimated the extent of their liability for property losses in a megadisaster. Until Hurricane Andrew, the industry had thought \$8 billion was the largest possible catastrophe loss. Reinsurers subsequently reassessed their position, which in turn caused primary companies to reconsider their catastrophe reinsurance needs.”

The best way of finding startup co-founders is when people started the business together. I compare this ideal scenario to the 1989 romantic comedy movie “When Harry Met Sally,” featuring Billy Crystal and Meg Ryan. At the beginning of that lovely movie, Harry and Sally, two complete strangers right after college graduation, met in Chicago and shared a drive to New York City, which is among the most natural (or “organic”) ways for two people to chat and interact to get to know each other.

Not all startups follow the same growth pattern or trajectory, and that’s perfectly okay. There’s nothing wrong with joining a startup later in the process, and having fun can be a part of building a successful business. You heard it right: happiness should be an integral part of a company’s mission and goals. No shame in that!

And the fun begins when you decide to join the team!