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Tokenizing Catastrophe Bonds for the Capital Markets

Brad Gow, **Sompo Digital Lab**
Arabella Kim, **Tokenized Re**

Executive Summary

Catastrophe bonds are a proven vehicle for bringing non-insurance capital into the risk transfer market. Technical complexity and limited distribution have, however, impeded broad investor participation. The rise of blockchain and tokenized real-world assets presents an opportunity to simplify cat bonds, expand distribution, and access over $400 billion [1] in digital asset capital seeking regulated, yield-bearing products.

The timing is compelling, driven by regulatory developments such as the GENIUS Act enacted in the United States in July 2025 [2] and Singapore's MAS Project Guardian initiative [3]. Together, these create a window for early adopters to lead the development of tokenized insurance-linked securities (ILS), secure favorable pricing, and influence frameworks.

> This paper outlines how tokenized catastrophe bonds issued in a regulated jurisdiction, structured for fixed income familiarity, and accessible via centralized digital asset exchanges can deliver high, uncorrelated returns for digital asset investors.

An Evolving Financial Markets Environment

Recent advancements in the regulatory environment around tokenization and digital assets in the United States has drawn the interest of leading financial institutions looking to harness blockchain technology to remedy long standing inefficiencies in existing financial infrastructure.

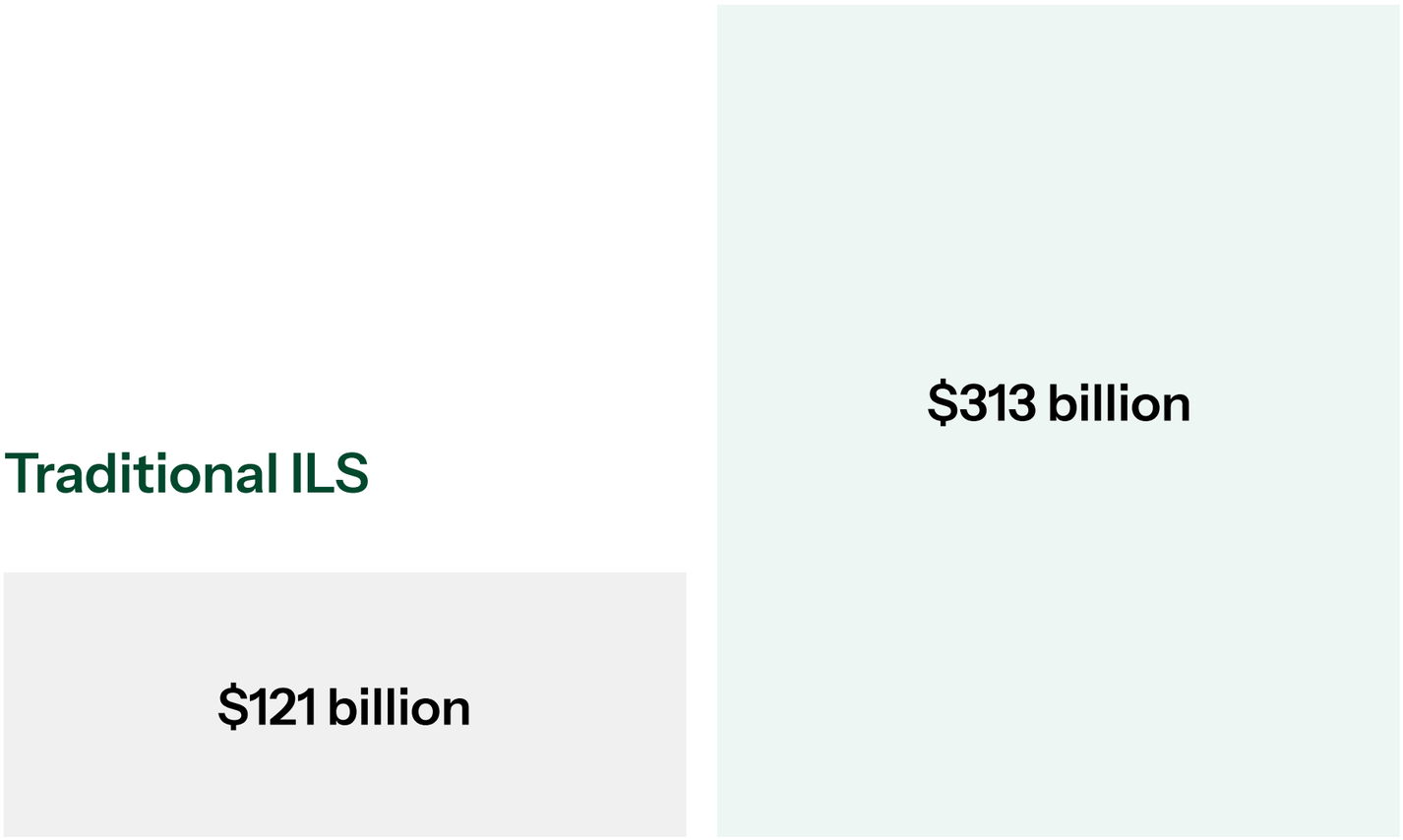
Adoption of tokenized money market funds is increasing as financial institutions test blockchain rails for short term cash management purposes. Meanwhile, the demand for dollar-denominated stablecoins is leading to corresponding growth in the reserve pools backing them.

Stablecoin, decentralized finance, tokenization of real-world assets and digital payments projects are driving investments intended to revolutionize money and the way it is handled, managed, and moved.

To date, efforts by the insurance industry have not kept pace. Transparency, security and instant settlement are not as critical for a risk averse, heavily intermediated industry driven by long-established processes and structures.

> **An effort to tokenize catastrophe bonds could allow a new class of non-ILS investors to accept insurance risk for enhanced yields, attracting new risk capital to supplement existing insurance industry capacity.**

Tokenized asset markets are over twice the size of the traditional ILS market and growing exponentially faster.



Structural Market Coverage Gaps

In most areas the insurance and reinsurance markets function relatively efficiently, allowing individuals and companies to transfer as much risk as they desire to a market that competes aggressively for their business.

Actuaries have a sufficient quantity of data to properly price individual risks and risk modelers have enough historical event data to estimate aggregate losses from catastrophes such as California earthquakes or European windstorms.

But in select areas, structural conditions exist that inhibit the insurance industry's ability to effectively do either.

Modeling Challenges

Insurer loss reserving practices for natural catastrophe risks are driven by sophisticated models that allow them to accurately estimate probable maximum losses (PMLs) from events of different severities. These models, informed by centuries of windstorm, earthquake and other natural catastrophe data, are critical to reinsurance purchasing strategies as they allow carriers to manage to net loss levels they are comfortable retaining.

Newer or more novel risks like cyber or terrorism can be more problematic.

These may have limited data points for actuaries to work with due to infrequency of loss, or have a limited product history to draw from. Also, rather than severe but relatively straightforward weather or tectonic events, these novel risks can be exposed to multiple variables that can complicate analysis and expand the scope of potential outcomes.

Losses may also be driven by malicious threat actors actively trying to cause harm. The ingenuity behind these human threats can result in unanticipated scenarios falling outside of the imaginations of underwriters and product developers.

These factors hamper the ability of risk modelers to confidently estimate potential losses. Loss models deemed less dependable lead to more conservative decision making in establishing reserves and setting rates, impacting the availability (and affordability) of coverage.

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Case Study: 9/11

The September 11, 2001 attacks impacting New York City, Washington D.C. and Shanksville, PA resulted in billions of losses and shook the global insurance industry. **No prior event had such a catastrophic impact on so many different lines of insurance simultaneously.**

Commercial property, business interruption, general liability, life, accident & health and workers compensation underwriters absorbed $40 to 50 billion in insured losses [4], or about 10% of industry surplus at the time.

As a result the industry quickly pulled back, severely limiting the availability of terrorism cover. In November 2002 the Terrorism Risk Insurance Act (TRIA) was signed into law to create a federal backstop for insurance claims related to acts of terrorism.

> Only with federal government support was the industry incented to develop solutions for covering terrorism threats.

Case Study: Cyber Insurance

Modeling aggregation events for the cyber insurance market are more challenging due to a limited loss data set (the product has only been widely available for about 15 years) and the number of variables that can impact losses.

The lack of dependable loss models has led to an overdependence on the reinsurance market, with many carriers ceding over 50% of their cyber portfolios to reinsurers compared to 12-15% for other commercial P&C lines [5].

Reinsurers are hampered by these same models, leading to limited interest and opportunistic pricing for higher excess layers.

Lack of data → Weak models → Dependence on reinsurers → Limited market interest → Opportunity for new capital

These dynamics create an opportunity for non-insurance industry capital providers to participate by taking risk remote placements at attractive yields.

Extreme Concentrations of Value

A few geographical areas have unusually large concentrations of value that, if impacted by a natural disaster, could result in losses that would be too large for the insurance industry to effectively absorb. The most notable examples today include the east coast of Florida for hurricane risk and Japan's Kanto Plain for earthquake risk.

Historically, traditional ILS offerings have provided the additional non-industry capital needed to provide relief for these areas, but also do so at higher ('peak peril') rates-on-line.

> In a limited number of cases the market is unwilling or unable to provide sufficient capacity, or to provide sufficient capacity in an economic manner.

Case Study: Florida Windstorm

The modern insurance-linked securities market (as well as the property risk modeling market) was born out of the devastating losses from Hurricane Andrew in 1992.

The tropical cyclone tore through Dade County, Florida with sustained wind speeds as high as 165MPH, destroying 63,500 houses and damaging an additional 124,000 more.

With total losses of $27.3 billion (equivalent to $62 billion in 2025) [6], the hurricane shocked **the insurance industry which had substantially underestimated the potential damage from a Category 5 storm.**

Since 1992 Florida has seen a significant amount of development with corresponding increases in property valuations.

> The concentration in property values in Florida continues to challenge the (re)insurance market and remains a focus of current ILS issuances.

A Growing Digital Asset Investment Pool

According to Artemis, **in August 2025 there was approximately $121 billion [7] of capacity in the insurance-linked securities market, up from the single digit billions of dollars in the early 2000's.** For the most part these funds come from institutional investors allocating a small percentage of their portfolios to ILS fund managers to buy natural catastrophe bonds with limited correlation with other investment products.

In contrast, the amount of capital supporting digital asset markets is accelerating, and now includes:

$148 billion
in total value locked in decentralized finance protocols;

$100 billion
in corporate Bitcoin treasuries;

$25 billion
in tokenized real-world assets, including tokenized money market funds;

$150 billion
in US Treasuries held in stablecoin reserve accounts. [1]

The recent passage of the GENIUS and CLARITY acts brings regulatory guidance to the stablecoin market in the United States. Stablecoin adoption and increased AUM in tokenized MMFs serve as indicators of broader digital market maturity with regulated entrants like Circle's USDC for stablecoins, Blackrock's BUIDL, Franklin Templeton's BENJI, and tokenized fund initiatives from Goldman Sachs and BNY Mellon.

Strategic Benefits of New Risk Capital

While there is an immediate opportunity to attract new risk capital to address these edge cases, in the longer term accessing the broader capital markets to build global insurance market capacity can result in benefits to investors, to carrier sponsors, and to the insurance industry at large.

For Investors

Traditional ILS products offer risk spreads on top of a risk-free rate typically provided by US Treasuries, and depending on attachment point can offer yields significantly higher than commercial debt. **This asset class is uncorrelated with stocks, bonds and economic cycles, providing diversification and improving portfolio Sharpe ratios.** They are utilized by sophisticated institutional players like pension funds and sovereign wealth funds, providing a high yield alternative that can serve to boost the returns of a portfolio focused on more conservative investments.

> This new breed of tokenized catastrophe bonds will be simplified to improve accessibility to the broader fixed income market and made available on a blockchain to attract a new class of digital asset investors that currently have limited access to insurance risk as an investment option.

If focused towards the top of the risk stack they will allow for fast resolution at maturity, minimizing exposure to trapped capital scenarios and freeing funds for future investment.

Tokenized MMFs as Collateral

Tokenized MMFs & Treasuries:	Yields:	Example:
~$7.4B on-chain (2025), **80% YTD growth**	comparable to traditional MMFs, **~4.1%–4.3%**	Franklin OnChain U.S. Government Money Fund **= 4.12% (Aug 27, 2025)**

Unlike non-yielding stablecoins, tokenized MMFs generate **real-time income**, making them superior as collateral

Implied Investor Returns

Base case:	Example:	Benefit:
risk-free (~4.0%) + insurance spread (4-6%) → **8–10% yield**	$25M pilot collateralized with MMFs (4.1% yield) + 5% spread = **~9% total return**	Attractive, uncorrelated returns with transparent collateral

For Sponsors (Insurers, Reinsurers)

With single digit risk spreads, these products can help achieve higher capital efficiency by offloading extreme tail risk in a more economical manner than non-proportional reinsurance or ILS.

Reinsurers and ILS issuers struggle with the same concentration of value and modeling uncertainty issues that carriers face, which is reflected in pricing difficult-to-model lines and geographies.

For an investor class that is currently not exposed to insurance risk and may be willing to trade additional risk for yield, terms for tokenized cat bonds can be priced at lower rates-on-line (ROLs) than equivalent non-proportional reinsurance or ILS offerings but still provide sufficient yield to attract new capacity.

And for investors less concerned with aggregation, **these products can also offer broader coverage which truly sits back-to-back with cedant portfolios with no loss caps or other limitations.**

For the Insurance Industry

In the short term, this new capacity can address industry pinch points to make economical capacity available where it had not been previously.

In the longer term, effectively incorporating capital from the traditional fixed income market to permanently add to the global pool of risk capital can lower the cost of tail risk to carriers.

A track record of successful issuances returning above average yields to investors has the potential to attract enough new capital disconnected to the (re)insurance and ILS markets to help dampen hard and soft market cycles that make it more challenging for insurers to manage their businesses.

Building a Tokenized Catastrophe Bond for the Capital Markets

Democratizing access to the ILS market can be realized by developing insurance linked security products that are attractive and accessible to targeted segments of the global capital market.

To do this successfully, **the esoteric and technically complex approach favored by today's ILS players needs to be modified to suit the requirements and appetites of the institutional fixed income market,** with minimal technical insurance language, shorter term sheets and high attachment points. Both sides should understand the role of these products in the risk stack: sponsors achieve capital efficiency at a lower price than non-proportional reinsurance or traditional ILS, and investors receive an attractive spread by backing remote tail risks with a small portion of their trading capital. This will include:

Language Familiarity

Reducing or eliminating technical insurance jargon and concepts, and using language that corporate bond traders are accustomed to.

Product Simplicity

Simplifying term sheets by clearly defining how and when the bond is triggered and eliminating the defensive language found in current ILS issuances. This is easier with risk-remote attachment points.

Clearly Articulated Risk Profiles

Providing modeled losses and historical event detail to roughly estimate the chances that the bond will be impaired or exhausted entirely. Modeling limitations should be noted, with the understanding that these same limitations drive the opportunity for the (non-insurance) capital market investor.

High Attachment Points

Positioning the security at the top of the risk stack, over retained business, proportional and non-proportional reinsurance and any other ILS protection, well outside the working layer and triggered by only extreme events. This can generally be achieved by targeting return periods of 1:125 and above.

Aligned Interests

Minimizing or eliminating the need for insurance expertise by creating products where investor interests are tightly aligned with the interests of the sponsor. Investor concerns can be addressed using shared layers and loss corridors that are structured in a manner that any loss borne by the investor is guaranteed to be considerably more impactful to the issuing sponsor.

Regulatory Clarity

Ensuring that tokenized catastrophe bonds are investment grade and issued in a jurisdiction that can provide effective regulation and oversight. Only securities viewed as investment grade will be acceptable to the forward thinking investors that will be needed to lead this next wave of ILS products.

Ease of Access

Direct access to the security through centralized exchanges favored by digital asset investors, rather than through investments in ILS funds managed by an intermediaries.

Of the items above, product simplicity and language familiarity are likely the most important. Traditional insurance-linked securities can be very lengthy and include technical reinsurance language incomprehensible to an investment professional accustomed to operating in a commercial fixed income environment. Like the tokenized structure, the product format must meet target investors where they are to be successful.

Traditional vs. Tokenized Cat Bonds

	Traditional Cat Bonds	Tokenized Cat Bonds
Distribution	Limited to ILS fund managers	Direct via regulated digital exchanges
Investor Base	Pension funds, SWFs	Broader: family offices, crypto treasuries, HNWIs
Complexity	Lengthy term sheets, technical jargon	Simplified, fixed-income style docs
Liquidity	Locked until maturity	Fractional ownership, 24/7 secondary trading
Minimum Investment	$1M+	Lower entry via fractional tokens

Risk Capital Stack with Tokenized Catastrophe Bonds

	Return Period
Catastrophe Bond (Tokenized)	1:125
Catastrophe Bond (Traditional)	1:50
Excess of Loss Reinsurance	1:20
Quota Share Reinsurance	1:5
Retention (Insurer capital)	**1:1**

Target Investors

A growing number of investors are buying institutional grade tokenized products like money market funds and cryptocurrency ETFs.

Allocations of a small portion of portfolios to tokenized catastrophe bonds would add diversification and yield, a strategy that should be attractive not only to institutional fixed income investors but also sovereign wealth funds, family offices, technology companies, blockchain treasuries and HNWIs.

Proposed Model

Jurisdiction:

Bermuda, Singapore/Project Guardian ecosystem

Blockchain:

Stellar, Hedera, permissioned Ethereum for institutional-grade settlement

Token:

Security token (ERC-1400/ERC-3643, SEP-8)

Token Rights:

Represents a pro-rata share of the bond's principal and coupon

Issuance Size:

Pilot $25 million, at scale $50-100 million

Distribution:

Direct listing on regulated token marketplaces plus traditional clearing via DTC

Investor Eligibility:

Institutional, accredited

Conclusion

The convergence of insurance-linked securities and blockchain technology is more than an innovation story – it is a capital markets evolution.

By simplifying structures, ensuring regulatory compliance, and leveraging tokenization for broader distribution, the insurance industry can unlock billions in new risk capital. We invite insurers, reinsurers, asset managers, and forward thinking investors to join in shaping the next generation of catastrophe risk transfer.

> Tokenized Re is committed to democratizing access to the risk transfer market with new technology. To connect, get on our mailing list for updates or to learn more, reach out to us at **info@tokenized.re**

About Sompo Digital Lab

SOMPO Digital Lab is an innovation division that pursues evolving digital technologies to promote DX for the entire SOMPO Group, and is comprised of R&D teams, in-house development teams and data scientists. With offices in Tokyo, Zurich and Silicon Valley SDL supports group company initiatives in AI and blockchain and is exploring new concepts in treasury management and insurance-linked securities.

About Tokenized Re

Tokenized Re is focused on bringing blockchain technology to the insurance-linked securities market. By simplifying and tokenizing catastrophe bonds, high, uncorrelated yield can be delivered to digital asset investors, bringing a new class of risk capital that benefits both investors and ILS sponsors.

1. Compiled from various sources: DeFiLlama (2025) for $148B DeFi TVL; Schwab (2025) for $100B corporate Bitcoin treasuries; InvestaX (2025) for $25B tokenized RWAs.

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