

Blockchain, smart contracts and parametric insurance: Made for each other

By **Laura A. Foggan, Esq., and Christine Elaine Cwiertny, Esq., Crowell & Moring**

NOVEMBER 16, 2018

Over the past couple of years, there's been a lot of talk about blockchain "disrupting" the insurance industry. Many industry observers have focused on the possible use of smart contracts for "parametric" or "index" insurance and their promise of a streamlined administration process, faster claim payouts, and lower costs.

So what does the insurance industry have to gain from smart contracts and parametric insurance? What products are currently available, and what does the future hold for parametric insurance on blockchain?

THE RISE OF THE 'SMART CONTRACT'

Blockchain is a digital ledger that permits digital information to be distributed but not copied. New information can be written onto the ledger, but previously entered information, stored in "blocks," cannot be modified. Cryptography links the new block of information to each prior block.

Blockchain technology is "consensus-driven" and decentralized. This is because a network of independent computers, known as "nodes," make up the blockchain.

Each node must verify each transaction appended to the digital ledger; thus, no single node can take control of the information on the blockchain. As a result, blockchain offers greater immutability and transparency for transactions.¹

Although blockchain was originally devised as the backbone for the digital currency known as bitcoin, its potential reaches far beyond cryptocurrencies.

The tech community is investigating and finding other uses of this technology to record transactions for just about anything of value. One such use is blockchain-based smart contracts.

A smart contract is a computer protocol intended to digitally facilitate, verify or enforce the performance of a contract. It can be used to exchange virtually anything of value between parties, while avoiding the use of a middleman.

An advantage of smart contracts is that they are saved and executed via computer coding and, unlike a paper copy, cannot be easily destroyed. Smart contracts that can be reduced to "if/then" transactions can be easily translated to computer code

to automatically execute upon the satisfaction of the predetermined if/then condition.²

Enter blockchain. The idea is to store smart contracts on the blockchain to enable self-executing contracts without intermediaries. To do so, the assets subject to the contract — such as a car, house or insurance payout — and the contract terms are encoded ("if A pays B \$5,000 then A receives B's car") and placed onto the blockchain. Blockchain's network of nodes then verifies the identities of the parties involved and the contract terms.

Parametric, also known as index-based, insurance compensates a policyholder when agreed-upon parameters are met.

Once the network reaches a consensus that the contract is valid (the parties are who they say they are, etc.), the smart contract is added as a block of information to the chain. Blockchain then monitors for the conditions that satisfy the contract (e.g., A has \$5,000 to pay B and B has proof of ownership of car) and once verified the contract automatically executes without the use of any third party or intermediary (i.e., A gets title/access to the car and B receives \$5,000).³

THE TRIGGERING TRIFECTA

Smart contracts appear to be one of the most promising, and prominent, uses of blockchain technology.

This coupling has not only led to the creation of numerous startups seeking to profit from this technology, but has also encouraged more traditional industries to investigate the use of smart contracts in their product offerings.

These include the insurance industry. And one type of insurance — parametric — has received a lot of traction for use with smart contracts over the past couple of years.

WHAT IS PARAMETRIC INSURANCE?

Parametric, also known as index-based, insurance compensates a policyholder when agreed-upon parameters are met. In effect, it is basically an if/then contract for insurance. If a certain parameter

is satisfied (e.g., a magnitude 7.0 earthquake) then the policyholder receives a predefined payout.

Because payment is tied to predefined parameters being met, the insurance policy is decoupled from an underlying physical asset or piece of infrastructure, such as a house, a car or agricultural fields, and any damage to that asset.

Thus, parametric insurance differs from traditional insurance policies because it does not indemnify the actual loss incurred to an asset from a risk event. The insurer merely makes an agreed-upon monetary payment when the predefined parameters are fulfilled. This makes the payout process predictable and quick.⁴

All parametric insurance consists of two elements: a triggering event and a payout mechanism. Coverage is triggered if the parties' predefined parameters are met or exceeded as measured by an objective index.

Given the apparent synergy between parametric insurance and smart contracts, many established insurers and startups have introduced blockchain-based insurance products to the marketplace.

An objective index is one that is independently verifiable, transparent and consistent. Ideally, the index will be easily measurable and reported quickly and effectively to enable prompt payments, and neither the insurer or insured can influence it.

Potential objective indices for parametric insurance include the U.S. Geological Survey's earthquake magnitude index, the National Oceanic and Atmospheric Administration's Regional Snowfall Index and Temperature, Precipitation and Drought Time Series, and the Social Security Administration's Social Security Death Master File.

As for the payout mechanism, the agreed-upon payout is made as soon as the agreed parameter is met or exceeded, regardless of whether the insured has incurred a loss.⁵

Although parametric insurance shares some similarities with traditional indemnity policies (e.g., it also requires a fortuitous event for coverage), it generally is not meant to replace a policyholder's traditional insurance program. Instead, it usually is a supplement to traditional insurance coverages.

Basically, parametric insurance is a way to fill gaps left by indemnity insurance, such as deductibles or excluded coverages. Such coverage is currently commercially available, as evidenced by Swiss Re's parametric natural catastrophe coverage for uninsured assets and AXA's parametric insurance solutions for agriculture.⁶

MADE FOR EACH OTHER

Parametric insurance has been characterized as the "lowest-hanging fruit" that will benefit from smart contracts and blockchain technology. The obvious benefit from a blockchain-based, parametric insurance smart contract is that it lends itself to automatic claims processing and payouts without the need for claims investigations and adjusters.⁷

Using blockchain-based smart contracts, once the insurer and policyholder agree to the parameters of coverage — e.g., if there is a 7.0 magnitude earthquake, then there will be a \$10 million payout, or if there is a Category 4 hurricane, then there will be a \$1 million payout — the policy language and parameters can be encoded and stored on blockchain's decentralized ledger.

Theoretically, there would be no need for the policyholder to maintain a paper copy of the contract because it would be available for viewing at any time by the policyholder (and the insurer) on blockchain.⁸

Further, there would be no need for the policyholder to contact the insurer when a parameter is triggered. Instead, trusted and secure off-chain data sources and indices would be monitored to capture information on the contract parameters and provide approval for automatic payout when the contract parameter is met or exceeded.⁹

As a result, most intermediaries, paperwork, claims investigation and human error would be eliminated from the payout process. Not only does this provide more certainty in recovery and quicker payouts for policyholders, but it also stands to cut the costs of claims processing significantly.¹⁰

CURRENT INSURANCE APPLICATIONS

Given the apparent synergy between parametric insurance and smart contracts, many established insurers and startups have introduced blockchain-based insurance products to the marketplace.

Several companies have been drawn to and offer flight-delay insurance, and options also currently exist for blockchain-based crop insurance, weather insurance and medical insurance for gestational diabetes.

Although most of these initiatives are European-based, Singapore also boasts new blockchain-based parametric insurance programs. The U.S. has yet to venture into blockchain-based parametric insurance.

FLIGHT DELAY INSURANCE

In September 2017 AXA, the French multinational insurance and asset management group, launched "fizzy," a fully automated and secure blockchain-based parametric insurance against flight delays.

Flight insurance purchased through fizzy is recorded on the Ethereum blockchain, and the insurance contract is connected to global air traffic databases. As soon as a delay of more than two hours is observed, compensation is triggered and paid.

It is anticipated that fizzy will provide insurance for up to 70 percent of flights worldwide by December 2018.¹¹

Etherisc and PolicyPal Singapore have also introduced blockchain-based parametric flight delay insurance.

In October 2017 Etherisc, a decentralized insurance protocol to build insurance products, introduced Flight Delay, which offers insurance against delayed and canceled flights. If a flight is delayed 45 minutes or more, Etherisc makes a payout immediately after the plane lands.

As of July 2018, Etherisc had issued 100 policies and made six payouts.¹²

More recently, in July, the PolicyPal Network introduced blockchain-based flight delay insurance. Under this program, a traveler purchases an annual travel plan from ERGO (the underwriter) and shares flight details through the PolicyPal app.

Once those details are approved, the traveler's data is added to the PolicyPal network blockchain. Flight delays are immediately recognized by PolicyPal's blockchain technology, and payouts are credited directly to the traveler's bank account.¹³

WEATHER EVENTS

In March 2017 Etherisc began testing a crop insurance product based on weather data in rural Africa using the Ethereum blockchain. This insurance is now being sold at crop.etherisc.com.

Farmers can pay \$1 or \$2 a month for insurance, and they receive an automatic payout if there is a drought or flood. The trigger for payment is algorithmic, derived from a data stream of pertinent parameters.

Etherisc is able to offer the low-premium insurance to farmers because the automatic payment process has eliminated the costs associated with assessing claims or damages.¹⁴

Skyline Partners is introducing a similar insurance product for Indian tea farmers in early 2019. Both the premium and the specific parameters leading to a payout are defined up front. Triggers for payout include the amount of rain, temperature and humidity.

By placing this parametric insurance on blockchain, Skyline Partners has made it affordable for and attractive to tea farmers.

First, the use of blockchain for these policies has cut down the paperwork and reconciliation costs, as well as the need for intermediaries. Thus, Skyline Partners can offer lower premiums to the farmers.

Second, the tea farmers tend to trust technology more than they trust insurers. Skyline Partners uses IBM's weather data as its source for determining whether a parameter has been triggered. The tea farmers agree to this data source up front and have access to it on blockchain. Because it's on blockchain, the farmers know there is no risk of tampering.¹⁵

Gestational diabetes

In Singapore one in five expectant mothers is affected by gestational diabetes. In 2018 MetLife introduced an experimental product, Vitana, which is an automated insurance policy using blockchain technology to offer pregnant women financial protection in case of a gestational diabetes diagnosis.

Using a mobile app, an expectant mother can sign up for insurance. Once she pays and confirms the policy, it is deployed as a smart contract to blockchain. If the expectant mother is diagnosed with gestational diabetes, an automatic payout of \$500 is deposited into her bank account via blockchain. There is no claims process.¹⁶

POTENTIAL INSURANCE APPLICATIONS

The blockchain-based parametric insurance products described above appear to be just the initial wave of innovation.

The promise of parametric coverage via blockchain is filling the protection gap in insurance by making insurance more affordable and more accessible to those who would otherwise go uninsured. To that end, startups are looking at blockchain to fill gaps in catastrophic loss insurance coverage.

Catastrophic loss scenarios

In January 2018 Joel Martinez and Jonathan Gonzalez, two Puerto Rican software developers, reached out to Etherisc for assistance in developing insurance that would reliably serve the needs of Puerto Ricans in the event of a future hurricane.

With blockchain technology, hurricane insurance and their premiums are locked up in smart contracts. When certain parameters are met — specifically, high-speed winds picked up by public weather sensors — payouts to policyholders are automatically made not more than 72 hours after a hurricane hits the island.

Although the payouts are small — \$3,000 to \$9,000 — and insufficient to rebuild an entire house or business, they are large enough to assist in the purchase of a generator, food, gasoline and medicine. They ensure Puerto Ricans have immediate cash to survive in the aftermath of a hurricane.¹⁷

Parametric insurance — outside blockchain — is also being used to fill the gap for earthquake and hurricane insurance in the U.S.

In early October 2018 an Insurtech startup, Jumpstart, began offering earthquake insurance for renters and homeowners in California. Consumers can sign up online for this parametric insurance.

In the event of an earthquake of a pre-specified intensity as measured by the U.S. Geological survey, Jumpstart will automatically reach out to its policyholders by text message and, once loss is confirmed, make a predefined payment by direct deposit into its policyholders' accounts.¹⁸

While Jumpstart is not currently using blockchain technology to automate this process, it seems to be a logical next step. Indeed, Nexus Mutual, a London-based startup, announced last year that it intends to create an earthquake coverage product using smart contracts on the Ethereum blockchain.¹⁹

Likewise, an investor-funded startup in Silicon Valley, Assured Risk Cover, has designed a parametric-based hurricane policy for the U.S. market. For a small premium, a homeowner or renter can purchase a policy with limits from \$1,000 to \$15,000.

Payments made under the policy can be used to cover the costs of temporary housing, debris removal and repairs to uninsured property if a hurricane meeting specified parameters takes place.

Assured Risk Cover built a parametric model based on a hurricane's location and severity, beginning with data from NOAA dating back to 1851. It used such data to simulate how hurricanes actually pass over the Atlantic, the Gulf of Mexico and land.

Assured Risk Cover then looked to how much damage could be sustained from varying levels of hurricanes, using information regarding how nuclear facilities are built to withstand hurricane strength winds.

From this data, it designed a model that prices coverage for individual addresses and the likelihood of extreme loss for a particular location.²⁰ Again, Assured Risk Cover is not currently using blockchain technology to automate this process, but it seems to be a potential candidate for such technology.

THE ROAD AHEAD FOR COST SAVINGS AND INCREASED EFFICIENCIES

Blockchain technology is already being used with regard to parametric coverage issued by European and Asian insurers as discussed above. It is anticipated that blockchain-based insurance will likely reach the U.S. soon, particularly in the form of parametric coverages, which are already being introduced in the U.S. to manage catastrophic risk. The promise of blockchain-based parametric insurance is twofold.

First, blockchain-based parametric insurance smart contracts have the potential to bring insurance to those would not otherwise have access to it. In effect, it is a sound start to filling the "protection gap" in insurance.

The average African crop farmer, Indian tea farmer and Puerto Rican citizen now have access to affordable insurance that can provide some cover to ease the impact of catastrophic weather events on their livelihood.

While such insurance will likely not cover the entirety of losses incurred, it provides enough coverage for a farmer or hurricane survivor to withstand the initial impact of a catastrophic event until other assistance can arrive.

Second, parametric insurance on blockchain is just the first step in innovation for the industry. It's a starting point because it is so well-suited to blockchain-based applications. But other insurance and insurance functions are sure to use blockchain technology to save costs and increase efficiency for insurers and reinsurers.

NOTES

- ¹ See Arthur Iinuma, *What Is Blockchain And What Can Businesses Benefit From It?* FORBES (Apr. 5, 2018), <https://bit.ly/2OF13W2>; *What is Blockchain Technology? A Step-by-Step Guide For Beginners*, BLOCKGEEKS, <https://bit.ly/2nna7Ac>.
- ² See *Smart Contracts: The Blockchain Technology That Will Replace Lawyers*, BLOCKGEEKS, <https://bit.ly/2qNKXi5>; see Alan Cohn, Travis West & Chelsea Parker, *Smart After All: Blockchain, Smart Contracts, Parametric Insurance and Smart Energy Grids*, 1 GEO. L. TECH. REV. 273, 281 (2017).
- ³ See *Smart Contracts*, BLOCKCHAINHUB, <https://bit.ly/2ER7C5k>.
- ⁴ See Cohn, West & Parker at 290-95; Andre Martin, *What is parametric insurance?* SWISS RE CORPORATE SOLUTIONS (Aug. 1, 2018), <https://bit.ly/2qGKmx9>. See also Tyler Jenks, *Are Blockchain and Smart Contracts the Future of Insurance?* MAKE POSSIBLE, at <https://bit.ly/2y2A1It>.
- ⁵ See Martin.
- ⁶ *Id.*; Swiss Re Corporate Solutions, *Parametric Solutions*, <https://bit.ly/2SCzspd>. See also AXA Group, *Infography: Parametric Insurance*, <https://bit.ly/2T8GVfH>.
- ⁷ See *Insurance alternative risk transfer options offered to primary policyholders*, BUS. INS. (Oct. 1, 2018).
- ⁸ See Cohn, West & Parker at 290-95.
- ⁹ See *id.* See also Jenks.
- ¹⁰ See Mark Carter, *Parametric insurance: Breaking the mold of traditional insurance*, IBM INSURANCE INDUSTRY BLOG (Jan. 22, 2018), <https://ibm.co/2NCxAcj>.
- ¹¹ See *AXA goes blockchain with fizzy*, AXA (Sept. 13, 2017), <https://bit.ly/2FkVWsh>.
- ¹² See *First Blockchain-based App to Insure Your Next Flight Against Delays*, ETHERISC BLOG (July 23, 2018), <https://bit.ly/2QBMlsl>.
- ¹³ See *New Product Launch: Blockchain-Powered Flight Delay Insurance*, MEDIUM.COM (July 2, 2018), <https://bit.ly/2PnKyAv>.
- ¹⁴ See <https://crop.etherisc.com/>. See also Ian Allison, *How Ethereum can help financially excluded farmers in Africa into the insurance market*, INT'L BUS. TIMES (Mar. 20, 2018), <https://bit.ly/2z6es1T>.

¹⁵ See Nicky Morris, *Insurtech targets under-insured with blockchain, parametric*, LEDGER INSIGHTS (Aug. 2018), <https://bit.ly/2Pggbhv>.

¹⁶ See www.vitana.sg. See also Sharanya Pillai, *MetLife pilots claims-free diabetes insurance for pregnant women in Singapore*, THE EDGE SINGAPORE (Aug. 21, 2018), <https://bit.ly/2zSnUp0>; Nicky Morris, *MetLife demos health parametric insurance*, LEDGER INSIGHTS (May 2018), <https://bit.ly/2T8I32V>.

¹⁷ See Renat Khasanshyn, *Puerto Ricans are developing their own parametric insurance product using Etherisc and Ethereum*, ETHERISC BLOG (Apr. 27, 2018), <https://bit.ly/2QABfth>.

¹⁸ See *Introducing Jumpstart: A New Hassle-Free Approach to Natural Disaster Recovery*, JUMPSTART RECOVERY BLOG (Oct. 2, 2018), <https://bit.ly/2T570kj>.

¹⁹ See Shefi Ben-Hutta, *Nexus Mutual to Build Blockchain Platform for Earthquake Coverage*, COVERAGER (Dec. 26, 2017), <https://bit.ly/2DAK6Zo>.

²⁰ See Alok Jha & Tony Manzitto, *Closing the protection gap with parametric hurricane insurance in the U.S.*, PROPERTY CASUALTY 360 (June 19, 2017).

This article appeared in the November 16, 2018, edition of Westlaw Journal Insurance Coverage.

ABOUT THE AUTHORS



Laura A. Foggan (L) is a partner in **Crowell & Moring's** Washington office, where she chairs the firm's Insurance/Reinsurance Group. **Christine Elaine Cwiertny** (R) is a counsel in the Insurance Group at the firm's Orange County office in Irvine, California.

Thomson Reuters develops and delivers intelligent information and solutions for professionals, connecting and empowering global markets. We enable professionals to make the decisions that matter most, all powered by the world's most trusted news organization.