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## When Smart Contracts Break: Developments in Blockchain, Smart Contracts, and Online Dispute Resolution

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When people think of the legal issues around blockchain technology in 2019, their thoughts probably jump to initial coin or security token offering regulations. The Securities and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), and numerous state securities regulators recently have taken steps to rein in questionable offerings. The prospect of traversing the still-developing maze of SEC, CFTC, and state regulatory requirements rightly keeps many blockchain founders and their potential investors up at night. Perhaps thoughts turn next to the non-trivial task of patenting blockchain technologies. Although some in the industry perceive patents as antithetical to open-source

principles underpinning blockchain technology, most recognize that patents are often the most cost-effective path for allowing fledgling technology companies to protect their innovations and attract institutional investors. Considering these pressing issues, contract law may not be on the radar. But it should be.

Smart contracts have become an indispensable aspect of blockchain technology. A smart contract is essentially an if/then condition (or set of these conditions) programmed to execute automatically when a certain event occurs in a blockchain transaction. For example, “if” a shipment of perishable produce arrives at the Port of Itaquí, Brazil, “then” transfer payment from the Brazilian distributor to the US supplier. As Vitalik Buterin, who launched the prominent blockchain system Ethereum, explained it, in a smart contract, an asset or currency is transferred into a program “and the program runs this code and at some point it automatically validates a condition and it automatically determines whether the asset should go to one person or back to the other person, or whether it should be immediately refunded to the person who sent it or some combination thereof.”<sup>1</sup>

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# Blockchain

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In this regard, smart contracts can resemble traditional paper contracts. Unlike traditional paper contracts, however, their authors or auditors may assume that nothing bad will happen when executing the condition or at least fail to account for unforeseen complications. What happens, for example, when the contracting parties did not consider the situation where the perishable produce is delayed in customs for so long that the produce expires? Without including programming to handle this complication, the smart contract will simply execute when the shipment arrived at the Port of Itaquí. Unwilling to pay for unusable produce, the Brazilian distributor will likely argue that the contract was not fulfilled. Conversely, the US supplier may shift responsibility to the Brazilian distributor because the produce passed all inspections prior to its timely shipment.

Even if your clients don't intend to implement smart contracts or blockchain technology into their supply chains today, regulations increasingly require companies to be prepared for a blockchain financial future. In the United States, counterparties to derivatives transactions have been required to use a legal entity identifier (LEI) when entering and reporting derivatives trades since mid-2012. Across the European Union, in Great Britain, Japan, India, and Australia, parties to derivatives trades similarly have been required to have, use, and report those trades using an LEI. India's regulators have even proposed rulemakings that would require all parties to any financial transaction to have, use, and report all trades using the LEI of each party involved. In a rare instance of global regulatory cooperation, a central site assigns and maintains the LEI listings for every derivatives-trading entity in those countries. Even in countries where entities entering into derivatives contracts aren't required to have an LEI by domestic regulators, their counterparties will require an LEI.

Traditional financial institutions like banks and clearing organizations are testing a gamut of different blockchain technologies to ease back office reporting burdens and operations staff. Using smart contracts in financial trades remains exploratory, and regulators are watching and learning from the reporting. Among the issues the finance industry faces before adopting a single blockchain technology mirrors the issue other industries struggle with: The need for security so that trade records cannot be tampered with and transparency so that regulators, investors, arbitrators, and courts can understand what happened when with whom. Even without the vagaries of customs, swaps and option trades amenable to smart contracts can run into difficulties when reference prices aren't posted promptly or disappear.

Envision a smart contract incorporating the terms of a fixed-to-floating interest rate swap entered into

between a bank and shoe company in 2007. The shoe company agreed to pay the bank \$100 times 70 basis points, and the bank agreed to pay the shoe company \$100 times 30-day London Interbank Offered Rate (LIBOR), once a month for the next 20 years. In 2008, everyone learned that banks had been manipulating LIBOR, and markets began using alternate reference rates to calculate interest. Despite reforms to how LIBOR is calculated, regulators are only requiring publication of LIBOR through the end of 2021. So beginning January 1, 2022, our bank and shoe company's smart contract might not have data to pull to calculate who owes whom on their fixed-floating rate swap. In 2008 the bank and shoe company still had 19 years to find a replacement reference rate for LIBOR and were each still receiving an economic benefit from the 2007 swap. No amendments were made. In 2012, the bank and shoe company exchanged LEIs, and the shoe company agreed that the bank would begin reporting the swap to regulators. In 2016, the bank began experimenting with smart contracts for its extensive fixed-to-floating rate swaps and sent a notice to the shoe company that with human oversight a computer code would be calculating the amounts owed by each party. No LIBOR replacement existed, much less had been agreed-on by the shoe company and the bank, so the smart contract instructed the bank to pay the shoe company when LIBOR was above 70 basis points, and told the shoe company to pay the bank when LIBOR was below 70 basis points. No matter how sophisticated the original coding of this swap, the bank and shoe company will need to discuss which rate to use to replace LIBOR. The negotiators and decision-makers at the bank and the shoe company will have probably changed in the 15 years since the swap was entered into. The credit agreement that the shoe company was trying to offset with the swap may have been renewed or replaced with drastically different debt. The bank is now subject to myriad regulations governing its own balance sheet and its trades with end-users like the company. No matter how clever the smart contract, it couldn't have included an if/then for every potential scenario under the bank's agreement with the shoe company. Just as the Brazilian distributor and US supplier will need to resolve their dispute over produce held up in customs, the bank and the shoe company will need to select a replacement reference rate for their swap.

Smart contracts demand smart solutions. Also technology law is evolving to keep up. "Online dispute resolution" uses computers and online technologies to manage disputes between parties, bringing traditional alternative dispute resolution into the 21st century. Some online dispute resolution techniques, for

instance, can involve automatically freezing disputed smart contracts and electronically soliciting bids from online arbitrators. Using online technology, jurors can be pooled from around the world. Even JAMS, a staid leader in dispute resolution, recognizes the need for change. Draft JAMS rules and clauses are being vetted currently by industry groups, experts, and potential users.

Is it possible to code for dispute resolution procedures? Of course. Do the normal dispute resolution provisions within contracts translate easily to smart contracts? Probably not. For example, standard dispute resolutions in swaps, such as agreeing to seek independent quotes, agreeing to be bound by an arbitrator, to notify one another of a dispute by 2 pm in New York, or to be governed by the laws of New York

leave questions that aren't amenable to one if/then scenario. How do we make sure that changes made to the smart contracts are actually agreed on by both parties, particularly when a third-party such as a clearing organization or a commodities dealer holds the code? Significant uncertainty remains on how to handle complex disputes and whether they ever can be truly online. What is certain is that blockchain technologies demand fast, efficient, secure, decentralized solutions. Attorneys practicing at the confluence of technology and law will continue to innovate and optimize outcomes for their clients in this rapidly developing technological area.

## Note

1. See <https://cryptoresearch.report/crypto-research/smart-contracts/>.

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