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Blockchain: Staying Ahead of Tomorrow

By Keith B. Letourneau and Stephen T. Whelan

Blockchain, also known as distributed ledger technology, foreshadows the future of decentralized financial transactions. In these peer-to-peer transactions, lessors, lessees, and lenders would use a key-access system, each confident that the information in their respective ledgers accurately represents their chronological dealings.

As a developing technology feeling its way to scale, blockchain, or distributed ledger technology (DLT), foreshadows the future of decentralized financial transactions. Conceptually, blockchain is a chain of decentralized-computer-terminal participants ("nodes") that are linked together through a key-access system that enables direct contracting between buyer and seller without employing intermediaries, while nevertheless creating an immutable transactional record.

Rather than relying on intermediaries to broker transactions, maintain records, control title transfers, charge markups for services rendered, and so on, DLT in theory would allow peer-to-peer transactions with decentralized ledgers that enable buyer and seller to communicate directly with confidence that the information contained in their respective ledgers accurately represents their chronological dealings without the parties having to incur intermediary costs.[1] Figure 1 compares the conceptual links between traditional and blockchain transactions.

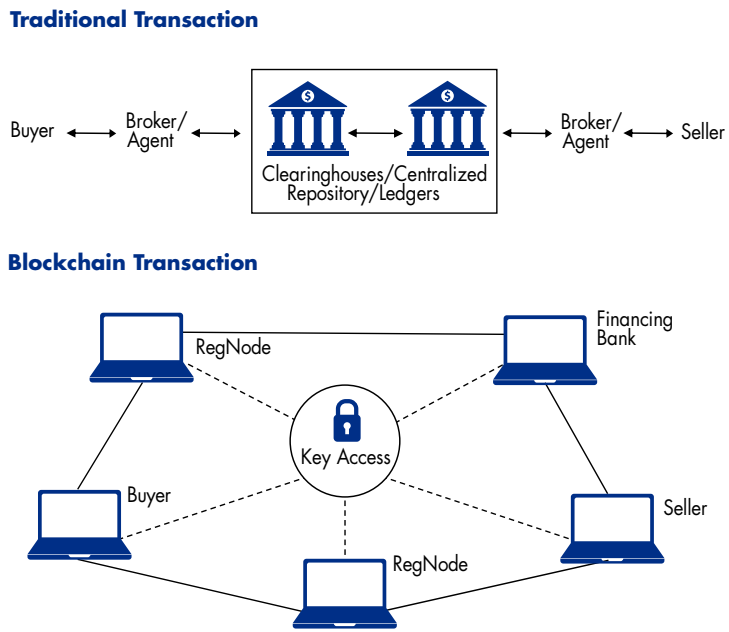
Blockchain also employs key-access restrictions to provide assurance that the parties are dealing with whom they intended. Blockchain has significant implications for equipment leases, loans, syndications, and securitization, as identified in the 2017 report of the ELFA Industry Future Council.[2]

HOW BLOCKCHAIN WORKS

At its core, blockchain technology ("blocks" of data connected via a cryptographic "chain") seeks to allow multiple participants in a commercial transaction to possess an accurate, immutable record of the transaction as it unfolds. Each party with key access would be able to view and make ledger entries relating to the transaction from its own "node" computer terminal, which would be identical to every other key-access participant's node. No one node would possess the "official record" of the transaction: each node in the chain collectively would constitute the official record.

No longer will it be necessary to transact business through an electronic vault, a centralized

Figure 1. Conceptual Links Between Traditional and Blockchain Transactions



repository or commercial institution, though such entities will certainly continue to play roles in the chain as well as in the lending of capital and possible monitoring of regulatory compliance.

Years later, when the contract expires and the lien of the indenture is released, the trustee would also be deleted as an authorized participant in the chain.

Let us consider how a theoretical lease-finance transaction might work using blockchain. Suppose that a lessor enters into a lease (electronic or physical) with a lessee. The lessor can create a chain between those two parties. If the lessor back-leverages the contract, then it can add the lender to the chain, noting its security interest in the contract and the related equipment (as well as filing a financing statement to perfect the lender's security interest). Months later, the lessor may want to securitize that contract with hundreds more of such lessor's leases and loans.

The first step would be to transfer those contracts to a newly formed, wholly owned, special purpose entity (SPE), which would be added to the chain. When the SPE issues asset-backed securities (ABS), the SPE will pledge the contracts and equipment to an indenture trustee which, too, would be added to the chain. The proceeds of the ABS would be applied to repay the original lender for that contract and the lender (as a condition to its being repaid) would consent to being deleted as an authorized participant in the chain.

Years later, when the contract expires (or perhaps earlier, if there is a casualty or voluntary termination) and the lien of the indenture is released, the trustee would also be deleted as an authorized participant in the chain.

This is merely an electronic counterpart of what transpires nowadays via possession of paper contracts. It also replicates what an electronic vault accomplishes, except that the chain is decentralized rather than centralized within one vault.

Although it is unclear whether the blockchain mechanism described above would satisfy all elements of UCC section 9–105 for perfecting a security interest via control of electronic chattel paper, or establishing that such contract is the single authoritative copy, a properly implemented blockchain would identify the secured party and the designated custodian (or trustee), and the lease or loan contract itself would continue to provide that revisions thereto could validly be made only with the consent of the lender or trustee.

As blockchain technology evolves, it should be feasible for the technology to comply with all other elements of Section 9–105. In the meantime, perfection by filing a financing statement will continue to provide comfort to secured parties.

As we will see from some examples in the marine finance arena, blockchain can function very efficiently where the marketplace is characterized by a discrete number of transactions comprising the blocks in the chain, and with transaction participants (lessors, lenders, investors, trustees, and investment banks) that have previous business relationships with each other and trust each other to join the transaction chain.

IMPLEMENTATION HURDLES

Federal Reserve staff members published a report in 2016 delving into blockchain's prospects for application, identifying numerous hurdles and issues that remain before blockchain can realize its full potential.[3] One issue is regulatory compliance, such as with anti-money-laundering requirements.[4] Decentralized transactions may reduce intermediary costs, but if not bound by standardized architecture (that is, an accepted technological framework for processing legitimate blockchain transactions reached by broad consensus between market participants), they also could enable the dark side of illicit commerce to proliferate.

Among other hurdles are demonstration of blockchain's scalability; interoperability with existing legacy systems (blockchain will have to work with existing payment, clearance, and settlement (PCS) computer systems until its functionality is well established); storage capacity; cybersecurity; and industrial standardization of the various iterations of the technology.[5] Buy-in from the numerous market players will not be easily achieved without verifiable proofs-of-concept demonstrating a reliable architecture.[6]

Although current market intermediaries are not expected to voluntarily relinquish their central role in financial transactions, perceptive trustees and collateral agents will realize (as demonstrated in the example above) that blockchain can enhance, rather than supplant, their functionality in equipment finance transactions.

The state of today's computing technology would also seem to pose an impediment to blockchain's implementation. Decentralizing ledgers among numerous nodes will require more, not less, computing power than having a single centralized authority tabulate and record transactions.[7] By way of example, the blockchain architecture of the crypto-currency Bitcoin has been plagued by transaction-processing delays.[8]

Given that U.S. PCS systems handle some 600 million transactions per day worth $12.6 trillion,[9] and given the potential for delay in managing these transactions via a technology that requires more rather than less computing power, it seems likely that blockchain will take hold only where transactions do not require seconds or minutes to process. Therein lies the opportunity for equipment finance.

While DLT seeks to remove intermediaries from the process, thereby reducing transaction costs, unless the federal government or an industry trade association (such as ELFA) plays a regulatory-monitoring-node role, there is the opportunity for considerable mischief — for example, transactions prohibited by persons identified on the U.S. Treasury's Office of Foreign Assets Control's (OFAC's) Specially Designated Nationals and Blocked Persons (SDN) list.

Standardized DLT architectures will need to account for regulatory nodes that monitor compliance, for example, with OFAC regulations. The new field of regulatory technology (regtech) will move these issues into the mainstream. Fortunately, equipment finance appears to be less susceptible to regtech intrusion, except perhaps for containers used in international commerce.

A variety of companies, including IBM, Bosch, Cisco, Microsoft, Samsung, Toyota, and Visa, are developing applications to implement blockchain technology and expand its global reach.[10] Nasdaq employs blockchain technology in its Linq system.[11] To date, more than 2500 blockchain patent applications have been filed.[12]

Other companies, including Thomson Reuters, are forming consortiums to create a broad-based blockchain structure that serves a variety of industries.[13] For instance, the Linux Foundation Hyperledger Project consortium is drawing hundreds of companies and organizations to create standardized blockchain software.[14]

Blockchain and Smart-Contract Technology

Blockchain's potential growth is linked to the developing field of smart-contract technology. To gain a commercial foothold, users of blockchain technology must develop transactional trust: that is, trust that each user can rely on other users to honor their respective contractual or regulatory obligations without the intercession of third-party intermediaries.

The introduction of smart-contract technology into the blockchain architecture should engender that trust by creating standardized practices for carrying out contractual obligations. We next explore the potential and current limitations of smart-contract technology in the DLT context.

SMART CONTRACTS

Smart contracts are computer codes that enable relatively straightforward transactions to occur automatically.[15] In its simplest form, computer coding provides the instruction "If this happens, then that occurs." In equipment finance, a smart contract could be coded so that if a monthly scheduled payment is not made, a default notice could be generated automatically.

How Does a Smart Contract Work?

In another context, a typical ocean bill of lading transaction, the parties to the transaction need assurance that each of them will meet its respective payment and performance obligations. Letters of credit processed through their respective banks are often used to address this issue.

Let us assume the seller and shipper is Chinese Company A, the buyer is American Company B, and the carrier is Singapore Ship C. Typically, companies A and B would reach agreement on terms and conditions through the use of brokers. One of these parties would make arrangements for ocean transport, oftentimes the shipper.

The buyer would make a letter of credit application with its bank, and the bank would issue the LOC upon the posting of collateral or after the buyer satisfies a credit check. The buyer's bank forwards a copy of the letter of credit (LOC) to the seller's bank, which advises the seller upon receipt. The seller would deliver the goods to the Singapore ship and in return receive an original bill of lading. The seller would then present the original bill of lading to the seller's bank and receive payment for delivering the goods.

The seller's bank transmits the original bill of lading to the buyer's bank, which makes payment to the seller's bank. The buyer makes payment to the buyer's bank (either by making payment outright or through a loan arrangement), and in return the buyer's bank delivers the bill of lading to the buyer. The buyer then presents that document to the Singapore ship once the vessel reaches the destination port. On receipt of the original bill of lading, the carrier delivers the goods to the buyer. Clearly, this process involves many steps!

the Linux Foundation Hyperledger Project consortium is drawing hundreds of companies and organizations to create standardized blockchain software.

Using blockchain and existing smart-contract technology, each of these quid pro quo steps can be tracked with ledger entries made as each occurs. Some steps presumably can be removed from the equation. The use of brokers seemingly would

no longer be necessary if the parties contract directly with each other, node to node.

A simple example can explore the possibilities: the payment of demurrage to an ocean carrier due to berth congestion or weather delay.

At least one of the banks involved in the transaction could also be eliminated if payment is triggered automatically through the blockchain process. (The buyer's bank may still be necessary, if the buyer needs to finance the transaction.)[16]

The use of conventional bills of lading presumably could also be simplified or eliminated and replaced with ledger entries noting when monies have been posted for payment, when loading occurs, when the goods arrive at their destination, and when monies are paid — either upon loading or upon delivery at destination, depending on the sales contract terms and conditions. The end result ideally would be a simplified transaction that reduces intermediary costs while providing assurances of performance and security.

Regulatory reporting requirements could also be fed into the blockchain structure so that monitoring nodes could ascertain compliance with tax, trade, cybersecurity, and other applicable laws and regulations.

WHAT ARE THE CURRENT LIMITATIONS OF SMART CONTRACTS?

Yet, when we refer to the term *smart contracts* today, that concept is rudimentary in application. If the ideal smart contract is a self-executing and self-enforcing arrangement between the parties that accounts for and manages every possible permutation that could occur and resolves all issues per the contract's terms, today we are only taking the first steps on a very long journey.

A simple example can explore the possibilities: the payment of demurrage to an ocean carrier due to berth congestion or weather delay. Demurrage is customarily paid to compensate the ship owner for delays in the employment of its vessel, which but for the delay could be earning revenue from another voyage.

Let us assume that we have a charter agreement between the vessel's voyage charterer, which leases the vessel for a certain voyage, and the vessel's owners, which operate the vessel and carry cargo between loading and destination ports directed by the charterer.

The charter includes a clause that provides for the payment of demurrage to the owner if the vessel is delayed at the load port due to berth congestion, but reduces that payment by half if the delay is caused by weather.

The vessel arrives at the berth and tenders a notice of readiness that triggers the application of laytime and demurrage. (Laytime is the time under the charter that is allowed for the charterer to complete cargo operations before demurrage applies.)

Ahead of the vessel in the queue are two other vessels. The port authority has closed the port due to heavy weather and the berth remains empty but unavailable. Is demurrage payable under the contract, and if so, is it subject to half-rate as a result of weather? How does a smart contract deal with this relatively common scenario?

For a smart contract to answer this question, the demurrage clause must have been coded onto the blockchain system and its potential permutations fully explored.

But for the weather, the two vessels ahead in the queue would not have been delayed, yet the affected vessel would not reach the berth in *any* event until the two vessels ahead of it completed their respective cargo operations and departed. Yet, how does a smart contract decide the cause of the delay, what law is employed to decide that issue, and how does a smart contract apply and interpret such law?

THE NEED FOR INTERPRETIVE CODING

Realistically, today's quid pro quo smart contracts are not able to answer every question of interpretation under an equipment lease or loan agreement. To do so, presumably we would need an IBM Watson-esque system loaded with the governing contract clauses, the laws that apply, their case-law interpretation, and the artificial intelligence sophisticated enough to evaluate causation from a legal perspective.

The resolution of these issues requires interpretation by human intelligence, and not simply a computerized assessment. Yet, that is not to say that smart contracts will never apply to equipment finance. In a forward-thinking move, the Equipment Leasing and Finance Foundation issued a request for proposal this year that seeks to study the role of artificial intelligence, smart contracts, blockchain technology, and augmented reality on the equipment leasing and financing industry.[17] In 2017, the European Union proposed a pilot project to create a blockchain proof-of-concept focused on regtech.[18]

In order for smart contracts in the blockchain context to progress beyond quid pro quo transactions (e.g., simple

payment-for-delivery transactions) computer coding and legal expertise must combine to create a new field of endeavor: legal coding.

After blockchain has been established, there remains the question of whether smart contracts will take hold in equipment finance, or whether they will be useful mostly for straightforward commercial payment and delivery terms.

By this we mean a coding discipline addressing the myriad permutations and interpretations that can arise from contract clauses.

Presumably, such expertise will require further development of artificial intelligence as well as a thorough understanding of the algorithms, or step-by-step calculations, that underlie such technology.[19] With the expected exponential growth of artificial intelligence capabilities through deep learning[20] in the decades to come, the development of this expertise seems almost inevitable.[21]

Legal coding will require the expertise to understand how contract clauses in any particular field operate and the ability to translate that understanding into computer code to implement that operation. It will also require collaboration across state and national borders to understand how different legal regimes may apply to the events at issue. Absent such interpretive coding in the near future, we can expect that smart contracts will address only basic, though certainly important, issues such as asset transfers, pledges, and payments.

CONCLUSION

Blockchain holds great promise for streamlining transactions in both equipment finance and maritime commerce within the next decade. If made impervious to hacking, blockchain technology may bolster financial stability by protecting against cyberattacks on banking, commercial, and financial institutions.[22]

Standardization of blockchain technology could foster the development of far smarter smart contracts; ease intellectual property transfers; expedite government contracting and supply-chain services; and reduce intermediary, compliance, and auditing costs.

After blockchain has been established, there remains the question of whether smart contracts will take hold in equipment finance, or whether they will be useful mostly for straightforward commercial payment and delivery terms. A next-generation smart contract conceivably could address the myriad clauses within a typical contract of sale, security and loan agreement, or equipment lease.

With the advent of blockchain coupled with ever-accelerating improvements in artificial intelligence and quantum computing technology, it may soon arise that a blockchain-supported smart contract can resolve disputes over nonconforming equipment or payment defaults, lien issues, and the like. It will require refinement for blockchain to take hold commercially as it overcomes the many hurdles that exist to its implementation, and for the time being smart contracts likely will be limited to quid pro quo transactions.

In the words of the 2017 Industry Future Council Report, blockchain is all about "Staying Ahead of Tomorrow."Assuming it takes hold, in the not-too-distant future, coupled with ever smarter smart contracts and quantum computing or distributed supercomputers created by blockchain, or both, blockchain technology could alter the way the world does business the way the electric lightbulb displaced the candle.

Endnotes

1. Blockchain is not simply limited to financial transactions. The container shipping giant Maersk recently teamed up with IBM to track the shipment of Maersk's cargo using a blockchain adaptation, the Hyperledger Fabric framework. See David Z. Morris, *Maersk Tests Blockchain-Based Freight Tracking*, Fortune, March 5, 2017; Nathanial Popper and Steve Lohr, *Blockchain: A Better Way to Track Pork Chops, Bonds, Bad Peanut Butter,* New York Times, March 4, 2017. Using blockchain systems, shippers and carriers can track the movement of goods and their constituent elements to increase security, optimize freight flows, reduce paperwork, and minimize fraud. *Id.* Music composers have also recently teamed up to form a blockchain consortium to guard against online piracy. Michael del Castillo, Music Groups Band Together to Build Blockchain Rights Solution, CoinDesk, April 7, 2017. Blockchain is also being used to develop the next generation of media-sharing technology. Richard Kastelein, Novus to Launch Innovative Blockchain Advanced File Index System, BlockChainNews, April 5, 2017. "[B]lockchain will also support a variety of other applications, including smart contracts, asset registries, and many new types of transactions that will go beyond financial and legal uses." Joichi Ito, Neha Narula, and Robleh Ali, The Blockchain Will Do to the Financial System What the Internet Did to Media, Harvard Business Review, March 9, 2017.

2. Equipment Leasing & Finance Foundation, "2017 Industry Future Council: Staying Ahead of Tomorrow" at p. 18.

3. David Mills, Kathy Wang, Brendan Malone, Anjana Ravi, Jeff Marquardt, Clinton Chen, Anton Badev, Timothy Brezinski, Linda Fahy, Kimberley Liao, Vanessa Kargenian, Max Ellithorpe, Wendy Ng, and Maria Baird (2016). *"Distributed ledger technology in payments, clearing, and settlement,"* Finance and Economics Discussion Series 2016–095. Washington, DC: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/FEDS.2016.095.

4. *Id.* at 33.

5. *Id.* at 22–24. Numerous companies, organizations, and governments are currently working on various iterations of blockchain technology. See endnote 10 below. Which of these, if any, will prevail as the dominant system will dictate how blockchain technology spreads through the financial markets.

6. *Id.* at 16–17.

7. In the future, quantum computers in the cloud may be able to accelerate computing power, but such computing power will not be available to the general public, given the peculiar temperature requirements (near absolute zero) needed to tap into this realm. See Stephen Shankland, *IBM quantum computers will unleash weird science,* March 6, 2017, c|net. On the other hand, blockchain itself may provide the answer to the

need for ever-greater computing power by creating supercomputers through a distributed network. Ben Dickson, *How blockchain can create the world's biggest supercomputer,* techcrunch.com, Dec. 27, 2016; *see also* Giulio Prisco, *Blockchain Technology to Power Next-Generation Distributed Supercomputers,* bitcoinmagazine.com, Jan. 3, 2017.

8. Nathaniel Popper, *A Bitcoin Believer's Crisis of Faith,* New York Times, Jan. 14, 2016. Bitcoin employs an open architecture blockchain system in which anyone can hold the cryptocurrency directly. Mills, David, et al., *Distributed ledger technology in payments, clearing, and settlement,* footnote 3 at p. 16. By contrast, this paper primarily addresses private systems where access is limited to transaction participants.

9. *Id.*, p. 3.

10. Jason Bloomberg, *IBM Bets the Company on Cloud, AI And Blockchain,* Forbes, March 22, 2017; Anna Irrera, Bosch, Cisco, *BNY Mellon, others launch new blockchain consortium,* Reuters, Jan. 27, 2017; Michael del Castillo, *Microsoft Unveils Project Manifest, A Plan for Blockchain Product Tracking,* CoinDesk, Jan. 25, 2017; Cho Mu-Hyun, *Samsung SDS commercializes Nexledger blockchain services,* ZDNet, April 6, 2017; Kim S. Nash, *Toyota Unit Joins R3 Blockchain Group,* Wall Street Journal, June 23, 2016; Telis Demos, *Visa Taps Blockchain for Cross-Border Payment Plan,* Wall Street Journal, Oct. 21, 2016; Penny Crosman, *Bank blockchain choices may come down to IBM vs. Microsoft,* American Banker, Feb. 28, 2017.

11. Laura Shin, *Why Nasdaq Is Even More Optimistic About Blockchain Than It Was 3 Years Ago,* Forbes, Feb. 21, 2017.

12. Phillip Stafford, *Banks struggle to make blockchain fast and secure,* Financial Times, app.ft.com, Sept. 26, 2016.

13. Jemima Kelly and Gertrude Chavez-Dreyfuss, *Thomson Reuters joins R3 blockchain consortium,* Reuters, Aug. 2, 2016.

14. Andrew Quentson, *Hyperledger and the Linux Foundation Opens Doors to the Public Blockchain Space,* Cryptocoins News, Sept. 18, 2016. Yet another blockchain consortium involves the cryptocurrency Ethereum, and its membership has expanded to include Samsung and Toyota, among its more than 100 members. *See* Michael del Castillo, *Enterprise Ethereum Alliance Adds 86 Members to Blockchain Consortium,* CoinDesk, May 22, 2017.

15. *See e.g.*, Josh Stark, *Making Sense of Blockchain Smart Contracts,* CoinDesk, June 4, 2016.

16. The application of blockchain to letters of credit and the supply chain is already well underway. In his April 8, 2017 article for Cointelegraph News, *Hong Kong Launches Blockchain Trade Finance Platform with Deloitte,* Top Banks, Joseph Young reported: "Earlier this month, HSBC, Bank of China, Bank of East Asia, Hang Seng Bank and Standard Chartered co-introduced a proof of concept Blockchain platform for use with trade finance operations which include lending, issuing letters of credit, factoring, export credit and insurance." *See also Maersk, IBM to speed up shipping with blockchain technology,* Procurement & Logistics Management, March 8, 2017.

17. Equipment Leasing & Finance Foundation Request for Proposal 2017, Artificial Intelligence, Blockchain, Augmented Reality & Smart Contracts, What Is Their Role in the Traditional Equipment Finance Business?

18. Stan Higgins, *European Commission Proposes Blockchain RegTech Pilot,* CoinDesk, March 27, 2017.

19. Stephen F. DeAngelis, *Artificial Intelligence: How Algorithms Make Systems Smart,* www.wired.com.

20. Peter Diamandis, *Within the Next 30 Years: Humanity Will Be Transformed by Exponential Growth,* Singularity University, Feb. 28, 2017; Carlos E. Perez, Deep Learning Exponential Growth Trends, IntuitionMachine.com, Dec. 9. 2016.

21. If blockchain AI smart contracts start to approach human interpretative intelligence capabilities, query whether such systems will make the same interpretative mistakes that require humans to rely upon appellate courts to resolve intractable disputes. If so, how will these systems resolve such problems?

22. *See e.g.*, Hannah Kuchler, *Cyber attacks raise questions about blockchain security,* Financial Times, Sept. 12, 2016; *see also* Barney Jopson, *Regulators warn of cyber threat to financial security,* Financial Times, May 19, 2015.

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Risk and Assets: An Overview and a Balanced View

By William Phelan

New regulations and rules are growing to require lending companies to add more capital to balance sheets and create more measures of risk. This article looks at risk as assigned to assets, as well as the strategic advantage a lender may gain by creating and operating a management system that is firmly in control of risks.

Credit risk remains one area of financial operations that has yet to be mastered, as became clearly evident in the financial crisis that began in 2008. Therefore, new regulations and rules are growing to require lending companies to add more capital to balance sheets and create more measures of risk. The intention of policy-makers is to make lending safer and easier to manage.

The job of calculating risks on assets is usually assigned to the chief risk officer or chief financial officer, and to quantitative analysts, whose jobs are to implement a risk-measurement system that can meet regulations and compliance without burying the business in complexity and overly costly processes.

Executives who run lending companies have argued that complex regulations to increase capital have inhibited lending. Regulators claim systems are needed to ensure safety and soundness. Although most risk managers would agree with the regulators who claim systems are needed to ensure safety and soundness, they would also argue that: the reality is always somewhere in between.

Risk-weighting assets offers a great potential for bolstering safety and soundness, but our technology and capabilities have lagged far behind the theory. The Basel Accord of 1988 became the first institutionalized step toward risk-weighting assets, but it has proven to be a blunt instrument. FASB's Current Expected Credit Loss Impairment Model (CECL) approach advances assignment of risk, but the trick is getting it right.

This article provides an overview for assigning risk to assets, their applications and unintended consequences, and the strategic advantage that a lender may gain by creating and operating a management system that is firmly in control of risks.

BASEL III

Basel III (2010) is the third Basel Accord issued by the Basel Committee on Bank Supervision. It is a voluntary set of regulations designed to increase bank liquidity and decrease leverage. In December 2011, the U.S. Federal Reserve announced that it would apply substantially all of the Basel III rules to all U.S. banks and to all institutions with more than US$50 billion in assets.

Basel III builds on the prior two accords and becomes effective March 2019 with the capital requirements shown in Table 1.

Table 1. Basel III Capital Requirements

	Capital %
Base	4.5%
Conservation buffer	2.5%
Seasonal buffer	0 – 2.5%
Common equity capital	7.0% – 9.5%
Tier 1 capital	8.5% – 11.0%
Total capital	10.5% – 13.0%

The assignment of capital is based on predetermined risk weights using this framework:

$$\text{Risk-based capital ratio (\%)} = \frac{\text{Regulatory capital}}{\text{Risk-weighted assets}}$$

Basel III has tweaked the weightings from prior Basel accords to arrive at weightings for various assets as shown in Figure 1.

The consequence of Basel III is that it remains difficult to account for all the different asset types and lending business models.

Some assets, like certain forms of equity or unsettled transactions, can have risk-weightings of 600% up to 1250%. The aim is to raise lender capital to a level that would provide an adequate buffer for credit losses and generally make the lenders and the system safer and sounder. The consequence of Basel III is that it remains difficult to account for all the different asset types and lending business models.

The principal underlying problem with the Basel approach is that it ignores asset correlations that are the main cause of significant volatility in credit losses. The second problem is the arbitrary allocation of risk weights based on perceived default risk rather than probable losses.

With a financial system built on leverage, reserves are essential to protect against losses. The most recent iteration of Basel moves further toward simply demanding more capital and less leverage through application of risk-weighted assets as shown in Figure 1.

CURRENT EXPECTED CREDIT LOSS

Current Expected Credit Loss also assesses the risk of assets. However, CECL allows for risk assessment based on a more granular system that is specific to the nature of the assets, loan types, geography, and borrower. Rather than having the risk prescribed by the sample of rating agency grades, the probable loss characteristics of the assets can be carefully considered. CECL provides multiple methods for assessing expected loss:

1. Average charge-off method
2. Vintage analysis
3. Static pool analysis
4. Roll-rate method (migration analysis)
5. Probability-of-default method
6. Regression analysis

Unlike the Basel III approach, which relies on ratings agencies, specific models or risk assessment methods are not explicitly prescribed by FASB. The lender is free not only to retain its current systems and methods but also to use real historical data on like asset portfolios to reach a conclusion informed by and trained on its actual historical experience.

Management can use its discretion to use historical loss information for factors relevant to determining expected collectability such as borrower information, financial asset information, lending policies and procedures, expertise and quality of credit review systems, environmental conditions (e.g., markets, geographical area, and regulatory/legal) as well as past experience.

Disclosure of the methods used and the key assumptions will be required as part of financial reporting under CECL. Factors such as credit quality information, allowance for credit losses, past-due status, nonaccrual status, purchased financial assets with credit deterioration, and collateral-dependent financial assets might be disclosed.

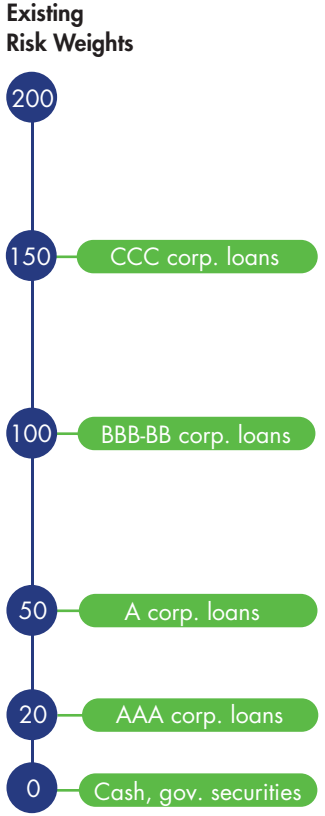
Unlike Basel, which is basically a point-in-time estimate, CECL requires loss estimates over the life of the asset to be reported in interim and annual financial statements. Such forward projections present particular challenges because so many variables, like local economic conditions, can affect the estimates. However, there is a genuine attempt to identify and quantify the key drivers of credit risk.

UNINTENDED CONSEQUENCES

The problem with Basel is that it focuses solely on the borrower and is therefore a very poor way to deal with specialized lending such as equipment finance. Where a key input to a lending transaction is the underlying value of security from the equipment with a predictable residual value at various points

Figure 1. Weightings for Various Assets

Default risk weight for assets not specifically assigned to a risk weight category.



Source: www.tellyourstory.com

in time, applying Basel rules can have unintended consequences.

Consider the example of capital treatment under Basel III in Table 2 of capital treatment under Basel III.

Which would be the more stable position? Basel III requires lenders to set aside 50% more capital for the 50 unrated private businesses. Basel III's emphasis on ratings from statistically recognized ratings agencies and its mechanistic approach to risk weights result in distortions in credit markets.

One example of the limitations of Basel directly related to equipment finance is found in the treatment of residual assets. Residuals receive a higher risk-weighting under Basel than the underlying credit. The Basel committee views the residual as an equity, which means a leased asset may require higher capital set-aside than an unsecured loan such as the one outlined in the example above.

Another example of unintended consequences as a result of Basel is found in a recent study on lending by the Big Four U.S. banks (JPMorgan Chase, Bank of America, Citigroup, and Wells Fargo) before and after the Great Recession. The authors found that small business lending by the four largest U.S. banks fell sharply relative to other banks beginning in 2008 and remained depressed through 2014 (Brian S. Chen, Samuel G. Hanson, and Jeremy C. Stein, "The Decline of Big-Bank Lending to Small Business: Dynamic Impacts on Local Credit and Labor Markets," Harvard University and NBER, March 2017).

The impact from this credit supply shock was that fewer businesses expanded employment, the unemployment rate rose, and wages fell. Industries most reliant on external finance, such as manufacturing, were affected the most. As part of their response in the study, executives from some of the Big Four banks in particular agreed with the study's conclusion and cited higher capital requirements as one of the root causes of their pullback from lending to small businesses in local communities.

In other words, the unintended consequences of increased capital requirements resulted in a credit-supply shock that continues to hold back the growth of private companies. Because CECL is not required until 2020 and no actual examples of its use have been observed, unintended consequences from its application are unknown at this time, but nonetheless they are a real possibility. Pre-rollout tests of CECL show generic statistics, for example, national averages, can result in excess capital with an accompanying lower return on equity.

Table 2. Capital Treatment under Basel III

Borrower	Collateral	Principal amount	Loan term (years)	Spread to Treasury
One BBB-rated corporation	unsecured	$10 million	5	+150
50 unrated private businesses	equipment	$200,000 per loan	3	+450

FINDING BALANCE

A dispassionate view of measuring credit risk shows that it remains one of those functions in financial services that has yet to be mastered. Consistency and measurement remain elusive. Assigning risk to assets is a great idea in theory, but difficult to put into practice. The prescriptive nature of Basel is intended to accomplish two objectives: add more capital to the balance sheets of big financial institutions and improve their liquidity.

Basel employs broad instruments, like using a sledgehammer to nail a picture hook. In many ways, CECL provides an opportunity to augment Basel's broad assumptions on asset risk with deep and valid data. Whereas lenders have developed robust and accurate systems to measure returns, most financial institutions lack the data and historical measurement to measure risk and to put a CECL system into place.

Systems to measure credit risk, from the seasoned credit veteran's experience to statistics like probability of default, seek to help lending operations, which take risk as their core function, to operate safely. Firms that exhibit fewer risk surprises enjoy higher stock valuations from investors, say economists Darrell Duffie and Kenneth J. Singleton in their book *Credit Risk: Pricing, Measurement, and Management (2003)*. Although Basel remains a step in the right direction, CECL presents more granular tools and capabilities that can help managers master credit risk in ways never before possible.

In other words, the unintended consequences of increased capital requirements resulted in a credit-supply shock that continues to hold back the growth of private companies.

Lenders should invest the time, systems, data collection and analysis to build a robust CECL function. If properly put into practice, credit risk management can become more measurable and consistent with fewer surprises and add to a material increase in shareholder value.

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