

# Blockchain impact on credit ratings: reducing costs and improving transparency

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# INTRODUCTION

**“Blockchain will fundamentally alter the way financial institutions do business around the world,”** according to the World Economic Forum. The impact will be felt in virtually every sector of the industry, bringing both greater efficiency to existing processes as well as triggering disruption by creating entirely new ways to perform core industry functions.

This paper examines the potential impact of blockchain on one of these functions: the rating of securitized products. We predict that the technology will improve ratings by:

- **Reducing risk** in securitized products through enhanced data reliability and improved recovery rates.
- **Improving surveillance** through access to real-time performance data on underlying collateral pools.
- **Protecting investor rights** by enabling the bondholder communication and voting capabilities recommended by both the SEC and the Structured Finance Industry Group.
- **Reducing rating cost**, making smaller deal sizes more economic and increasing the potential volume of deals.

Combined, these factors will make both the rating process and the securitizations themselves more efficient. Ultimately, this will reduce the time and effort to rate transactions, lower the credit subordination needed to meet the required confidence threshold for a given rating level, and open the door for new products.

These findings have emerged from Figure's™ direct experience in originating, financing and selling HELOC loans on the Provenance™ blockchain. In addition, we have conducted interviews with Morningstar and KBRA to gauge their views on the impact of blockchain technology on the rating process.

## **ABOUT PROVENANCE**

Provenance is the first blockchain to support the successful origination, financing and servicing of loan assets completely on chain, allowing for an evaluation of real-world performance rather than conceptual potential.

Provenance is a public but permissioned distributed stakeholder blockchain that has been in general production since Q3 2018. It was primarily built from the ground-up,

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but uses certain elements of IBM's Hyperledger. Provenance is accessible to anyone (entity or individual) that is permissioned. Provenance embodies the attributes of all blockchains (distributed decisioning and trustless and immutable data), but adds features necessary for financial services applications. These include:

- **Rich Ledgers:** Provenance's ledger supports the storage of both data and files, including full asset documentation. This allows for true (legally enforceable) digital assets rather than tokenized representations. Assets exist only on chain, eliminating the need for reconciliation between on and off chain activity.
- **Ownership Registry:** Legal ownership is determined solely on chain. This creates a central registry of beneficial owners and allows ownership transfers to settle instantaneously.
- **Asset Exchange:** Provenance instantly clears and settles trades. Price discovery becomes transparent, eliminating the need for market making intermediaries. Assets can be fractionalized, creating liquidity in illiquid asset classes.

#### SMART CONTRACT DEFINITION

Smart contracts are integral to the Provenance blockchain, and will be referenced throughout this paper. Smart contracts are programs that are stored on the blockchain which execute actions when a specific event occurs. This event can be a document submission, a payment, or compliance with an underwriting standard (i.e. FICO is between 650 and 750). Smart contracts contain terms and conditions agreed upon by the participants to render services, transfer assets and record transactions. Smart contracts can be executed systematically between participants without an intermediary.

#### **ABOUT FIGURE**

Figure has utilized the Provenance blockchain exclusively to originate, finance and sell fixed-rate, amortizing home equity lines of credit that it markets directly to borrowers. Loan durations range from 5 years to 20 years, with a variable draw period.

Figure's first HELOCs were originated in Q3 2018, and total volume has exceeded 1,800 loans and \$100M in funding as of April 2019. Figure is currently arranging two securitizations on Provenance, a rated and an unrated transaction. This provides a production use case for the value of blockchain.

# IMPACT ON RATINGS

We believe that blockchain will provide a competitive advantage to originators who fully embrace the technology, allowing them to both lower their rating costs and increase their capital efficiency through reduced levels of credit subordination (or achieve higher ratings through comparable subordination). It will achieve this by reducing risk, improving surveillance, protecting investor rights and reducing rating agency expenses.

## REDUCING RISK

Determining the credit risk of the collateral backing a securitized asset is among the most important factors in rating the resulting bonds. Blockchain origination will reduce this risk in two ways: through increased certainty in the underlying credit data, and through a streamlined ability to manage recoveries in instances of default.

## ENHANCING DATA RELIABILITY

An evaluation of the risk of a loan pool depends upon the quality of the underlying data provided by the originator. Are the inputs to underwriting accurate? Were the underwriting guidelines uniformly applied?

Today the answers to these questions are provided by due diligence firms, which individually review the loans in a pool to check the loan tape data against the actual documentation. Although post-crisis reviews of mortgage pools typically audit 100% of the loans (at \$100's of dollars per loan), it is cost-prohibitive to do so for lower balance loan pools. In these situations, loans are sampled, introducing a degree of uncertainty into the diligence results. The 5 most recent auto securitizations listed on Finsight averaged less than 200 loans audited per pool—a rate below 1%.



In addition, as we saw during the Global Financial Crisis, [inadequate or nonexistent disclosure](#) of 3<sup>rd</sup> party due diligence findings to rating agencies and investors, along with gaps or errors in the diligence process, resulted in the failure to identify loans in breach of the claimed credit standards. This compromised the forecast accuracy of pool performance, and led to the massive funding of loans that were clearly unaffordable to borrowers. The resulting increase in losses is now factored into the worst-case economic

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scenarios employed by the rating agencies. Morningstar Credit Ratings, for example, uses this period as a base for their RMBS rating scenario. In order to achieve an “A” Rating, a bond needs to endure a peak-to-trough house price decline commensurate with that experienced during the crisis without being impaired.

Blockchain can solve both these issues. It can simultaneously allow for a 100% audit of all loan pools, while enabling independent verification of the diligence results. This is achieved by leveraging two key elements core to every blockchain protocol—proofs of authenticity and immutable data—with the efficiency and consistency provided by smart contracts.

The proofs allow a blockchain origination platform to ensure that all credit data is digitally signed by the source provider, and this digital signature can be used by any 3<sup>rd</sup> party to authenticate the data’s source. Smart contracts can then be run to confirm compliance with the underwriting guidelines. Once verified and written to the blockchain, the data is immutable and stored across multiple instances of the chain.

To examine a concrete example, consider the authentication of FICO scores. In a traditional process, the originator pulls a borrower’s FICO and inputs it into its proprietary Loan Operating System (LOS). It is eventually sent as part of a loan tape to a rating agency or a loan buyer. As noted above, the party evaluating the loan pool will typically diligence the result by comparing the FICO in the loan tape with the underlying documentation provided by the credit bureau. However, this process requires that the evaluator trust the accuracy of the underlying documentation as provided by the originator. It can also be manual, verifying data via a “stare and compare” method subject to human error.

In a blockchain-based process, certainty goes up and effort goes down. The FICO score is not extracted as a number from an originator’s proprietary LOS, or provided as a cell in an excel spreadsheet. It exists on chain as encrypted (i.e. tamper-proof) data signed by the independent credit reporting bureau that provided it. The file can be decrypted by any third party by using the credit bureau’s public key, thereby proving both the source of the data and the underlying accuracy. There is no need to rely on the originator’s LOS, and the data exists in a digital format that supports the use of smart contracts. This allows the process of both testing the data and ensuring compliance to the underwriting guidelines to be fully automated with complete accuracy, enabling verification of 100% of the pool. Finally, once the FICO accuracy and underwriting compliance have been authenticated, this information is stored immutably on the distributed ledger so that it does not need to be re-validated in the future.

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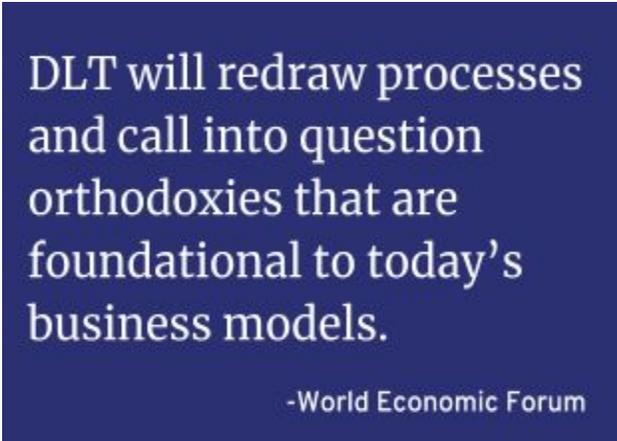
As digital reproduction and document forging become easier in the future, blockchain's ability to pull data direct from an authenticated source will become even more important in protecting data integrity.

One can also imagine additional technologies—such as automated facial recognition or biometric scanning—being layered on to further increase confidence and prevent fraud. By converting traditional manual processes to digital ones, pulling data directly from trusted 3<sup>rd</sup> party sources, providing validation that can easily be confirmed through smart contracts by every node on the blockchain, and by storing all this data immutably in a distributed ledger that provides a single source of truth, blockchain makes it possible to achieve a level of data certainty that does not exist today. In this way, blockchain's enhanced transparency should also help protect borrowers by preventing the funding of loans that violate basic underwriting and "ability to repay" standards.

#### IMPROVING FORECAST ACCURACY

The resulting ability to ensure a uniformly accurate data set will allow for loan pools that are more compliant to stated underwriting guidelines, and that will therefore exhibit a narrower range of expected loss rates. This should in turn allow for lower levels of credit subordination required to achieve a target confidence level that a bond will perform as rated.

It might take time for the industry to adjust to the performance improvements made possible by this new technology. Although rating agencies may conceptually recognize the superior accuracy and underwriting policy compliance of loans on blockchain, most companies' published rating criteria state that their analysis presumes the loan tape data provided to them (as audited by the due diligence firm) is accurate. While it logically follows that the data will be more accurate for a pool in which 100% of the loans have been audited against 100% of the underlying data fields and 100% of the underwriting criteria, a rating agency's criteria today may not allow it to reflect this increased data reliability in its analysis.



**DLT will redraw processes  
and call into question  
orthodoxies that are  
foundational to today's  
business models.**

-World Economic Forum

Over time, however, the industry will develop the performance history to both prove and quantify the benefits of data that is definitively accurate, and underwriting policies that have been uniformly applied. This will allow the rating agencies to narrow the magnitude of performance variance they would expect to see from these

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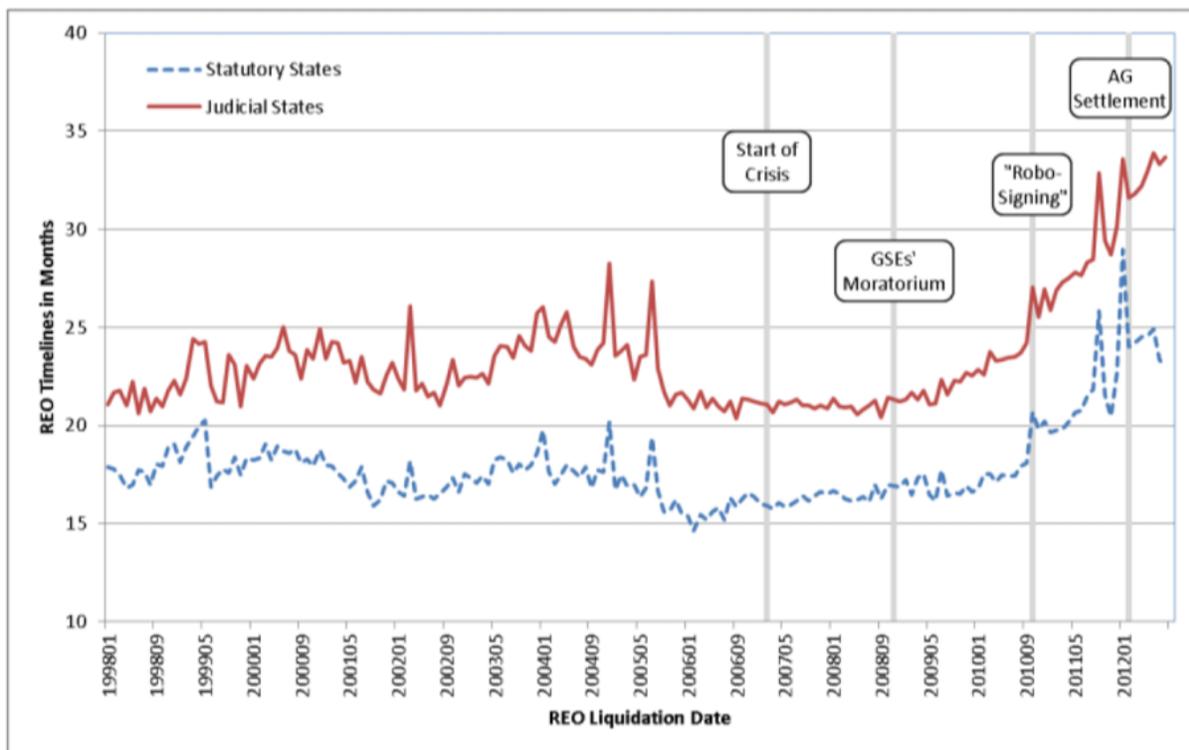
more homogenous loan pools, and require less credit subordination to support a given rating level. This will in turn result in a significant improvement in capital efficiency for the issuer of the securitization.

### IMPROVING RECOVERY RATES

Another area where a blockchain can reduce risk—particularly a protocol that records complete loan files rather than tokenized representations—is by mitigating losses through improved servicing and recovery. When a loan does default, the comprehensive, immutable loan record resident on the blockchain will speed the process and improve the rate of recovery.

In today's paper-based origination process, loans have a physical presence (i.e. the signed contracts) that need to be housed with a trusted 3<sup>rd</sup> party custodian. This not only introduces costs (custodians charge onboarding as well as annual custody fees), but also operational complexity.

When assets trade between owners utilizing different custodians, the files must move. As the loan file accumulates sale and performance history, additional data needs to be added to the file.



Source: Lender Processing Services, Cordell, Geng, Goodman, Yang (2013)

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As the industry discovered during the Robo-Signing crisis, mortgage files are not always complete, impairing the ability of lenders to foreclose. The result was a 75% to 100% increase in recovery timelines, which peaked at 34 months in Judicial States.

In addition, an inability to identify the owners of securitized loans during the crisis impeded certain types of loan modifications—particularly principal reductions which required investor consent—even when such modifications would have enhanced recoveries.

Contrast this with a system where loans are originated and custodied on a blockchain, as are the resulting securities. Smart contracts ensure that outreach to late borrowers occurs in strict compliance with servicing guidelines, and that a loan is transferred to special servicing immediately upon tripping the delinquency triggers. Timely response to late payments and timely transfer to special servicing have been shown to reduce default rates.

If a loan does go into default and foreclosure becomes necessary, all documents and data necessary to enforce the lender's rights—promissory note, mortgage ownership, payment history, documented attempts to cure through special servicing—exist in one place and in digital format. This allows proceedings to begin immediately once the borrower trips the foreclosure triggers, and lowers the legal and administrative costs of pursuing the recovery (which are deducted from the proceeds available to the lender). Furthermore, should a modification be needed, the noteholders of the securities backed by the loan are recorded on chain and can be reached for consent.

The comprehensiveness of documentation improves the odds of recovery, and the speed limits the risk of collateral deterioration. This will lower the loss severity for loans originated on chain. It will also help prevent a recurrence of the kind of neighborhood blight experienced after the financial crisis because of servicers' inability to reclaim abandoned homes.

In addition to improving recovery rates by streamlining the foreclosure process, blockchain can mitigate investor losses by streamlining mortgage insurance claims. Applying for a claim today is an onerous process, slowing investor payouts. Here, too, smart contracts can automate the process by gathering documents and submitting claims immediately upon the occurrence of a triggering event. The result will be faster and more consistent payouts.

The combination of heightened data reliability and decreased loss severity enabled by blockchain origination will limit the magnitude of expected loss scenarios for a deal. This reduces credit risk, allowing for lower levels of credit subordination necessary to achieve a given rating level. By reducing the credit enhancement required at each rating level, the deal will become far more capital efficient for issuers.

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MICHAEL BRAWER, COO OF MORNINGSTAR CREDIT RATINGS

*Michael Brawer has been chief operating officer for Morningstar Credit Ratings since 2018. He oversees operations and is responsible for building and administering functionality to help the company drive sustainable growth. Michael works with other members of the executive leadership team to set goals and objectives, increase operational efficiency, and promote the company's culture of integrity.*

**Are you fielding inquiries about blockchain securitizations? From what type of institutions?**

We have spoken with 8 or 9 firms looking to issue debt, or facilitate the issuance of debt, on a blockchain. We've noticed several business models. Some firms are originating assets to be securitized on a blockchain. Others are not originating, but are facilitating a debt issuance on their own protocol. Others are facilitating a debt issuance with a protocol-agnostic view. Another firm we spoke to is a pure technology play that develops and sells software to financial institutions that are interested in issuing debt on a blockchain.

**What do you see as the most promising aspect of blockchain for a rating agency?**

Blockchain has been described by some industry participants as allowing for "programmable money" or "programmable securities". We are interested in how blockchain technology will allow us to program the dissemination of information that accompanies such securities. This programming can help ensure the accuracy of the rating when it is displayed on different users' systems, as well as grant permissions to access a rating for a private securitization deal when certain conditions are met.

**What do you see as the most promising aspect of blockchain for securitization overall?**

In addition to merely squeezing additional profit out of a given securitization, the real promise is the potential to better democratize our capital markets. With less scale needed to make the economics viable, smaller financial institutions and regional financial institutions will be able to greatly increase their participation in the capital markets.

**How is enhanced data reliability likely to impact a credit rating agency's operations?**

Credit rating agencies take into account the reliability of information available to them when deciding whether they are able to rate a new debt issuance or maintain a rating on an existing debt security. In cases where they do not feel they are able to obtain a sufficient amount of reliable information, they will not issue a credit rating. The enhanced data reliability that blockchain can provide could make it easier for a credit rating agency to

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expand its business into additional asset classes where information reliability has historically been a challenge.

## **IMPROVING SURVEILLANCE**

Blockchain will also greatly enhance transparency and operational reporting, allowing rating agencies to improve their deal surveillance and investors to react more rapidly to changes in the underlying collateral performance.

## REAL TIME REPORTING

All transactions in a blockchain system are recorded in real-time to the distributed ledger, the “single source of truth” accessible to all *permissioned* participants. Borrower payments are recorded to the chain and made visible as they are received, eliminating the 30-day remittance reporting cycle that characterizes today’s environment.

With Provenance, this is facilitated by the incorporation of Omnibus banks into the blockchain protocol. These are core members of the ecosystem that serve as gateways from the fiat world of cash to the digital world of the blockchain. They receive and disburse fiat payments among borrowers, originators and investors. For example, rather than send payments to the servicer, borrowers send money to an Omnibus bank which 1) receives the payment, and 2) records the receipt as a transaction on the distributed ledger. The protocol in turn amortizes the borrower’s loan through a smart contract. The Omnibus bank then remits payment to the loan holder’s account.

Because there is a single distributed ledger recording all payments and delinquencies rather than separate databases maintained by the servicer and trust administrator, reporting happens in real-time rather than on a 30-day cycle. In addition, disbursements to the trust can be automated via smart contracts, which has allowed Provenance to be architected for real-time remittances as well as reporting.

Another benefit of the distributed ledger as the universally accepted source of truth is the elimination of reconciliation errors and effort between different databases. It is not uncommon for discrepancies to exist between servicer reporting and investor reporting. With a blockchain-based platform, servicer reporting and investor reporting are driven off the same data. The combination of a single dataset and the extreme granularity of the data stored virtually eliminates reconciliation errors, and make any questions that do arise much easier to resolve.

These improvements to surveillance and asset transparency allow both rating agencies and investors to spot changes in market conditions more rapidly and respond with more agility. In addition, the benefits will carry over into the secondary trading market, where buyers and sellers will trade on current performance data

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rather than reports up to 30 days old. This will tighten spreads, further improving capital efficiency.

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*Brian Ford is the Head of Securitized Credit Research and Patrick Welch is the Chief Credit Officer at Kroll Bond Rating Agency.*

**Are you fielding many inquiries about blockchain securitizations?**

We have had several discussions with industry participants about the potential use of blockchain over the past few years. KBRA has been approached by more than one issuer, either seeking ratings on a fully “on chain” securitization where assets are originated, warehoused, and securitized all within a private/permissioned blockchain environment, or on a securitization with some complementary element of blockchain technology.

**What do you see as the most promising aspect of blockchain for a rating agency?**

Rating agencies require accurate and timely information to effectively rate a securitization and monitor that rating on an ongoing basis. Therefore, the potential to improve the accuracy of data received and reduce the time it takes to be received, would be a welcome development.

**What do you see as the most promising aspect of blockchain for securitization overall?**

The most likely near-term benefit may come from moving custody of loan documents on to blockchain, as the promise of enhanced security, transparency, immutability, and auditability may help to reduce fraud risk, assuming these promises come to fruition. Future efficiencies and cost savings may come from the use of smart contracts and more highly automated collection and payment processes.

**How do you see blockchain as impacting rating agency surveillance?**

The impact of blockchain on our surveillance process will depend on the information being provided, the frequency of that information, and our ability to access and incorporate that information into our surveillance process. That said, any technology that improves data transparency, accuracy, and timelessness should be beneficial to surveillance process, which for rating agencies, often requires the review of hard copy remittance reports that are delivered 15-25 days following the collection period.

**Will access to real time performance data impact your practices?**

We view access to real time performance data as a credit positive, but changes to our practices depend on the information provided and - to the extent we find it to be beneficial - our ability to access and incorporate that information into our surveillance process.

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## **PROTECTING INVESTOR RIGHTS**

There exists no central ledger anywhere on earth containing the beneficial owners of stocks and bonds. This situation has existed since market moved to the indirect nominee (aka “Street Name”) legal regime in the 1970s in response to the Paperwork Crisis on Wall Street. Registered ownership was separated from Beneficial Ownership, with DTCC created as the registered owner of all traded stocks and bonds. DTCC holds assets in the name of the nominee (the custodial banks) who in turn hold them on behalf of the true beneficial owner.

The beneficial ownership record is therefore scattered across the individual ledgers of the 900+ custodial participants on DTCC in the United States. DTCC can’t see below the custodial entity (the Street Name holder); only the custodians can see down to their own beneficial owners. A similar information architecture applies in global markets, with Euroclear and Clearstream in Europe, The Canadian Depository for Securities in Canada, Austroclear in Australia, etc.

The consequences of separating registered ownership from beneficial ownership, and making beneficial ownership opaque, became clear during the Global Financial Crisis when investors were unable to communicate with one another for the purposes of enforcing their rights. This was particularly evident in the enforcement of reps & warranties claims in the RMBS market. When RMBS bonds were sold to investors, they came with promises that the loans backing the bonds were originated in compliance with specified underwriting guidelines. If it later turned out that loans breached these guidelines, investors could demand the loan be bought back at par—but only if 25% (in most securitizations) of the investors lodged a put back claim. How is an investor to get to the 25% threshold if there is no central registry of beneficial owners?

The answer, in most cases, is that they were not. Rights in principal did not exist in practice. This became a substantial obstacle to recovery, a fact explicitly noted by the SEC in [Reg AB II](#):

*“The aftermath of the financial crisis has demonstrated that investors have encountered difficulty in locating other investors in order to enforce rights collectively under the terms of the ABS transaction... Without an effective means...to communicate, investors have told us that they are unable to utilize the contractual rights provided in the underlying transaction agreements.”*

SEC, Reg AB II, p 27

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The economic magnitude of this inability to enforce rights was enormous. The civil litigation against BofA's Countrywide unit was at one point the largest civil litigation in US history, alleging \$108B in damages. It settled for \$8.5B.

To address this, the SEC mandated a limited form of reporting—issuers must publish any requests by one investor to communicate with other investors—but this has not proven effective. The inability of investors to communicate with one another for the purposes of enforcing rights remains an obstacle holding back the private-label RMBS market.

Responding to ongoing concern from industry investors, the Structured Finance Industry Group (SFIG) called for the development of a bondholder communication platform to be implemented as a best practice in all new securitizations. Their objective was to:

*“Provide investors, who are registered on the platform, with unimpeded ability to communicate with other certificate holders, including having equal and direct access to other certificate holders of the same securities (on an anonymous or known basis, as chosen by each individual certificate holder).”*

SFIG RMBS 3.0 Green Paper, 5<sup>th</sup> Edition p.  
271

Moody's responded to the SFIG paper by publishing a Sector Comment agreeing that improving the ability of bondholders to communicate “would be credit positive for future transactions.” They go on to state:

*“Facilitating communication amongst transaction parties reduces information asymmetry and improves transparency. It also improves and streamlines voting and consent processes, potentially avoiding some losses.*

*Currently, because multiple intermediaries must forward communications to the ultimate investor, certain investors may receive the information more quickly than others and in some cases some investors may not see the information at all.”*

*Moody's Sector Comment,  
“SFIG Investor Proposal Will Reduce Information Asymmetry”*

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Fitch Ratings incorporated the presence of a bondholder communications platform into their published criteria by assigning it a “mitigating factor” point value in their “R&W Framework Tiering” (p. 34, Fitch US RMBS Rating Criteria).

### IMPACT OF BLOCKCHAIN

Blockchain solves the root cause of the bondholder communication problem: it replaces fragmented, inaccessible ledgers with a universal distributed ledger accessible to anyone with the appropriate permissions. By recording every transaction—including ownership transfers—immutably on chain, it reconstitutes the comprehensive ownership registry for a security that was scattered behind the sequestered walls of bank custodians.

Both communication and voting applications can be built on top of this reconstituted registry, resolving the problem that has plagued the industry since the advent of DTCC. This will make it easier for investors to enforce rights, as well as enhance the ability of issuers to execute votes and solicit noteholder input in events such as restructurings. Both of these use cases help investors protect the value of their assets, and will be “credit positive” for deals.

The SEC, SFIG, Moody’s and Fitch have all recognized the value of such a system in principal; blockchain is the first technology that can allow it to be realized in practice. The result will be securitization structures that ensure investor rights are enforceable, lowering the risk of a repeat of the losses visited upon investors during the crisis and bringing more capital off the sidelines and back into the securitization market.

### **REDUCING RATING COSTS**

Blockchain will also make the rating process faster and more efficient, lowering the cost of a rating and in turn allowing for smaller deals to be economically securitized.

### CUTTING DUE DILIGENCE EXPENSE

As noted above in the section on data certainty, blockchain can both cut the cost and increase the coverage of due diligence. With due diligence costing \$350-\$500 per RMBS loan, this represents a meaningful component of the cost of a rating, even if it is typically paid by the issuer rather than the rating firm. The fact that blockchains store data in a structured, digital format opens the door to process automation via smart contracts.

From a ratings perspective, blockchain-enabled smart contracts can diligence 100% of the data elements and underwriting policies in a loan pool without any human intervention. The integrity of the smart contract—which will be audited by an

independent 3<sup>rd</sup> party to ensure it functions as intended—is ensured by the fact that it is immutably stored on the blockchain. No one can alter the code from the original. The result is a dramatic reduction in the cost of performing due diligence, which will in turn lower the cost of a rating. This will make it economic to securitize smaller loan pools, increasing the number of deals issued.

### CUTTING ANALYST EXPENSE

There is a direct relationship between analyst effort and the cost of producing a rating for rating agencies, and a substantial component of that effort is spent in structuring and harmonizing the data received from originators and issuers. This is because data is delivered in varying, non-standard formats that need to be manually manipulated (a process referred to as ETL for “Extract, Transform, Load”). Data for many CMBS transactions is delivered in PDFs, for example, requiring analysts to expend significant time in ETL before even starting their analysis.

Blockchain ensures that data arrives in a consistently structured, digital format, eliminating the need for ETL. The savings go beyond this, however. Consistently structured data also allows rating agencies to program their own smart contracts to automate credit covenant tests such as geographic concentration, percentage of low FICO borrowers, or percentage of second liens.

The same automation applies to ongoing surveillance, with smart contracts automatically checking for delinquency or loss rate triggers that would prompt a review. Smart contracts can also be used to automatically compile monthly surveillance performance reporting.

A blockchain-based securitization in which loan data can be ingested, tested, monitored and compiled without analyst intervention can materially reduce rating agency resource requirements, allowing for lower rating costs and the re-deployment of analysts to the creation of new, higher value-added products.



MICHAEL BRAWER, COO OF MORNINGSTAR CREDIT RATINGS

**What are the ways in which you see blockchain impacting your organizational and cost structure?**

In the simplest of terms, we are a provider of independent credit opinions and blockchain is a distributed, digital ledger. Providing independent credit opinions directly onto a distributed, digital ledger requires up-front technology development and ongoing programming work. Once this is up and running, we could easily see a more efficient work force and streamlined operations on an ongoing basis. This will manifest itself through a lower administrative burden for analysts allowing them to focus more of their time on high value analytical work, more fully automated internal controls, and faster response time to market participants.

**What new skill sets do you expect blockchain to demand of rating agencies?**

Rating agencies will need to develop the skills to understand smart contracts. Even where we feel we can rely on the integrity of the underlying blockchain protocol (the digital ledger itself), smart contracts—which may be written in diverse programming languages by a diverse group of industry participants—will end up controlling most of the ways in which these programmable securities and their cash flows behave. The two broadest concepts here are: (i) understanding the integrity of the technology underpinning smart contracts (i.e., are they likely to function—in a real-world setting—exactly as represented) and (ii) understanding the legal enforceability of smart contracts. Outside resources, such as smart contract auditing and opinions from outside counsel, will obviously be useful here. However, rating agency analysts will need to understand enough about these matters to make informed judgments about the likelihood of timely repayment of principal and interest.

**What new products do you envision blockchain as allowing you to launch?**

We see blockchain as helping to fulfill the promise of digitization of the capital markets. We will continue to provide independent credit opinions, but we will increasingly provide them in a manner and format that interacts directly with the tech protocol used in the issuance of digital debt securities. In a sense, we will be rolling out the technology to function as an “oracle” of sorts—a trusted 3<sup>rd</sup> party provider of credit opinions and information on a digital protocol, pointing directly to specific digital assets.

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# CONCLUSION

Blockchain has already transitioned from concept to implementation, with actual loans now being originated, warehoused and sold entirely on chain. Rating agencies are hearing from a number of issuers interested in extending this into full securitizations. When blockchain securitization does arrive this year, it is poised to significantly lower costs, decrease risk, increase transparency and improve liquidity. Although this paper has focused on the impact on ratings, the effects will be felt throughout the value chain.

For rating agencies, blockchain offers the opportunity to achieve greater certainty with less resource investment, as well as enables the creation of new analytic offerings. Early adopters will have an advantage by moving more rapidly up the learning curve in understanding how to design and implement smart contracts, and to capitalize on the dramatic increase in data availability.

For originators, blockchain promises a cheaper, more consistent manufacturing process that will produce higher quality loans with virtually no underwriting exceptions. This will translate into loan pools that are easier to diligence, require less subordination for a given rating, and that price higher than traditionally originated loans.

**Blockchain's unprecedented data reliability and transparency address core weaknesses in securitizations that contributed to the financial crisis and hurt investors and borrowers alike.**

-Sheila Bair  
Former FDIC Chair

From a public policy standpoint, improved transparency for investors will help prevent market funding of mortgages which are unaffordable to borrowers. A clear record of ownership will facilitate loan modifications and other value-maximizing strategies for distressed borrowers, as well as servicer accountability for prompt loss mitigation.

For every participant in the securitization value chain—including trustees, custodians, and servicers—blockchain will bring both significant disruptions and new opportunities. Those who adapt most rapidly will thrive. Those who don't will face an increasing competitive disadvantage.

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