John Vibert

Managing Director,
Head, Structured Products Team

John Di Paolo, CFA, FSA

Principal,
Structured Products Team

Florence Chan, FSA

Vice President,
Structured Products Team

WWW.PGIMFIXEDINCOME.COM

For Professional Investors Only. All Investments involve risk, including the possible loss of capital.

FEBRUARY 2019

Applications of ESG to Securitized Assets

At first glance, one might conclude that securitized assets are not obvious candidates for Environmental, Social, and Governance considerations. Commonly cited ESG concerns, such as labor practices, corruption, corporate governance, and environmental stewardship, do not prominently feature in many assets common to securitization. However, we contend that such interpretations rely on an overly narrow perspective, and that ESG considerations—particularly Social and Governance issues—are integral to successfully investing in securitized assets over the long term. In fact, as we discuss in this paper, we believe that securitized asset investors who ignore ESG considerations are failing to heed some of the most important lessons of the global financial crisis.

PGIM Fixed Income has been a signatory to the Principles for Responsible Investment (PRI) since February 10th, 2015, but our consideration of ESG issues in the context of securitized assets long pre-dates this official recognition. Despite our conviction regarding the importance of ESG, the securitized assets market has been slow to incorporate ESG principles. In particular, unlike the corporate and sovereign debt markets, the securitized assets market lacks independent third-party ESG service providers. Therefore, PGIM Fixed Income's structured products team has created an internal ratings approach to the consumer ABS asset class and our own framework for evaluating issuers and investments across securitized assets more broadly.

FIGURE 1: COMMON ESG CONSIDERATIONS FOR SECURITIZED ASSETS

Social	• Does the underlying asset (typically a loan) serve the needs and interests of the borrower in addition to those of the lender and securitization investors? • Does the underlying asset class give rise to heightened risks related to U.S. state/federal or European regulatory enforcement?
Governance	• Does the securitization structure and related transaction documentation (Indenture, Prospectus Supplement, Pooling & Servicing Agreement (PSA)) provide adequate investor protection? • Does the legal jurisdiction and related case law increase investor risk?
Environmental	• Does the underlying asset class have first- or second-order exposures to climate change or pollution risks?

Source: PGIM Fixed Income

In the following sections we discuss Environmental, Social, and Governance considerations as they relate to securitized assets and provide examples illustrating how we incorporate ESG into our investment process.

PART 1: SOCIAL

There is a tendency among some market participants to dismiss ESG-awareness as political correctness rather than considered investment analysis. This is unfortunate because a key lesson from the global financial crisis is the importance of considering the social implications of financial products, particularly whether the interests of the consumers are aligned with the interests of originators and servicers.

ORIGINATION:

Poorly designed, disclosed, and underwritten financial products are more likely to result in borrower failures, which in turn typically result in greater securitization losses and undercompensated risk exposure for investors.[1] Such products are also more likely to engender a regulatory response that can further deepen investor losses, increase the risk of reputational damage, heighten mark-to-market volatility, and increase the risk of tail events, including contractual abrogation.

For example, consider subprime “2/28” hybrid adjustable-rate mortgages (ARMs), which were ubiquitous in the run-up to the global financial crisis. The defining characteristics of 2/28s were a two-year fixed rate “teaser” period, followed by an annual reset for the remaining 28-year term of the mortgage loan.[2] Many 2/28s were originated with back-end margins in excess of 500 bps.[3] With LIBOR already over 5% in late 2006, the ex-ante expectation was for interest rates on these mortgages to reset up to 10% or more just two years after origination. The prevailing wisdom was that capital markets would remain wide open for subprime borrowers, and they would simply refinance when the first step-up occurred. Originators were perversely incentivized to produce ARMs with high back-end margins because they anticipated further profits in two years’ time by refinancing the post-reset borrowers into new teaser mortgages. Further, rating agency models tended to view loans with high back-end margins quite favorably due to the excess spread they ostensibly generated in a securitization, resulting in high back-end margin mortgages generating higher gain-on-sale proceeds for originators.[4]

The aftermath of the subprime lending bubble is well known. When financial markets seized in response to poor origination quality and higher-than-expected defaults, many borrowers found themselves unable to refinance and similarly unable to afford interest rates of 10% or more. The result was a vicious spiral of rising defaults across all consumer lending products and worsening economic conditions. This outcome might have been avoided had investors considered the suitability of a financial product with immediate and large step-ups for borrowers who were, by definition, already at the fringes of financial viability.

FIGURE 2: KEY ASPECTS OF OUR ORIGINATION DUE DILIGENCE DERIVED FROM OUR ESG PRINCIPLES

Area of Inquiry	PGIM Fixed Income Focus
Underwriting Approach • Do originators underwrite loans based on “ability-to-repay?” • Do originators underwrite to fully-indexed interest rates? • Do originators ascertain that disposable income meets basic thresholds?	A strong preference for originators that perform cashflow-based underwriting, although we have some tolerance for parametric, model-based underwriting depending on the quality of the inputs.
Exceptions Policy • Under what circumstances are exceptions to the underwriting guidelines granted? • Who is permitted to grant exceptions?	A preference towards a no-exceptions practice because exceptions may, in hindsight, introduce bias in the approval process.
Origination Model • Are underwriting and acceptance decisions made centrally or do branch offices have latitude to make selective overrides?	A preference towards centralized decision making for purposes of consistency and to mitigate the risk that human biases could influence the origination process.
Disparate Impact • Does the originator have policies and procedures in place to mitigate the risk of disparate impact? • Has the originator conducted a formal third-party disparate impact study? • Does the originator conduct audits to assess the potential for disparate impact findings ex-post?	Discriminatory lending practices, whether intentional or not, diminish credit-worthiness and greatly increase the risk of contractual abrogation and adverse regulatory intervention.

Source: PGIM Fixed Income

[1] *Critics of this statement might highlight counterexamples, such as the profitability of payday lending. We would argue that the risk of regulatory action and/or reputational damage diminishes the perceived profitability of such products.*
[2] *Many subprime ARMs had remaining terms longer than 28 years under the auspices of affordability, but here we are specifically considering 2/28s.*
[3] *The weighted average gross margin for 2006 vintage subprime ARMs was 598 bps (Source: PGIM Fixed Income, Intex).*
[4] *All else being equal, a loan with a higher back-end margin generally resulted in higher securitization proceeds due to the perception that the higher back-end margin income would more than offset any increase in losses from defaults.*

SERVICING:

Although much of the post-financial crisis legislative and regulatory response has focused on origination standards, poor servicing standards arguably pose an even greater risk to investors. The risk from poor servicing is two-fold. First, improper servicing heightens the risk of borrower non-performance because borrowers may not be presented with potential loss mitigants, or borrowers may receive conflicting guidance from poorly trained and equipped servicing personnel. Second, servicers' violations of state, federal or European laws, as well as breaches of other regulatory agency guidelines, are more likely to result in adverse outcomes for investors as legal remedies against servicers empirically appear less likely to be time-barred, and investors have struggled with privity to settlement negotiations between servicers and other third parties. **As is the case with our origination due diligence, our investments strongly favor sponsors with centralized servicing operations that allow few, if any, exceptions.**

FIGURE 3: OUR SERVICER DUE DILIGENCE IS HEAVILY INFLUENCED BY ESG PRECEPTS

Area of Inquiry	PGIM Fixed Income Focus
Borrower Engagement	**Includes:** 1) Specific loss mitigation protocols—are loan modifications or other remedies sustainable and do they balance the needs of borrowers with respecting the contractual rights of investors? 2) Are servicer staffing levels adequate to meet borrowers' needs? How is staff trained and compensated? 3) Are distressed borrowers afforded a single point of contact? 4) Are servicing systems automated with proper checks and balances?
Legal and Regulatory Compliance	**Includes:** 1) Meeting with the accounting, auditing, and compliance staff. 2) Assessing infrastructure and technology investment. 3) Tracking engagement with regulators and history of enforcement actions or settlements.
Investor Engagement	Focuses on PGIM Fixed Income's ability to influence behavior and outcomes via provisions in the governing documents as well as ongoing dialogue with servicers and originators.

Source: PGIM Fixed Income

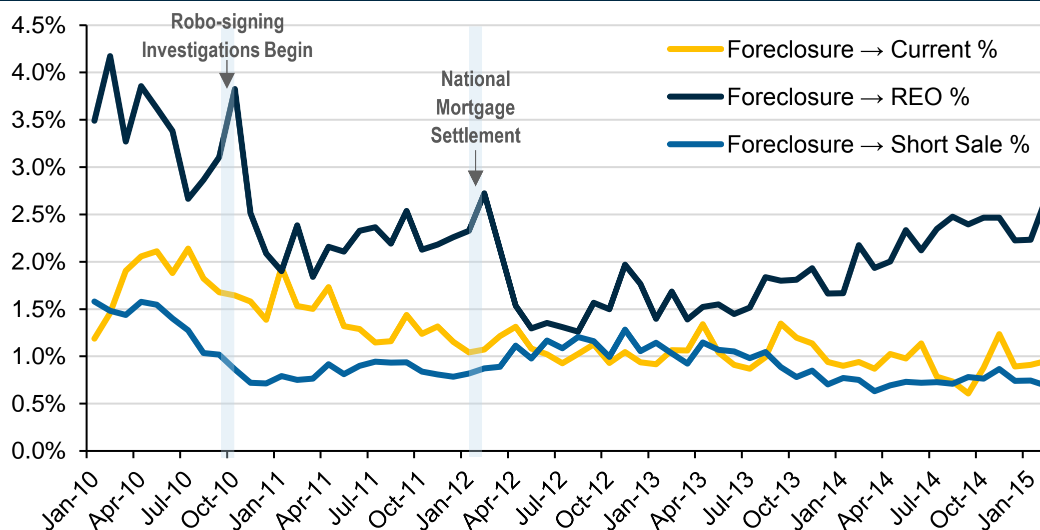
When evaluating servicers, our preference is for those that demonstrate a strong culture of compliance through the active involvement of audit, compliance, and legal staff in the servicing process. Additionally, we look for servicers with the requisite technology investment necessary to minimize servicing errors and adapt to changing market conditions.

PUBLIC POLICY:

In the aftermath of the financial crisis, investors have become attuned to a new risk in the form of public policy intervention. PGIM Fixed Income defines public policy risk as the risk that state, federal, European or other regulatory and judicial entities abrogate or otherwise insert themselves in contractual processes, resulting in increased losses for investors.

Numerous examples of public policy risk exist from the financial crisis, but one of the best known is the National Mortgage Settlement ("NMS"). The NMS grew out of the "robo-signing" scandal in which several large mortgage servicers failed to follow proper legal procedures for pursuing foreclosures on delinquent mortgage loans. Investors in mortgage-backed securities were harmed by the scandal in two ways. First, during the lengthy period between the scandal's emergence and the consummation of the NMS, mortgage servicers delayed foreclosures and other loss mitigation activities as observed in Figure 4, which shows foreclosure-to-REO transition rates before and after the investigation commenced. This in turn inflicted higher losses than investors would have otherwise realized had these activities been pursued on a timely basis.

FIGURE 4: MONTHLY TRANSITION RATES FROM FORECLOSURE TO REO



Source: PGIM Fixed Income. Data as of February 2015.

Second, a significant share of the "damages" agreed to by servicers in the settlement were "paid" in the form of credit for loan modifications of investor-owned loans. Investors were thus penalized not just by the actions of the servicers themselves, but also by the suboptimal loan modifications demanded by regulators as compensation for the servicers' malfeasance.[5,6] Lest readers think that regulatory imposition like the NMS is a relic of the financial crisis, the same issue of regulatory intervention is playing out today in the student loan market where the Consumer Financial Protection Bureau has intervened to negotiate a settlement with respect to trusts issued by National Collegiate, and the Administrator of the Colorado Uniform Consumer Credit Code has named 36 securitization trusts in a complaint asserting that the trusts violated the UCCC.[7,8]

CASE STUDY: SUBPRIME AUTO ABS

While today's subprime auto market reminds some of the subprime mortgage debacle, the reality is more nuanced. One of the ESG challenges of the subprime auto market is that car transportation is a necessity in most parts of the U.S., whereas home ownership is merely an alternative to renting. The imperative of having transportation led subprime auto securitizations to perform comparatively well throughout the financial crisis, yet from an ESG perspective, aspects of subprime auto lending raise potentially significant concerns. Some of the concerns we address in rating subprime auto issuers include:

1. Securitizations from some originators have expected cumulative default rates of 50% or greater. ESG-aware investors must weigh the social implications of facilitating a lending model in which 50% of the borrowers are expected to fail and lose a significant down payment, against the benefits of car ownership for the 50% of borrowers who prevail yet end up paying interest rates of ~30% to cover the high expected rate of failure.
2. Some subprime auto lenders target specific demographics in their business model, creating heightened regulatory risks.
3. Certain underwriting practices, such as hard versus soft credit pulls, have negative implications for borrowers' credit scores.
4. Subprime auto servicing has drawn criticism for such practices as the use of auto kill-switches and deceptive borrower outreach.[9]
5. Ancillary product sales may push the LTV of such loans to 150% or more.

For reasons such as those above, PGIM Fixed Income prioritizes on-site diligence of subprime-focused specialty finance companies in our diligence process, and we have comparatively few subprime auto lenders on our approved purchase list.

[5] *It is worth noting that regulators have made the unconvincing argument that investors were not harmed because the modifications were "Net Present Value positive" relative to foreclosure. The myriad faults with the NPV tests and a refutation of the logic that investors are only entitled to an NPV-positive outcome, rather than an optimal outcome, is beyond the scope of this paper. The authors would merely note that the largest owners of delinquent mortgages, Fannie Mae and Freddie Mac, both opted out of the settlement (Q.E.D).*

[6] *Important aspects of the servicing reforms portion of the NMS, including single-point-of-contact, are consistent with our ESG servicing precepts and arguably provided some benefit to investors.*

[7] *https://www.consumerfinance.gov/about-us/newsroom/cfpb-takes-action-against-national-collegiate-student-loan-trusts-transworld-systems-illegal-student-loan-debt-collection-lawsuits/*

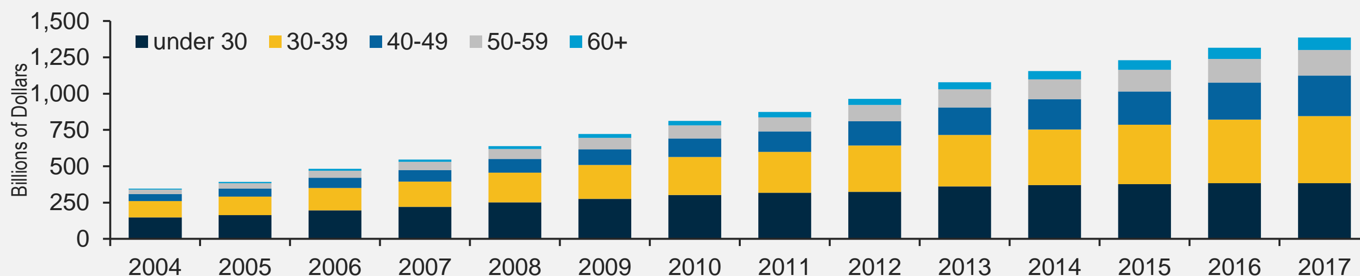
[8] *https://www.findknowdo.com/news/01/02/2019/marketplace-lending-update-securitizations-under-attack-colorado-litigation?utm_campaign=Cabinet%20Newsletter&utm_source=Newsletter&utm_medium=Email*

[9] *In a well-known example, one subprime auto debt collector posed as pizza deliverers to contact borrowers and determine their location. See https://files.consumerfinance.gov/f/201509_cfpb_consent-order-westlake-services-llc.pdf*

CASE STUDY: *STUDENT LOAN ABS*

At first blush, one might consider financing higher education to be entirely consistent with ESG principles. After all, the utility of higher education is well supported based on aggregate statistics highlighting the correlation between educational attainment and employment results. **Unfortunately, 40% of students do not graduate college within six years, and that number rises to 74% with for-profit colleges. Additionally, the perceived necessity of higher education creates a coercive dynamic between student loan originators, students, and parents in the private in-school student loan market (Figure A shows total student loan debt balances by age group).**[10] Finally, the notorious non-dischargeability of student loan debt in bankruptcy completes the foundation for ESG concerns.

FIGURE A: TOTAL STUDENT LOAN BALANCES BY AGE GROUP



Source: New York Fed Consumer Credit Panel / Equifax

Some of the prominent issues in our ESG ratings of student loan ABS include:

1. The use of parental co-signers to guarantee in-school undergraduate student loans without properly underwriting parental income or assessing the likelihood that these guarantors maintain their disposable income as they rapidly approach an underfunded retirement.[11, 12]
2. The inability of originators to underwrite students' thin credit files, uncertain educational paths, and projected future earnings.
3. Originator policies with respect to acceleration events upon the death of the co-signer or student
4. Servicing and collection procedures, including availability of income-based repayment models as well as history of regulatory investigations and borrower complaints.
5. Exposure to for-profit universities, certificate programs and certain trade schools which tend to have the poorest graduation rates, highest default rates, and the most student complaints.[13]

Origination practices in the refinance student loan market generally score highly on our ESG criteria. Two of the most appealing elements of the student loan refinance market are the ability to perform income-based underwriting and the reduced reliance on co-signers. However, while refi student loans score well on an ESG basis with respect to origination practices, many prominent refi student loan lenders were established in the past decade, and their servicing practices are untested given the dearth of financial stress experienced in the current, record economic expansion.

As previously mentioned, servicing risks—particularly in the student loan market—are very much in focus for both U.S. and European regulators. Servicing risks are even more heightened for government guaranteed student loans as it can be disastrous if a servicer lacks the capability to implement more stringent and ever-changing student loan regulations. In the UK, for example, the Honours 2 Trust has remained tangled in regulatory purgatory for years after the original servicer failed to comply with a notification change under the UK Credit Consumer Act 1974 (CCA) that went into effect in October 2008. Pursuant to the change in the CCA, creditors under fixed-sum credit agreements have been required to serve a specific form of a notice of sums in arrears (NOSIAs) on a borrower in default and (if necessary) a specific form of subsequent notice of sums in arrears (SNOSIAs). A failure to serve a compliant NOSIA or SNOSIA renders the credit agreement unenforceable during the period of non-compliance and the borrower is not liable to pay interest or default charges during that period. Due to the servicer's failings, the Honours 2 Trust had to develop a remediation plan to rectify the situation with the UK government and the borrowers, and while the trust reached an £8 million settlement with the servicer on December 7th, 2017, it remains unclear if the cost of remediation can be covered by the settlement.[14] In the meantime, the Honours 2 tranches have experienced meaningful volatility in response to the uncertainty raised by the settlement and a heightened awareness of servicing risks.

[10] https://nces.ed.gov/programs/coe/indicator_ctr.asp
[11] https://loans.usnews.com/how-to-cope-with-student-loan-debt-in-retirement
[12] https://www.wsj.com/articles/over-60-and-crushed-by-student-loan-debt-11549083631
[13] https://www.nytimes.com/2018/12/06/business/education-corporation-of-america-closing.html
https://www.nytimes.com/2016/09/08/business/downfall-of-itt-technical-institutes-was-a-long-time-in-the-making.html?module=inline
[14] https://www2.trustnet.com/Investments/Article.aspx?id=201610311556539030N

While a careful consideration of the social dimensions of investment risk is clearly not a panacea for credit risk, we believe that understanding the alignment of interests between borrowers and originators—with a focus on the borrower experience—reduces the risk of such products for investors.

PART 2: GOVERNANCE

Although governance issues are typically considered in the context of corporate governance constructs (e.g., within the investment grade and high yield corporate debt sectors) and the strength of democratic institutions (e.g., within emerging markets), securitized assets present unique governance challenges. For securitized assets, the ability to influence outcomes and behavior is inextricably linked to the contracts governing securitization vehicles. Unfortunately, poor governance constructs are not the exclusive purview of corporations and sovereigns.

In contrast to the active governance structures, independent auditors, and board oversight in the investment grade and high yield markets, securitizations are inherently passive vehicles with diffuse voting interests. This heightens the up-front stakes because investors typically have a brief window of opportunity to negotiate a governance construct that protects their interests. For securitizations, the primary governance structures are the documents that govern cashflow distributions, key calculations, and the activities, obligations, representations, and warranties of originators and service providers.

FIGURE 5: DOCUMENTATION REVIEW IS A FUNDAMENTAL PART OF PGIM FIXED INCOME'S ESG PROCESS. IN RECENT YEARS WE HAVE WORKED WITH SPONSORS ON THE FOLLOWING ISSUES:

Issue	Description	PGIM Fixed Income Advocacy
LIBOR Replacement Language	In July 2017, the FCA announced its intention to cease compelling LIBOR submissions from banks after 2021. Nevertheless, securitizations continue to include references to LIBOR without adequately addressing an alternative for when LIBOR publication ceases.	PGIM Fixed Income has worked with issuers, sponsors, and, more recently, regulators and trade associations to develop more robust language that contemplates a post-LIBOR reset mechanism. Interbank offered rate (IBOR) replacement alternatives are presently further advanced in the U.S. and UK than in Europe.
Special Hazard Events in Credit Risk Transfer (CRT) Securities	The original CRT issued by Fannie Mae and Freddie Mac failed to account for heightened levels of delinquency arising from natural disasters.	Advocated that the GSEs change the charge-off language in CRTs to allow for longer periods of delinquency in federally designated emergency areas.
Conflicts of Interest Between Senior Bond Holders and Servicers in Commercial Mortgage Backed Securities (CMBS)	Subordinated B-piece holders of CMBS may continue to provide direction to special servicers even after appraisal reductions should have shifted control to more senior classholders.	Worked with issuers to make appraisal reduction language more effective in changing control to senior bondholders rather than having a stakeholder with underwater economic interests continue to drive workout decisions.
Amendment Language	Many securitization documents have vague language around the circumstances in which defined terms and key provisions may be modified.	Negotiated with numerous issuers that money terms or eligibility criteria may not be modified without senior bondholder consent. In European transactions, we have engaged with issuers to ensure that notices must be sent to bondholders and not just published in a "leading" newspaper, that the governing law may not be changed without senior bondholder consent, and that no amendment can be passed by one bondholder owning a de minimis amount of bonds.
Due Diligence	Our preferred due diligence includes reviewing all trust documents instead of relying on prospectus summaries of relevant risk factors.	Asked issuers and underwriters to increase accessibility of relevant supporting documents which are frequently not available to investors.
Reg AB II	144(a) deals are not subject to the same SEC disclosure guidelines as public deals.	Worked with issuers, underwriters, and regulators to ensure proper bondholder disclosures.

Source: PGIM Fixed Income.

The table above represents some successful efforts at improving governance constructs, and PGIM Fixed Income continues to communicate with issuers, regulators, and trade associations on a variety of other governance issues. Additionally, we have declined to invest in numerous transactions due to perceived deficiencies in the governance framework embedded in the securitizations.

PART 3: ENVIRONMENTAL

For ESG-oriented investors, environmental considerations typically enter discussions from a first-order perspective. Specifically, are there any activities in which the issuer is engaged that might give rise to heightened environmental impact and risk? Classic examples, borrowed from other asset classes, include heightened risks related to investments in coal producers as well as oil and gas companies. While such considerations also factor into securitized assets, most notably in the auto ABS space, investors in securitized assets must also consider second- and third-order effects. The following case study discusses the residential credit-risk transfer (CRT) market and how first- and second-order environmental considerations influence our approach to assessing the risk/reward dynamic.

CASE STUDY: CREDIT RISK TRANSFER SECURITIES

The impact of climate change would seem an unlikely consideration for ABS investors, yet it is a potentially important consideration for long-term investors in CRT securities issued by Fannie Mae, Freddie Mac (collectively, "the GSEs"), and the private mortgage insurance industry. CRT securities are issued by the GSEs to protect themselves, and by extension U.S. taxpayers, from credit losses on their mortgage insurance activities. Accordingly, CRT securities are typically leveraged to relatively small amounts of credit losses. For illustration purposes, Figure B shows the capital structure of a 2018 vintage CRT issued by Fannie Mae, which includes a B1 tranche that attaches at 0.50% of losses and detaches at 1.15% of losses.

FIGURE B: CAPITAL STRUCTURE OF A 2018 VINTAGE CRT ISSUED BY FANNIE MAE

Tranche	Attach	Detach
CAS 2018-C05 1M1	3.35%	4.10%
1M2	1.15%	3.35%
B1	0.50%	1.15%

Source: Fannie Mae, PGIM Fixed Income as of February 2019. Provided for illustrative purposes only. It should not be assumed that an investment in the securities listed has or will be profitable. Actual holdings will vary for clients. This information is not intended to constitute investment advice or an offer to sell, or the solicitation of an offer to purchase securities.

A meaningful exposure to borrowers defaulting in response to the effects of natural disasters on their property (a/k/a "special hazard risk") is embedded within these securitizations. While FEMA estimates that 13 million Americans reside in flood zones, other environmental models suggest that the number could be up to three times higher.[15] Although "special hazard risk" and inadequate investor protections are something we have highlighted in these securities going back to the inception of the program in 2013, it was not until the arrival of Hurricanes Harvey and Irma in 2017 that investors broadly began to focus on the embedded transfer of catastrophe risk in these securities. A thorough discussion of the nuances of natural disaster exposure in CRT securities is beyond the scope of this paper, particularly since the GSEs have made numerous changes to the program in recent years; however, from an environmental perspective, a key consideration, if one believes that catastrophic environmental events are likely to increase in frequency and severity, is whether homeowners may default in large numbers or require modification. This is a particularly acute problem for high loan-to-value CRT securities because private mortgage insurers may rescind coverage if the property is not restored to its original condition, and the related mortgage modification risk generally bypasses the mortgage insurers and falls on CRT investors. While the environmental risks to CRT are distinctly indirect, the example is useful in highlighting the pervasiveness of ESG issues throughout the securitization marketplace.

THE ESG RATINGS PROCESS FOR CONSUMER ABS ISSUERS

ESG considerations have long been an integral part of our investment and surveillance processes. Through regular engagement with the issuers, via both on-site due diligence visits and issuer meetings, we gather information with respect to issuers' business models, servicing and collection practices, legal and compliance policies, and loan and offering documents. Other channels of information gathering include ESG and sustainability disclosures on a company's website, third-party vendors, such as Sustainalytics, publicly available information, and news outlets. The information supporting ESG engagement is documented as part of our credit review.

While ESG principles have been at the core of our issuer due diligence process for some time, the broader market's increasing focus on ESG prompted us to formalize our ratings system. We devote substantial resources to assessing ESG issues, and for ratings purposes and clarity of investment decision-making, we distill the results into the five categories described in Figure C. This simple yet comprehensive approach allows us to clearly communicate our ESG views on an issuer and facilitates further discussions with clients when necessary.

FIGURE C: THE FIVE CATEGORIES OF ESG RATINGS FOR ABS ISSUERS

Scale	Description
1	Acceptable—Minimal documented ESG concerns directly related to the securitization, securitized collateral, originator/sponsor/servicer.
2	Acceptable with ESG concerns—One or more documented ESG concerns directly related to the securitization, securitized collateral, originator/sponsor/servicer with limited impact to credit.
3	Fail with active engagement—Documented ESG concerns directly related to the securitization, securitized collateral, originator/sponsor/servicer perceived as detrimental to credit. PGIM Fixed Income actively engages in remediating ESG concerns.
4	Fail—Significant ESG concerns with no active attempt at engagement and remediation
NR	PGIM Fixed Income has no experience, meetings, or interaction with issuer.

Source: PGIM Fixed Income

[15] *http://iopscience.iop.org/article/10.1088/1748-9326/aaac65/pdf*

CONCLUSIONS

PGIM Fixed Income believes the incorporation of ESG principals is fundamental to making sound long-term investments in securitized assets. Our approach to ESG for securitized assets includes:

- Considering the utility and appropriateness of a financial product to the consumer as a potential driver of adverse default and loss propensities as well as a catalyst for heightened public policy risk.
- Analyzing the competency of third-party service providers, particularly loan servicers, to understand the impact on borrowers and the risk of adverse public policy interventions.
- Understanding key governance constructs in the securitization documents to protect investors from poor tail outcomes, particularly in the event of distressed workout situations.
- Considering how environmental factors can have first-, second-, or third-order effects on collateral performance that heighten overall credit risk.

NOTES

NOTES

NOTES

NOTICE: IMPORTANT INFORMATION

Source(s) of data (unless otherwise noted): PGIM Fixed Income as of February 2019.

PGIM Fixed Income operates primarily through PGIM, Inc., a registered investment adviser under the U.S. Investment Advisers Act of 1940, as amended, and a Prudential Financial, Inc. ("PFI") company. PGIM Fixed Income is headquartered in Newark, New Jersey and also includes the following businesses globally: (i) the public fixed income unit within PGIM Limited, located in London; (ii) PGIM Japan Co., Ltd. ("PGIM Japan"), located in Tokyo; and (iii) the public fixed income unit within PGIM (Singapore) Pte. Ltd., located in Singapore. Prudential Financial, Inc. of the United States is not affiliated with Prudential plc, which is headquartered in the United Kingdom. Prudential, PGIM, their respective logos, and the Rock symbol are service marks of PFI and its related entities, registered in many jurisdictions worldwide.

These materials are for informational or educational purposes only. The information is not intended as investment advice and is not a recommendation about managing or investing assets. In providing these materials, PGIM is not acting as your fiduciary. These materials represent the views, opinions and recommendations of the author(s) regarding the economic conditions, asset classes, securities, issuers or financial instruments referenced herein. Distribution of this information to any person other than the person to whom it was originally delivered and to such person's advisers is unauthorized, and any reproduction of these materials, in whole or in part, or the divulgence of any of the contents hereof, without prior consent of PGIM Fixed Income is prohibited. Certain information contained herein has been obtained from sources that PGIM Fixed Income believes to be reliable as of the date presented; however, PGIM Fixed Income cannot guarantee the accuracy of such information, assure its completeness, or warrant such information will not be changed. The information contained herein is current as of the date of issuance (or such earlier date as referenced herein) and is subject to change without notice. PGIM Fixed Income has no obligation to update any or all of such information; nor do we make any express or implied warranties or representations as to the completeness or accuracy or accept responsibility for errors. **All investments involve risk, including the possible loss of capital. These materials are not intended as an offer or solicitation with respect to the purchase or sale of any security or other financial instrument or any investment management services and should not be used as the basis for any investment decision. No risk management technique can guarantee the mitigation or elimination of risk in any market environment. Past performance is not a guarantee or a reliable indicator of future results and an investment could lose value. No liability whatsoever is accepted for any loss (whether direct, indirect, or consequential) that may arise from any use of the information contained in or derived from this report. PGIM Fixed Income and its affiliates may make investment decisions that are inconsistent with the recommendations or views expressed herein, including for proprietary accounts of PGIM Fixed Income or its affiliates.**

The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients or prospects. No determination has been made regarding the suitability of any securities, financial instruments or strategies for particular clients or prospects. For any securities or financial instruments mentioned herein, the recipient(s) of this report must make its own independent decisions.

Conflicts of Interest: PGIM Fixed Income and its affiliates may have investment advisory or other business relationships with the issuers of securities referenced herein. PGIM Fixed Income and its affiliates, officers, directors and employees may from time to time have long or short positions in and buy or sell securities or financial instruments referenced herein. PGIM Fixed Income and its affiliates may develop and publish research that is independent of, and different than, the recommendations contained herein. PGIM Fixed Income's personnel other than the author(s), such as sales, marketing and trading personnel, may provide oral or written market commentary or ideas to PGIM Fixed Income's clients or prospects or proprietary investment ideas that differ from the views expressed herein. Additional information regarding actual and potential conflicts of interest is available in Part 2A of PGIM Fixed Income's Form ADV.

In the United Kingdom and various European Economic Area ("EEA") jurisdictions, information is issued by PGIM Limited with registered office: Grand Buildings, 1-3 Strand, Trafalgar Square, London, WC2N 5HR. PGIM Limited is authorised and regulated by the Financial Conduct Authority of the United Kingdom (Firm Reference Number 193418) and duly passported in various jurisdictions in the EEA. These materials are issued by PGIM Limited to persons who are professional clients as defined in Directive 2014/65/EU (MiFID II). In certain countries in Asia, information is presented by PGIM (Singapore) Pte. Ltd., a Singapore investment manager registered with and licensed by the Monetary Authority of Singapore. In Japan, information is presented by PGIM Japan Co., Ltd., registered investment adviser with the Japanese Financial Services Agency. In South Korea, information is presented by PGIM, Inc., which is licensed to provide discretionary investment management services directly to South Korean investors. In Hong Kong, information is presented by representatives of PGIM (Hong Kong) Limited, a regulated entity with the Securities and Futures Commission in Hong Kong to professional investors as defined in Part 1 of Schedule 1 of the Securities and Futures Ordinance. In Australia, this information is presented by PGIM (Australia) Pty Ltd ("PGIM Australia") for the general information of its "wholesale" customers (as defined in the Corporations Act 2001). PGIM Australia is a representative of PGIM Limited, which is exempt from the requirement to hold an Australian Financial Services License under the Australian Corporations Act 2001 in respect of financial services. PGIM Limited is exempt by virtue of its regulation by the Financial Conduct Authority (Reg: 193418) under the laws of the United Kingdom and the application of ASIC Class Order 03/1099. The laws of the United Kingdom differ from Australian laws. In South Africa, PGIM, Inc. is an authorised financial services provider – FSP number 49012.

© 2019 PFI and its related entities.

2019-0970