

Risky Road: Assessing the Costs of Alternative Credit Scoring

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Foreword

The Honorable Rick Lazio

Over the past 70 years, the American housing finance system has provided unparalleled liquidity to the housing market. Through the establishment of the New Deal Era Federal Housing Administration (FHA) and soon thereafter the Federal National Mortgage Administration (Fannie Mae), its sister the Federal Home Loan Mortgage Corporation (Freddie Mac) and the Government National Mortgage Association (Ginnie Mae), trillions of dollars of home loans have been insured, guaranteed and placed in the secondary market. This has allowed lenders to reach ever more home borrowers, many of whom, in turn, were able to build household wealth, establish credit and achieve the oft-cited American Dream. This financing system has evolved over many years and with each year gained in sophistication and complexity as a result of new technology, data, and careful recalibration.

We all know that this remarkable progress has not been without sporadic crises which set homeowners, lenders, investors, insurers, and taxpayers back dearly. Most economists believe that the scars of the Great Recession of 2007-10 continue to be seen in today's economic data. This is particularly apparent in the unfortunate decline in minority homeownership.

We know that the housing finance system is not invulnerable. Likewise, we know that the nation and her communities are made stronger when we have protected the mortgage market from the lethal risks that sometimes lurk beyond the happy numbers. Achieving stability and sustainability requires careful balance.

I know this as someone who served as Chairman of the Subcommittee on Housing and Community Opportunity in the United States House of Representatives which had jurisdiction over federal housing policy. I also know this as someone who has worked at senior levels at one of our nation's largest lenders as well as our largest mortgage insurer. I have seen this careful balance first hand.

This is why this paper sponsored by National Taxpayers Union is so vitally important. For the last half century, National Taxpayers Union has served as the guardian of taxpayers in our nation's capital. Their voice, widely respected by policymakers in both major political parties, is the voice of the people who pay our federal government's bills. The political class in Washington may decide how the money gets spent. But it is the teacher, police officer, small business owner, clerk, mechanic, and homeowner who pays the tab. Most of us who are the bill payers can't get to Washington to watch out for overspending, waste and abuse. Instead, in our place stands NTU.

Some might ask why NTU has weighed in on this issue. After all, wouldn't we expect them to be shaping the debate on marginal tax rates or business tax credits? Of course, we would. But NTU is engaged on so much more. They are committed to protecting today's and tomorrow's taxpayers. They sound the alarm when massive taxpayer liabilities are obscured by complexity. They are standing guard when the political class runs up deficits rather than paying for new spending by reducing lower priority programs. They understand that every dollar borrowed by the government is an additional dollar which must be paid back at some point by the taxpayer.

This last point is at the heart of their effort in this important Policy Paper. In 2011, the Congressional Budget Office (CBO) wrote that the true cost of guaranteeing the mortgage book of Fannie and Freddie in the aftermath of the Great Recession was an astounding \$317 billion. And while a good deal of that was repaid, billions of dollars were added to the federal debt as a result of the bailout. Few would take

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issue with the fact that this financial catastrophe was a result of poor basic risk management and, to some degree, the political class pushing the GSEs past the limits of prudential risk management. This is what NTU seeks to avoid.

As the author of important federal housing laws, a top housing advisor to two presidential campaigns and an author of numerous chapters and articles, I know that politics can unfairly distort sound risk management practices. In the realm of mortgage finance, accurate credit scoring is at the heart of assessing risk.

The importance of credit scoring to our economy and our communities cannot be overstated. Over two decades, actuaries, accountants, financial wizards, and investors have prodded, pulled, and tested the models that we use today. They have undergone rigorous academic analysis. This is not to say that we cannot imagine a better model, but rather that the one that we have is time and data tested and serves the system well. Every day this is validated, when lenders, borrowers, insurers, and investors consummate mortgage transactions involving billions of dollars.

Mortgage finance service businesses have spent enormous sums of money building a technological architecture based, in large part, on the credit scoring model. Investors, who live in the realm not of public opinion but of the uncompromising and sometimes financial marketplace depend on the reliability of credit scoring to price mortgage loans and decide on whether to create the liquidity that the system requires to operate optimally.

It's true that every day we develop new data and get smarter about which data matters and how to best use that data to make the best decisions around housing credit. What I am suggesting is that a \$15 trillion dollar U.S. mortgage market is so intensely critical to our national economy and to the tens of thousands of communities across our great nation that changes must be done with a high degree of humility and care. A careless change could lead to financial calamity, not just for the cogs in the mortgage finance wheel, but to the very same people that those that argue for quick and easy change purport to help.

The regulator should be commended for providing an avenue to pilot new credit scoring models as a way to test new approaches. More can and should

be done to introduce more types of data which are not currently collected by the Credit Reporting Agencies. Data such as consumer permissioned banking activity could provide a more complete picture so that whomever is truly creditworthy has the credit score they deserve. But we should always begin with the goal of improving the accuracy of the data, rather than establishing some politically attractive claim about how many more might be served.

I'm grateful to NTU for undertaking this timely, balanced, and thoughtful analysis of the credit score issues before Congress and the Federal Housing Finance Agency, which oversees the GSEs. I am confident that my former colleagues and those at FHFA will access this research and analysis and embrace their recommendations to create a process for review that respects the awesome complexity and importance of the American mortgage market.



Rick Lazio (R-NY) served in the U.S. House of Representatives from 1993 until 2001. While in Congress he was Chairman of the Subcommittee on Housing and Community Opportunity of the House Banking (now Financial Services) Committee. He was also the sponsor of the Small Business Tax Fairness Act, which was enacted in the 106th Congress. Mr. Lazio is currently Senior Vice President at AlliantGroup, and is regarded as one of the nation's foremost experts on the housing finance market.

Remarks from NTU's President

Credit Scoring: A Vital Concern for Taxpayers

Why should credit scoring matter to taxpayers? The question is far from academic, and its answers equally so.

Guaranteed loans from Fannie Mae and Freddie Mac, mortgages provided under the Federal Housing and Veterans Administrations, many student loans, and Small Business Administration loans are among some of the federal programs that utilize credit scores in their lending decisions. All told, by our calculations, credit-scored processes of one type or another are employed in federal programs helping to underwrite close to \$7 trillion in consumer credit. The accuracy of credit scoring can therefore literally mean tens of billions of dollars in default or other risk for which taxpayers are eventually liable.

Imagine if this accuracy were undermined by unsound evaluation processes, or by political considerations. Either outcome is undesirable and must be addressed with different responses. Yet, both are at this point entirely preventable.

Time and again throughout its 50-year history, National Taxpayers Union (NTU) has alerted public officials to seemingly obscure but critically important connections in housing and finance policy that could have negatively impacted taxpayers and our country's economic future.

We have raised the alarm when analytical methods or standards that are universally accepted among the private sector become politicized and have highlighted the need for careful cost-benefit analysis. The U.S. Government Accountability Office has cited lack of sound data-informed business practices as reasons why programs such as student loans and Department of Energy loan guarantees accrue unnecessary liabilities.

Our Founder James Davidson testified before the House Ways and Means Committee in September 1989, at what was then billed as the "first oversight hearing on GSEs [Government-Sponsored Enterprises] in recent memory." Throughout the early 1990s, NTU actively sought GSE oversight legislation in Congress, and pointed out the need to design institutions that could accurately assess and regularly report on systemic risks as well as remedies. In 2000, I testified before a subcommittee of the House Banking and Financial Services Committee on H.R. 3073, the Housing Finance Regulatory Improvement Act – and met a cold reception from lawmakers who bristled at ideas such as applying impartial private-sector capital standards to these quasi-public entities.

During 2008, NTU worked to develop more constructive responses to the financial crisis of that time, such as enhanced use of covered bonds to offset ever-increasing proposals to put cash on the line through the Troubled Asset Relief Program. Throughout the GSEs' ten years of conservatorship, we have developed bipartisan legislative and approaches to minimizing risks and attempting to construct pathways out of their taxpayer-backed limbo. At the same time, we have paid careful attention to regulatory oversight on the part of agencies like the Federal Housing and Finance Administration (FHFA).

Which brings us to the 2018 directive from Congress to develop new processes for evaluating credit scores and FHFA's new proposed rule.

Credit scoring should be a neutral, predictive tool that is annealed through precise modeling as well as rigorous testing. New or different iterations of credit scoring should undergo the same time-tested process of evaluation. As NTU pointed out in our March 2018 comments, filed jointly with other citizen groups in response to an FHFA request for input on credit scoring explained:

Credit scoring is an essential piece of our housing market. Its purpose is to indicate the likelihood a potential borrower is to default on their mortgage. The exact score helps FHFA determine who is qualified for a mortgage and helps set conditions for repayment depending on risk. Credit Reporting [Agency] scores are used as an initial screen for mortgage applicants and, in many cases, become the foundation of the mortgage decision. Credit Reporting Bureaus played a major role in the 2008 financial crisis as lenders lowered their credit-scoring requirements to fuel the housing demand for subprime borrowers. Led by a policy of “rate shopping,” lenders drove all rating agencies to lower their standards, which created a “race to the bottom” where firms devalued the actual risk of the score to secure revenue from their competitors. Should such a course of events take place again, we could reenter a situation where firms have an incentive to make the most loans instead of striving to provide the highest reliability.

It was thus with great concern that NTU viewed Congress’s directive in the 2018 Economic Growth, Regulatory Relief, and Consumer Protection Act for FHFA to develop a process for evaluating credit scoring models. The agency came under great pressure from various interests – including an entity sponsored by the Credit Reporting Agencies – to effectively confer a regulatory subsidy upon market entrants that even FHFA’s then-Director concluded would have little impact on the expansion of qualifying mortgages.

Unlike some of its other actions, FHFA has in its December 2018 Notice of Proposed Rulemaking (NPRM) on Validation and Approval of Credit Score Models established an elegant balance. As NTU noted at that time, the new rule avoided the path of sanctioning an illusory, government-driven form of “competition” among credit-scoring models by establishing sensible boundaries on how such models can qualify for consideration by the GSEs. The NPRM not only calls for sound cost-benefit analysis in evaluating new models, it also builds conflict-of-interest guardrails (which are standard in other regulatory spheres) to ensure that those models compete without bias or favoritism. This holds promise for creating a true market-driven environment that nurtures innovation.

As the deadline for NPRM comments approaches, NTU is publishing this Policy Paper with the assistance of top experts in the field of housing finance in hopes it will contribute to an informed discussion among public officials about the need to preserve those principles of benefit-cost analysis, guardrails, and a level playing field for competition and innovation. We have consulted a variety of sources for data and analysis, such as American Enterprise Institute, Quantilytic, LLC, Milliman, Whalen Global Advisors, CoreLogic, and the Urban Institute, and are grateful for this wealth of information in preparing our paper for submission on March 21, 2019.

In fact, this discussion should transcend the NPRM, and continue as leadership changes at FHFA take place. After all, FHFA correctly concluded that when it considered its own RFI in late 2017 on whether to allow or even require the use of multiple credit scores in evaluating borrower qualifications, “a central theme from RFI respondents was that the operational challenges of implementing a multi-credit score approach would outweigh any benefits.” This too, would have downstream effects through the economy, as private-sector entities that evaluate loans backed by the GSEs would have to cope with numerous compliance and liability costs.

As the introduction that follows these remarks will show, our Policy Paper explores in considerable detail how a thoughtful approach to credit scoring models can benefit consumers, taxpayers, and the economy. By considering the need for innovation, the imperative of managing taxpayer risk, ever-

present requirements for more evaluative data, and the potential impacts on private-sector users, we hope to create a holistic framework that demonstrates all the elements that comprise a successful future for credit scoring. In turn, we suggest best practices that can weave these separate threads into a strong fabric that can support private and public sector lending and credit programs.

Creating that public-sector fabric will involve reconciling many viewpoints from numerous stakeholders, weighing the benefits and the costs of particular strategies to increase access to credit. At any given point, public officials may decide that the increased risks of taxpayer bailout in a particular lending program are worth the gains or vice versa. But the tool to evaluate those benefits and costs should not be subject to artificial manipulation in order to depict a desired outcome. In such a chaotic environment, what would otherwise be informed, transparent policymaking becomes little more than a hyper-politicized guessing game.

As history has shown, taxpayers ultimately lose at this game. Yet, with FHFA's rulemaking, we have a rare opportunity to level the playing field before it becomes hopelessly tilted. If implemented without political interference, it can foster genuine innovation in new business enterprises while methodically ensuring they have sufficient viability in a financial sector that needs a solid analytical foundation to thrive. With trillions in hard-earned resources at stake, our leaders must recognize this urgent and pivotal decision point.

Executive Summary

The Federal Housing Finance Administration's (FHFA) Notice of Proposed Rulemaking (NPRM) on Validation and Approval of Credit Score Models has taken a cautious approach to the introduction of alternative credit scoring models, and for good reason: an estimate of the costs versus the benefits of making such a change is not clearly provided to the industry or the public. Currently, there is no hard mortgage performance data evidencing the performance of loans with credit scores using alternative scoring methodologies. Unintended consequences such as increased default risk as well as operational processes should be evaluated further. These consequences include not only sizing the potential increase in implicit and explicit taxpayer liabilities, but also implementation, legal, and compliance costs to all actors in the lending industry for potentially multiple alternative scoring methods. The latter computations would necessarily need to include other government lending and credit programs that rely on some form of credit scoring in their operation.

FHFA's NPRM was commendably candid in pointing out the uncertainty of the benefit and the size of the market that may be impacted by a change in credit scoring methodologies:

FHFA concluded that the Enterprises' empirical findings revealed only marginal benefits to requiring a different credit score than Classic FICO. These findings suggest that, regardless of the credit score used in the underwriting process, each Enterprise's automated underwriting systems more precisely predicted mortgage defaults than third-party credit scores alone. The Enterprises' automated underwriting systems incorporate additional information provided by the borrower and/or third parties during the mortgage application process (e.g. borrower income and assets) that is not reflected in the information used to generate a standalone third-party credit score such as Classic FICO, FICO 9, or VantageScore 3.0.

NTU is concerned that unless it is properly and methodically tested, a new credit scoring methodology may impact the risk in the Government-Sponsored Enterprises' (GSEs) portfolios. According to the Urban Institute, the risk taken by the GSEs continued to rise over the time period of Quarter 2 2011 and Quarter 3 2018. The increase is primarily driven by an increase in borrower risk, which includes borrower characteristics such as Loan-to-Value, Debt-to-Income, and credit score. The total risk taken by the GSEs has increased from 1.4 percent to 3.0 percent as a result of expanding the underwriting credit box.¹

The use of credit scores is far-reaching and impacts almost all lending decisions, risk-based pricing, mortgage and servicing valuations, investor views, capital requirements, and many other benchmarking requirements. As more and more Fintech lenders (and other institutions) deploy alternative data to evaluate credit, adequate evaluation of the impacts across all of these areas is vital.

NTU supports FHFA's cautious and measured approach to innovation and competition in order to balance these goals against risk and determine if the net result is a value to taxpayers and the financial system. A disciplined analysis of performance on a pilot set of mortgage loans originated with alternative credit scores is required to thoroughly vet the implementation of new credit scoring methodologies. We recommend that the study referenced by FHFA using GSE historical loan performance benchmarked to alternative scores be a Congressional/Regulator mandate for lender and interested stakeholder model developers. Sources such as the Office of the Comptroller of the Currency, the Federal Reserve and Actuarial Standards of Practice, should provide the standards necessary to properly develop and validate new credit scoring models.

¹ See Goodman, Laurie, et al., Housing Finance at a Glance: A Monthly Chartbook, Urban Institute, February 2019, "Credit Box: Housing Credit Availability Index," p.13, https://www.urban.org/research/publication/housing-finance-glance-monthly-chartbook-february-2019/view/full_report.

Introduction

Pro-Taxpayer Principles of Credit Scoring

In the previous Congress, lawmakers introduced the Credit Score Competition Act of 2017, which “require[d] Fannie Mae and Freddie Mac to establish procedures for considering certain credit scores in making a determination whether to purchase a residential mortgage.” In May 2018, this legislation was included in the Economic Growth, Regulatory Relief, and Consumer Protection Act (S.2155, Public Law 115-174) which amended the Fannie Mae and Freddie Mac (GSEs) charter acts as well as the Federal Housing Enterprises Financial Safety and Soundness Act of 1992. Its enactment requires the Federal Housing Finance Agency (FHFA) to create a process by which new credit scoring models can be validated and approved for use by the GSEs when they purchase mortgages. FHFA subsequently issued a prudent and balanced rule (Notice of Proposed Rulemaking, “Validation and Approval of Credit Score Models”) on December 13, 2018 to achieve this end.²

National Taxpayers Union’s (NTU) review of the proposed FHFA rule has focused on potential increased taxpayer exposure from nontraditional credit scoring methodologies. We approached this important issue by evaluating the following framework:

Transparency. An orderly, transparent, and deliberative process for evaluating enterprise business assessments for new credit scoring must also take into account the economic opportunity costs of compliance, adaptation, and disruption to borrowers and lenders. A recent Government Accountability Office (GAO) study³ recommended that Consumer Financial Protection Bureau (CFPB) provide lenders and banks with specific guidance on using the data in underwriting as there are concerns about potential disparate impact and other fair lending issues. *NTU believes that regulatory costs are already particularly acute in the financial sector.*

Best Practices. There is a range of information including preliminary studies from industry, think tank, and public sector sources to develop best practices in evaluating alternative credit score approaches. *NTU believes that from these can be drawn recommendations for data analysis that can better inform public policy decisions from a cost-benefit perspective that accounts for the interests of all stakeholders.*

Risk of Unintended Consequences. If regulators (or Congress) were to circumvent the alternative credit scoring model validation process with goals intended to qualify more borrowers for mortgages, it could lead to unintended consequences for the financial stability of the taxpayer-backed mortgage guarantee system. Incremental policy changes can lead to exponential increases in risk. In addition to evaluating Credit Reporting Agency (CRA) data, industry participants have differing views about incorporating nontraditional credit scoring methodologies, which include alternative data sources.⁴ *NTU is particularly concerned that “nontraditional credit scoring” could serve as a pretext to lowering standards and therefore a race to the bottom effect, potentially leading to underqualified borrowers receiving a mortgage backed by American taxpayers. FHFA’s December 2018 Notice of Proposed Rulemaking (NPRM) stipulated that this process would be more cautious than originally anticipated. NTU is supportive of this caution, and remains concerned that changes to the current credit standards could increase the likelihood of a future taxpayer-funded bailout.*

² For further background on the legislation and the rule, see Federal Housing Finance Administration, “Notice of Proposed Rulemaking: Validation and Approval of Credit Score Models,” Issued December 21, 2018, <https://www.fhfa.gov/SupervisionRegulation/Rules/Pages/Validation-and-Approval-of-Credit-Score-Models.aspx>.

³ Government Accountability Office, “Financial Technology: Agencies Should Provide Clarification on Lenders’ Use of Alternative Data,” GAO-19-111, December 2018, <https://www.gao.gov/products/GAO-19-111>.

⁴ Alternative data sources may include rent and utility payments, cell phone payments and other installment loans.

Innovation in Credit Scoring and Borrower Qualification. Supporting both of these developments is important not only to provide greater economic opportunity for families and homebuyers, but also greater entrepreneurial strength for the business community. In any case, significant innovation in the credit scoring space is already occurring through the advent of refinements and expansions to existing standard tools, which themselves are being subjected to rigorous testing. *NTU believes these goals must be balanced with the benefits of a stable, predictable system of lending and finance that measures and protects against risk, not only to borrowers and lenders, but also to government (taxpayers). One approach to achieving this would be by allowing controlled test and learn pilots following the solicitation phase for models that don't have demonstrated experience (as laid out in the FHFA proposed rule). NTU has repeatedly called for GSE pilots to be narrowly tailored to specific tasks within the GSEs' defined missions. In this instance, the use of pilots is appropriate and beneficial, and avoids mission creep.*

I. Sizing the Costs: More than Meets the Eye

The most important thing a legislator or regulator must do when issuing a new rule or passing a new law is to consider the costs of that policy to taxpayers, to industry, and to the government, and weigh the costs versus the benefits before changing the status quo. In their rush to pass the “Credit Score Improvement Act” last year, Congress neglected to fully research, document, and understand the potential costs of this rule to all parties involved. NTU believes there are significant costs that must be considered around alternative credit scoring and a multiple score approach.

Industry Impact

“NTU believes there are significant costs that must be considered around alternative credit scoring and a multiple score approach.”

Embracing a multiple score approach will introduce new risks and create expensive operational challenges for industry participants. FHFA’s 2017 Request for Input regarding current credit score requirements gathered a significant response by industry stakeholders in both the primary and secondary mortgage market concerned about moving toward multiple score system.⁵ Many of these stakeholders provided information related to the potential costs and implementation requirements if a new credit scoring methodology is adopted by FHFA and the GSEs. Although it is difficult to quantify the future costs and impacts to the industry and consumers, we’ve summarized key themes described in the comment papers as well as other perspectives.

Mortgage Originators and Servicers

Inaccurate scoring methodologies are likely to lead to an enhanced level of risk, which may not be priced correctly. In addition to an undetermined increase in risk, each user of a credit score will need to evaluate the operational processes that require changes once the new score methodology is implemented. These costs may include testing and comparisons of “old” vs. new methodologies, and staff to carefully evaluate these differentials and gauge the impacts on stakeholders. For example, lenders will need to update their operational policies and procedures in collecting alternative data, evaluating credit data and resulting scores. Many banks would need to ensure that their systems and processes adhere to the model risk management guidance issued by the Federal Reserve and the Office of the Comptroller of the Currency (OCC). To do so, these lenders would need to engage in thorough testing and documentation during a transition period. Lenders may need to adjust risk-based pricing overlays to their mortgage pricing if concerns exist about the accuracy of the new credit scoring methodology. FHFA has requested that

⁵ For background, see Federal Housing Finance Administration Credit Score Request for Input, December 20, 2017, https://www.fhfa.gov/Media/PublicAffairs/PublicAffairsDocuments/CreditScore_RFI-2017.pdf.

lenders and stakeholders respond to the NPRM with their comments; however, an estimate of the costs versus benefits is not clearly provided to the industry or the public. Unintended consequences such as increased default risk as well as operational processes should be evaluated further.

For lenders, inaccurate scoring could result in higher levels of delinquency as under qualified borrowers are unable to meet repayment schedules. While the full estimation of how many more potential borrowers would become scorable under a multiple scoring system is unclear, providing mortgages to a greater number of under qualified borrowers certainly increases the amount of risk across the mortgage market. Ultimately, that risk is carried by the GSEs, and by extension, taxpayers.

Mortgage servicers will need to evaluate potential changes to Mortgage Servicing Rights (MSR) values as credit score is a factor in valuations. Additionally, if potential expected and unexpected losses increase, the valuation will be impacted. According to the Mortgage Bankers Association (MBA) servicing study,⁶ between 2008 and 2016 the cost of servicing non-performing loans quadrupled to \$2,113 and is 13 times higher than performing loans. As the Urban Institute rightly notes, “these increasing costs negatively affect all stakeholders in the housing finance system.”⁷ As traditional financial institutions have shrunk their footprint, non-depository institutions have greatly expanded their market share in the mortgage market. The non-depository institutions do not have to meet the same capital standards as banks. Further, a Harvard University School of Government study determined the median FICO Score⁸ of an FHA-insured non-bank borrower is 667, versus 682 for banks, and at several large non-bank originators it is below 660.⁹ Lower scores for taxpayer-backed mortgages adds to systemic risk and a greater likelihood of a taxpayer-funded bailout.

New Model Implementation

In addition to significant operational costs previously mentioned, implementation may include timing of updating proprietary models for lenders that use their own underwriting and proprietary risk system. According to the Mortgage Bankers Association’s RFI comments to FHFA¹⁰, maintaining a single model features “the lowest implementation costs and the shortest implementation timing. This is because there would be no structural changes to the current credit score framework, aside from the change in model itself. Industry participants would need to adjust models of default risk to accommodate the change, as well as meet any back-testing, documentation, or other requirements as noted above.” MBA also notes that additional models would add greater costs in order to meet compliance standards and there “would also be more significant changes to systems and databases required as current systems and databases are not (in most cases) designed to accommodate credit scores from multiple providers.”

In addition to mortgage lenders’ underwriting systems, the Mortgage Insurance (MI) industry would be impacted by the change in methodology. For MIs in the private market, accurate credit scores are an integral piece of their evaluations as it determines the precise amount of capital MIs needed to leverage against loans. To implement a system, USMI (US Mortgage Insurers) calculates each individual MI company would need to dedicate about \$15 million for every model and assign thousands of hours of resources and years of lead-time to change their systems to accommodate this change. Adopting just one additional

⁶ Walsh, Marina, “Servicing Costs Per Loan (Single-Family) - Performing v. Non-Performing,” Mortgage Bankers’ Association, July 25, 2017.

⁷ Goodman, Laurie et al., “The Mortgage Servicing Collaborative: Setting the Stage for Servicing Reforms,” The Urban Institute, January 2018, https://www.urban.org/sites/default/files/publication/95666/the-mortgage-servicing-collaborative_1.pdf.

⁸ Fair Isaac Corporation (FICO) is an analytic company that has distribution agreements with Credit Reporting Agencies to develop models used to generate credit scores.

⁹ Lux, Marshall, and Greene, Robert, “What’s Behind the Non-Bank Mortgage Boom?” Working Paper # 42, Mos-savar-Rahmani Center for Business & Government, Harvard University, June 2015, https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/working.papers/42_Nonbank_Boom_Lux_Greene.pdf.

¹⁰ See Comments of the Mortgage Bankers Association in Response to Federal Housing Finance Agency Credit Score Request for Input, Submitted March 30, 2018. Retrieved from: <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submission-detail.aspx?RFID=979>.

model could cost the MI industry (consisting of seven insurers) \$105 million, a significant expense that may force these companies to shift their capital away from doing business.¹¹

Investors

Investors are concerned that the change in credit scoring methodology would have far-reaching effects on assessing the valuation of residential mortgage loans and securities as well as MSRs. The market today currently relies on traditional credit scoring (FICO score) methodologies. This is the case in many areas of finance. A Mercator Advisory Group review of 2018 asset-backed securitizations across six asset classes determined that FICO Scores were disclosed in 97.5 percent of instances. In one class, auto financing transactions, FICO scores were “solely cited” in 100 percent of cases.¹²

Thus, there is reason to doubt market acceptance of alternative scores. As stated in the Whalen Global Advisors’ comment letter:

Any change to the existing process would require considerable disruption in primary and secondary markets. Market participants and investors would need to retool their internal valuation models. Regulators will need to approve the new internal risk models as well as investors in RMBS, ratings agencies, central banks, commercial banks, pensions, insurance companies, and capital models.¹³

Other impacts include the analysis that banks utilize to evaluate capital charges under Basel III/IV framework. The authors estimated that it could cost tens if not hundreds of millions of dollars to restructure existing models and systems. They state that it could take years to implement these changes.

The investment community shares a concern that there is insufficient data to evaluate the impact of using alternative scores on mortgage loans. They believe that this lack of analysis may cause loans originated using this methodology to be traded at a discount until more information and testing is performed. As a result, lenders might be conservative in their use of the alternative scores and could possibly require additional fees on these loans. If this occurs, it will increase the cost of credit that could be passed on to borrowers.

The chart below summarizes comments¹⁴ related to issues and impacts for borrowers, lenders, investors, and mortgage insurers in adopting alternative credit scoring models for GSE mortgage loan approvals. Adopting a multiple score option would certainly increase complexity of the mortgage application process and lead to greater confusion. To address impending confusion, stakeholders would undoubtedly have to devote greater resources to expand outreach and education to help consumers understand model differences and their respective changes to their score, which could impact eligibility and cost of obtaining a loan. Without an accurate predictive score, the result could mean qualified borrowers receive less credit than needed, or under qualified borrowers receiving a mortgage or perhaps receiving more credit than such a consumer can responsibly repay.

¹¹ See Comments of U.S. Mortgage Insurers in Response to Federal Housing Finance Agency Credit Score Request for Input, Submitted March 29, 2018, <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submission-detail.aspx?RFID=969>.

¹² Riley, Brian, “Asset-Backed Securities: A Primer for Credit Card Managers,” Mercator Advisory Group, February 25, 2019, <https://www.mercatoradvisorygroup.com/Reports/Asset-Backed-Securities--A-Primer-for-Credit-Card-Managers/>.

¹³ See Comments of Whalen Global Advisors in Response to Federal Housing Finance Agency Credit Score Request for Input, Submitted January 29, 2018, <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submission-detail.aspx?RFID=897>.

¹⁴ To review these and other comments on the RFI in detail, see the FHFA’s comment submissions at: <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submissions.aspx>.

Reactions to Credit Score RFI		
Respondent	Issue	Impact
American Bankers Association	Systems and disclosures.	Costs to update and implement.
Center for Financial Services Innovation (CFSI)	Artificial intelligence based underwriting is part of the proposed alternative credit data methodology, which sets up a “black box” approach and impedes fair lending.	AI based underwriting can cause risks because consumers will not have transparency with underwriting decisions. Concerns about fair lending. FHFA will need to monitor denial reasons for disparate impacts.
Consumer and Civil Rights Group	Concerned that credit invisible consumers will likely end up with low scores instead of no scores if full file utility credit reporting is implemented.	Costs to consumers may increase as many alternative data points are only reported if delinquent.
Credit Union National Association (CUNA)	Large lenders with their own automated underwriting systems would need to revise.	Significant operational issues.
Federal Home Loan Banks (FHLBs)	Managing operational issues.	FHLB participants (PFIs) would have operational hurdles to manage and additional internal and external costs.
Structured Finance Industry Group (SFIG)	Disrupts primary and secondary markets without providing certainty there will be a meaningful increase of eligible borrowers. Needs disclosure of models and methodologies	Increases borrower costs due to investors’ lack of familiarity with new and not well- understood models.
Securities Industry and Financial Markets Association (SIFMA)	Change in scoring changes participant’s ability to model credit risk and prepayments is core analysis of TBA and CRT markets.	Market Disruption that places investors at a disadvantage as credit scores are core to the analysis of TBA and CRT markets.
USMI (US Mortgage Insurers)	In addition to pricing, mortgage insurers (MIs) use credit scores for capital reserving calculations (PMIERS). MI’s need uniform score to use for all origination and loss mitigation as well as CRT (credit risk transfer).	USMI estimates it will cost MI’s \$15 million per MI company per model as well as thousands of hours of resources and years of lead-time to change their systems to implement this change.
Whalen Global Advisors	All possible changes proposed by FHFA imply a significant change for investors and other end users of consumer and institutional credit ratings. All the relevant approval stakeholders need to be involved.	Any change would require considerable disruption in primary and secondary markets. Regulators will need to approve the models as well as investors in RMBS, ratings agencies, central banks, commercial banks, pensions, insurance companies, and capital models. Banks will need to restructure under Basel III/IV framework. Could cost tens if not hundreds of millions and years. Concern that alternative scores on mortgage loans may be traded at a discount until more information and testing is performed. This will increase costs to borrowers.

Consumer and Taxpayer Impact

The GSEs utilize risk-based pricing to ensure that mortgage loans are priced appropriately to their underlying default risk. A minimum required credit score of 620 generally applies to all mortgage loans delivered to the GSEs. These risk-based pricing fees (Loan Level Pricing Adjustments, or LLPAs) are assessed upfront on a loan level basis and are set by certain risk characteristics such as credit score, loan to value, term, occupancy, program and mortgage insurance. Lenders generally increase the interest rates on loans with LLPAs and therefore the additional fees increase the cost of the mortgage. According to FHFA,¹⁵ the average LPA is 15 basis points. Those borrowers that do not have a traditional credit score are generally paying the highest LPA. Therefore, they are segmented into the highest risk category and charged the highest fees.

The fees are expressed as a percentage of the loan amount that can be charged to the borrower by increasing the mortgage interest rate. For example, a 0.50 percent fee might equate to an additional 0.125 percent in interest rate. Due to this risk-based fee requirement, credit score accuracy is very important to the pricing of mortgage loans.

“For example, a 0.50 percent fee might equate to an additional 0.125 percent in interest rate. Due to this risk-based fee requirement, credit score accuracy is very important to the pricing of mortgage loans.”

GSE Loan Level Pricing Adjustments

The chart below shows the incremental adjustments in the price to the borrower (and the risk adjusted fee charged by the GSEs) in each credit score band. The loan-to-value (LTV) range for this price adjustment is 90.01-95 percent LTV, which reflects borrowers with lower down payments. Borrowers without credit scores are placed in the lowest credit score band and are generally underwritten manually. Adjustments to credit score modeling can affect the loan level pricing adjustments both positively and negatively. For example, a loan that was previously scored at 640 and requires 2.75 percent in additional fees may be scored higher using alternative credit score factors (and carry lower fees). This may result in an incorrect level of risk-adjusted fees to manage the portfolio along with additional cross-subsidization required for the better credit score loans to compensate for the lower credit score loans. In some government lending programs, taxpayer assets rather than other borrowers provide that cross-subsidization. In a sense, the explicit taxpayer guarantee for GSEs does not provide a cross-subsidy, but it has been cited as a source of moral hazard.¹⁶

¹⁵ Federal Housing Finance Agency, “Fannie Mae and Freddie Mac Single-Family Guarantee Fees in 2017,” December 2018.

¹⁶ Mendenhall, Slade, “The Role of Moral Hazard in the Housing Boom and Bust,” George Mason University, June 3, 2018, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3189798.

Loan Level Price Adjustments (LLPAs) 30 Year Fixed Rate 90.01-95.00 LTV		
Credit Score	Pricing Adjustment	Incremental Adjustment
>= 740	+.250%	-
720-739	+.500%	+.250%
700-719	+1.000%	+.500%
680-699	+1.250%	+.250%
660-679	+2.250%	+1.000%
640-659	+2.750%	+.500%
620-639	+3.250%	+.500%
<620	+3.250%	0

As demonstrated by the table above, the LLPA for an average mortgage amount of \$275,000 in 2017 as sourced by Home Mortgage Disclosure Act (HMDA) data, the future homeowner could pay pricing adjustment fees from \$687.50 to \$8,937.50 based on credit score.

Understanding the performance of alternative scoring models through a pilot process such as the one established in FHFA's NPRM can better adjust the fees associated with those loans. Unfortunately, the less structure that is given to performance evaluation, the worse the environment will be for consumers. A volatile or methodologically weak scoring model creates unpredictable risk, which could lead to equally unpredictable (but undoubtedly large) increases in the fees described above.

“ The GSEs utilize risk-based pricing to ensure that mortgage loans are priced appropriately to their underlying default risk. ”

Private Mortgage Insurance

Approving a loan that should not have been approved could result in the future foreclosure of the homeowner as well as greater loss costs (frequency and severity) than actuarially priced by the GSEs. The same issue holds true for private mortgage insurers who are in the first loss position after the borrower's down payment when securing a mortgage loan.

Mortgage Insurance Monthly Premiums									
Amortization term> 20 years/ Non-refundable									
Fixed (Fixed Payments for >- 5 Years)									
LTV	Coverage	760+	740-759	720-739	700-719	680-699	660-679	640-659	620-639
97%-95.01%	35%	0.58%	0.70%	0.87%	0.99%	1.21%	1.54%	1.65%	1.86%
	25%	0.46	0.58	0.7	0.79	0.98	1.23	1.31	1.5
	18%	0.39	0.51	0.61	0.68	0.85	1.05	1.17	1.27
95%-90.01	30	0.38	0.53	0.66	0.78	0.96	1.28	1.33	1.42
	25	0.34	0.48	0.59	0.68	0.87	1.11	1.19	1.25
	16	0.3	0.4	0.48	0.58	0.72	0.95	1.04	1.13
90%-85.01%	25	0.28	0.38	0.46	0.55	0.65	0.9	0.91	0.94
	12	0.22	0.27	0.32	0.39	0.46	0.62	0.65	0.73
85% & Below	12	0.19	0.2	0.23	0.25	0.28	0.38	0.4	0.44
	6	0.17	0.19	0.22	0.24	0.27	0.37	0.37	0.42

The chart above provides an example of a mortgage insurer's rate card for borrower paid mortgage insurance.¹⁷ Mortgage insurers charge premiums to borrowers based on several credit components such as LTV, credit score and other factors. The chart above shows the pricing of mortgage loan premiums by LTV and credit score as well as insurance coverage percentage. For example, a borrower with a \$200,000 mortgage amount with 5 percent down payment and a 620 credit score must pay¹⁸ \$237 each month (in addition to the mortgage payment) in order to obtain a mortgage loan approval from the loan investor. However, adopting less predictive scoring methods would cause borrowers to purchase insurance that does not accurately reflect their actual level of risk. Further, requiring mortgage insurers to implement models for alternative scores would produce a costly and time-consuming procedure. Mortgage insurers would have to test and implement models to determine pricing. Such changes to the credit scoring methodology would influence the pricing of mortgage insurance for all borrowers. Further, if a credit score is not accurately priced to the predicted level of risk as determined by a credit score, the danger of default rises.

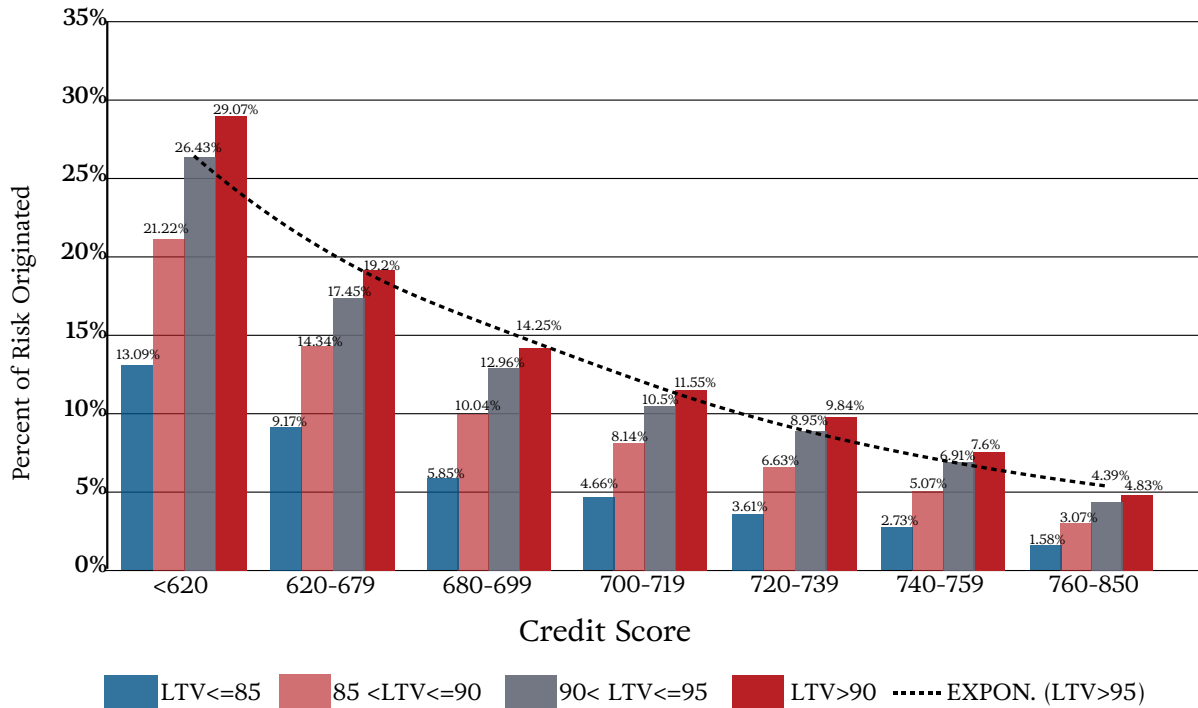
GSE PMIERs Capital

In addition to the GSE LLPA and the mortgage insurer rate card, a straightforward way to evaluate the expected elevated default risk from a credit score perspective is to look at current capital requirements as measured by a bank's Comprehensive Capital Analysis and Review (CCAR). The following example involves a component of the private mortgage insurer risk based capital requirements imposed on them by the GSEs. It is widely believed that these requirements are generally modeled under similar CCAR stressed loss assumptions.

¹⁷ Mortgage Guaranty Insurance Corporation, "Borrower-Paid Monthly Premiums," July 9, 2018.

¹⁸ Calculation for monthly premium: \$200,000 *1.42%/12= \$237 monthly premium.

Private Mortgage Insurer Eligibility Loan
Vintage: Post June 2012



The chart¹⁹ above lists factors that mortgage insurers must apply to individual loans to hold as reserve for losses. These factors provide the base calculation. Other risk characteristics and variables are added to the capital calculation. The chart shows that the lowest credit scores have the highest capital calculations. Adopting a new credit scoring model with different minimum scoring criteria would have a direct impact on these capital requirement factors.

For example, a change in credit scores could cause a shift in characteristics that negatively impact the capital standards known as Private Mortgage Insurer Eligibility Requirements (PMIERS). The differential between capital requirements for loans with 660 credit score versus a loan with 730 credit score is significant. A loan with a 95% LTV with a credit score of 660 requires more than twice as many supporting assets compared to a loan with a 90% LTV to a borrower with a credit score of 730.²⁰ This is a critical consideration in modeling alternative credit scoring. The risk curve is by no means proportional — a poorly informed decision could lead to a steep risk trajectory.

PMIERS apply the Federal Reserve Bank's CCAR²¹ Severely Adverse stress scenario (excluding the Global Market Shocks) for loans insured after 2008 to maintain consistency with the stress tests of the federal financial regulators.²² In this manner, the appropriate factor is placed on loans originated after the financial crisis. As stated previously, one of the key components of the segmentation to apply capital requirements is credit score. Less reliability in the predictive value of those scores could render the entire PMIERS exercise highly speculative and risky.

All told, these scenarios illustrate how the accuracy of credit scoring is essential to protecting lenders, borrowers, and taxpayers from unstable and unaffordable downstream costs.

¹⁹ Fannie Mae, "Private Mortgage Insurer Eligibility Requirements," September 27, 2018.

²⁰ Presentation of Rick Thornberry, Radian Group, for Radian 2017 Investor Day, November 6, 2017, <http://www.radian.biz/sfc/servlet.shepherd/version/download/068C0000003ZkjzIAC>.

²¹ Board of Governors of the Federal Reserve System, "Stress Tests and Capital Planning: Comprehensive Capital Analysis and Review," February 5, 2019, <https://www.federalreserve.gov/supervisionreg/ccar.htm>.

²² Federal Housing Finance Agency, "Overview of Draft Revised Private Mortgage Insurer Eligibility Requirements," July 11, 2014.

II. The Impact of Alternative Credit Scoring on the Non Scorable Population

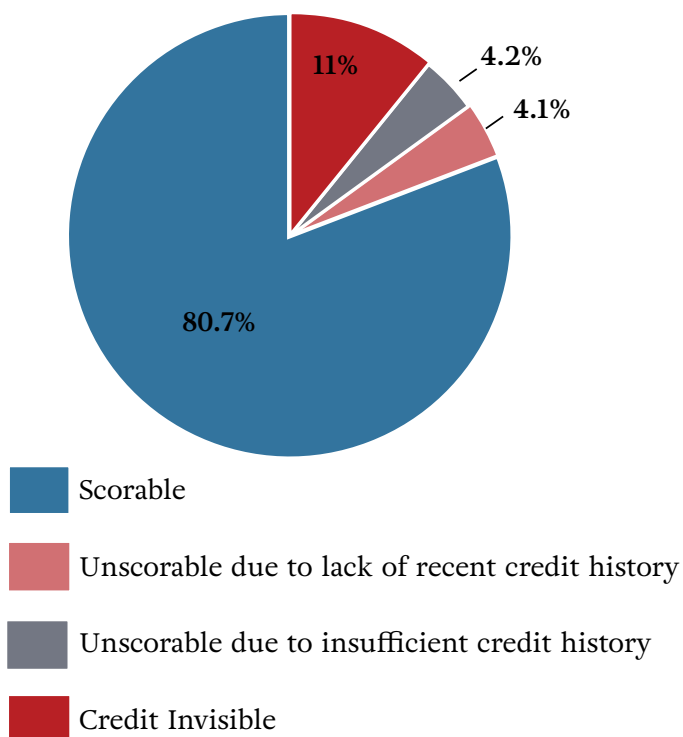
The existing credit scoring model framework accepted by the GSEs, investors, mortgage insurers, and other industry participants and stakeholders has been in place for over twenty years.

FICO Scores use information in a consumer's credit report to predict the likelihood of paying bills on time. Specifically, the FICO Score predicts the relative likelihood of default, defined as a credit obligation 90+ days past due, occurring within two years of the date of the score. Other credit scores using different algorithms also predict credit risk.

Pursuant to GSE and FHFA current requirements, loans delivered to the GSEs for purchase are underwritten using the FICO Score. In order to generate a reliable credit score certain minimum criteria are necessary: at least one account opened for six months or more, and at least one account that has been reported to the credit bureau within the past 6 months. There is much debate about the size of the universe of consumers that would need alternative credit scoring as they don't have sufficient information at

the Credit Reporting Agencies (CRAs) to generate a FICO Score. The section below cites different sources and methodologies for sizing the alternative scoring market.

U.S. Adult Population
Credit Scoring Type



In 2015, using a dataset²³ containing information on 5 million consumer credit records, the Consumer Financial Protection Bureau (CFPB)²⁴ estimated that 11 percent of adults in the U.S. or about 26 million people are “credit invisible.” This is defined as consumers that do not have a CRA record. An additional 19 million consumers, or 8.3 percent of the adult population, have credit records that were treated as unscorable by a commercially available credit scoring model. A consumer's credit record may be considered unscorable for two reasons: it contains insufficient²⁵ information to generate a score or, it has become “stale” as it has no recently reported activity.

The CFPB data shows that 38 percent of the estimated 26 million credit invisibles are younger than 25. On the other hand, most of the “stale (older tradelines with no activity) unscored credit records are from the over 25-year old age cohort, according to CFPB's analysis of its Consumer Credit Panel data.

²³ In addition to the Consumer Credit Panel data, CFPB used the 2010 Decennial Census to pull in data on number of consumers, racial and ethnic mix by census tract. The third data source was the 2008-2012 American Community Survey to pull in data on median household income in each tract, county, and MSA.

²⁴ See Consumer Financial Protection Bureau, “Data Point, Credit Invisibles,” 2015, https://files.consumerfinance.gov/f/201505_cfpb_data-point-credit-invisibles.pdf and Supervisory Highlights Consumer Reporting Special Edition, March 2, 2017, <https://www.consumerfinance.gov/data-research/research-reports/supervisory-highlights-consumer-reporting-special-edition/>.

²⁵ The record may have too few accounts or has accounts that are too new to contain sufficient payment history to calculate a reliable credit score.

The unscorable and credit invisible segments of the U.S. population were reviewed further by the CRAs. VantageScore, owned by the Credit Reporting Agencies, estimated there were 30-35 million consumers as of 2010 who had credit files at one or more of the CRAs but were considered unscorable by traditional models. Using their methodology, VantageScore stated that up to 10 million consumers would become “attractive to many lenders” if standards were changed.²⁶ This does not, however, mean that all of these consumers would qualify for a mortgage; only some fraction of this number would do so.

In its December 2017 Request for Input (a year prior to the NPRM), FHFA specifically compared and contrasted how VantageScore, Classic FICO and FICO Score 9 treat minimum scoring criteria in their methodological practices.²⁷ For a file to be scorable, FICO requires a minimum of one tradeline reported to a CRA in the last six months. VantageScore’s method has no such requirement, provided “it can generate a score using other data such as unpaid collections or public records.” On the question of minimum tradeline age, FICO stipulates one tradeline of at least six months old. VantageScore has no requirement. As FHFA concluded:

An important difference between the credit score models is the minimum scoring criteria which each score provider uses to determine if a borrower’s credit file contains enough information to generate a score. Because of its less restrictive minimum requirements, VantageScore will score more consumers in the U.S. population than FICO.²⁸

The statement above may be a tautology, but it bears repeating because it is fraught with consequences for taxpayers: dropping standards low enough will increase any pool of individuals able to receive a credit score. Reducing this argument to its ultimate absurdity means a scorable universe as large as the adult population of the United States.

Another view of this universe comes from FICO, which states that 92 percent of the consumer credit applicant population (190 million) is scorable under FICO utilizing credit file data from CRAs. Some 28 million others have credit bureau data that may be insufficient for a conventional score, while 25 million are effectively “credit invisible” (the latter of which tracks closely with CFPB).²⁹

How does a “scorable universe” actually translate to a universe of qualified credit applicants? As explained above, the terms “scorable” or “creditworthy” or “mortgage-qualified” are far from having the same meaning. While the estimates above have commonalities and differences, the likely mortgage origination of purchase loans that could be scored and approved pursuant to GSE guidelines may be much smaller. Quantilytic, LLC estimated that this group would be closer to 48,000 potential new mortgages.³⁰ Understanding the incremental consumer credit obtained based on proposed changes is very important in solving whatever perceived problem exists. Without this key insight, disruptive and unwise changes could be adopted at great cost with far less benefit than originally portrayed.

²⁶ See VantageScore, “Explore Our Model: How It Scores More People,” <https://www.vantagescore.com/scores-more-people>.

²⁷ Federal Housing Finance Agency, December 20, 2017. “Credit Score Request for Input,” December 20, 2017. https://www.fhfa.gov/Media/PublicAffairs/PublicAffairsDocuments/CreditScore_RFI-2017.pdf.

²⁸ Ibid.

²⁹ Gaskin, Joanne, “Alternative Credit Data: The Answer to Broadening Financial Inclusion,” Mortgage Women Magazine, July 14, 2017, <http://www.mortgagewomenmagazine.com/analysis/alternative-credit-data-answer-broadening-financial-inclusion/>.

³⁰ Parrent, Tom and Haman, George. “Risks and Opportunities In Expanding Mortgage Credit Availability Through New Credit Scores,” Quantilytic, LLC, December 2017. Retrieved from: http://www.progressivepolicy.org/wp-content/uploads/2017/12/UpdatedCreditScoring_2017.pdf. Research Sponsored by FICO.

III. Sizing the Benefits: Less than Meets the Eye

If properly implemented, updates and changes to credit scoring methodology may have certain benefits, such as:

- Increased availability of credit to consumers if more compliant alternative data sources are utilized;
- Reduced-risk based pricing fees (if new scores are more predictive); and
- Expanded universe of credit scoring models to allow increased innovation and competition.

On the other hand, if not properly implemented, the costs of such updates and changes to consumers, providers, the government, and taxpayers can far outweigh any of these putative benefits.

One of the key problems that FHFA's proposed rule is attempting to address is uncertainty. With even a minor change resulting in major differences of opinion over outcomes, the need for patient, thorough exploration through time-tested modeling techniques is necessary.

In order to focus more intently on the cost-benefit equation of credit scoring alternatives, this section will review studies from Quantilytic, LLC and the GSEs as well as deeper analysis of Home Mortgage Disclosure Act data, helping to demonstrate that the benefits of a “go fast” approach toward alternative credit scoring may not be as great as anticipated.

VantageScore states that by changing the minimum scoring standards to fit a near prime demographic, lenders could see an increase in the approval rate within a population that was, according to one of the CRAs, “historically being left behind”.³¹ Others suggest that using alternative data could, along with or in the absence of changes to scoring standards, provide benefits as well. This could mean utilizing techniques with “thin file” consumers who do not meet traditional credit histories. The most popular form of alternative data includes non-credit payment history such as rent, utility payments, and mobile phone payments.

To evaluate and further define the potential for a “scorable lift,” NTU evaluated prior studies³² which utilized different methodologies.

FICO vs. VantageScore Segmentation and Methodologies

The Quantilytic, LLC study is among the more comprehensive attempts to evaluate VantageScore's methodology to score more consumers. It posits that VantageScore 3.0 decreases the information requirements to obtain more scores for consumers and that this increases the risk exposure as the model has a looser fit.³³ This means that the model's “goodness of fit” worsened after applying the new scoring methodology. The report stated that very thin or very old credit files do not have enough

³¹ See Experian, “The State of Alternative Credit Data,” 2018, <https://www.experian.com/assets/consumer-information/white-papers/alternative-credit-data-paper.pdf>.

³² Schnare, Ann B., “Alternative Credit Scores and the Mortgage Market: Opportunities and Limitations,” Appears in “Updated Credit Scoring and the Mortgage Market,” Progressive Policy Institute, December 2017. Retrieved from: http://www.progressivepolicy.org/wp-content/uploads/2017/12/UpdatedCreditScoring_2017.pdf. Research sponsored by FICO.

³³ Parrent, Tom and Haman, George. “Risks and Opportunities In Expanding Mortgage Credit Availability Through New Credit Scores,” Quantilytic, LLC, December 2017. Retrieved from: http://www.progressivepolicy.org/wp-content/uploads/2017/12/UpdatedCreditScoring_2017.pdf. Research Sponsored by FICO.

information to produce reliable scores. Further, it states, “While VantageScore 3.0 uses the same 300-850 score range as the FICO Score that in no way means that the scores represent the same odd ratios. If the GSEs consider accepting VantageScore as a risk indicator, they would have to rigorously test the score and determine its odds ratio.”

Quantilytic, LLC looked at the performance of non-traditionally scorable consumers to evaluate the impact of credit availability of this group once they obtained credit. Using a test score that emulated VantageScore’s minimum scoring criteria, the newly scored are predominately at the lower end of the credit spectrum.

This study³⁴ used credit score data with GSE loan data and evaluated the performance of non-traditional scorable consumers once they obtained credit. The study indicated that near term performance is not good for many of those previously unscorable consumers who eventually obtain credit. Using FICO’s classifications for newly scorable consumers, the “new to credit” group had more than twice the bad rate (18.4 percent) of the general population (7.2 percent). The study found that approximately two thirds of the newly scorable consumers have scores below 620. Reviewing these scores two years later, only 7 percent improved. The study concludes that since the VantageScore of 620 represents higher odds of default than a 620 FICO score, direct comparisons cannot be drawn.

FHFA also observed the difficulty of making direct comparisons in this way. As its RFI pointed out:

While FICO and VantageScore use the same score range, their credit scores are not interchangeable because of the minimum scoring criteria described above, which leads to a different universe of ‘scorable consumers’ and a different credit score distribution for each model. The score difference between FICO 9 and VantageScore 3.0 cannot be addressed or corrected by simply adding or subtracting a fixed number of points from either score because each model rank orders borrowers somewhat differently.³⁵

This complexity alone should be a warning to policymakers who believe the differences in “scorability” can be reduced to some tidy index.

How Many New Mortgages Would Actually Be Created?

The Quantilytic, LLC Study

Quantilytic, LLC further defined the population of unscorables that might be originated by analyzing VantageScore, FICO, Home Mortgage Disclosure Act and GSE data. According to HMDA data (see section below), we know that many consumers are rejected due to credit reasons. Additional denial reasons include underwriting and DTI ratios. In addition, not all consumers seek mortgage credit each year. Therefore, the authors evaluated the actual number of purchase mortgages originated in each FICO score segment in 2015. Using the proportion of mortgages originated in each FICO segment across the spectrum suggested reduced tradeline requirements (a component of VantageScore’s approach) resulted in the number of potential qualifying mortgages as potentially 48,000 per year.³⁶

The authors conclude that producing a score for a consumer does not make them creditworthy. If insufficient information is used to rank a consumer in a higher credit category, it may have the unintended consequence of advancing more credit than a consumer can handle. Conversely, it could unfairly reduce their access to credit and/or increase the price of credit.

³⁴ Ibid.

³⁵ Federal Housing Finance Agency, “Credit Score Request for Input,” December 20, 2017, <https://www.fhfa.gov/SupervisionRegulation/Rules/Pages/Validation-and-Approval-of-Credit-Score-Models.aspx>.

³⁶ Others within the industry, including FICO itself, believe this figure is too generous. See, for example, Zoldi, Scott et al., “Truth Squad: Will Weaker Scoring Criteria Create a Mortgage Surge?” Fair Isaac Corporation, January 10, 2017, <https://www.fico.com/blogs/risk-compliance/truth-squad-will-weaker-scoring-criteria-create-a-mortgage-surge/>.

While scoring more people, albeit through less predictive scores, will increase the number of what appear to be eligible borrowers, it will also increase the number of borrowers who may be under-qualified to afford a mortgage. To that end, credit score providers would have an incentive to score as many consumers as possible, leading to a potential “race to the bottom” effect. Therefore, if more under-qualified borrowers obtain credit, and these borrowers have trouble with their monthly payments, due to unforeseen circumstances, it could cause a rise in delinquency rates.

Higher than expected default rates could cause immediate losses at the GSEs, which continue to operate at low capital buffers. Throwing more unknowns into the equation at the GSEs would worsen the systemic risk the GSEs place on the housing finance system, for which taxpayers continue to shoulder a considerable burden.

The GSEs’ Study

Prior to the enactment of Public Law 115 - 174, the GSEs undertook an assessment of the potential impact of updating the current credit score requirement to another scoring methodology. This assessment was limited to the use of credit scores models available at all three CRAs used by mortgage lending for loans acquired by the GSEs (not the overall population of all mortgage applicants).³⁷ This analysis did not include alternative credit data or nontraditional credit scoring methodology:

FHFA concluded that the Enterprises’ empirical findings revealed only marginal benefits to requiring a different credit score than Classic FICO. These findings suggest that, regardless of the credit score used in the underwriting process, each Enterprise’s automated underwriting systems more precisely predicted mortgage defaults than third-party credit scores alone. The Enterprises’ automated underwriting systems incorporate additional information provided by the borrower and/or third parties during the mortgage application process (e.g. borrower income and assets) that is not reflected in the information used to generate a standalone third-party credit score such as Classic FICO, FICO 9, or VantageScore 3.0.³⁸

Evaluation of HMDA Data

HMDA³⁹ requires that most depository and for-profit non-depository lenders collect, report, and disclose certain mortgage data on a yearly basis. The table below lists reasons for denial of applications for conventional home-purchase loans, 1-4 family and manufactured home dwellings by income of applicant. This data represents information reported by mortgage banking entities for 2017. The information is limited in terms of credit denial reasons. Credit scores are not available in this dataset. And, denial data for income is incomplete compared to denial data for other characteristics of borrowers.

The table below shows those applicants that were denied credit for credit history and credit application incompleteness. This universe of applicants did not receive mortgage credit approval; however, there are no specific details associated with the credit score. Nor are there details on whether the applicant had no credit file information or thin credit file information, or whether the credit application was never completed. It is difficult to determine the volume of denials due to credit as there could be multiple denial reasons per denied applicant. Lenders may report up to three denial reasons per application. According to the CFPB, the overall denial rate on applications for home-purchase loans was 10.8 percent in 2017, slightly lower than 2016.⁴⁰

³⁷ FHFA’s review of updated credit score models is only one aspect of FHFA’s and the GSEs’ broader inquiry into the impact that credit scores have on access to credit. This review includes the GSEs’ ability to evaluate mortgage applications using their automated underwriting systems when a borrower does not have a credit score. Both Enterprises have developed and implemented this automated underwriting system capability—Fannie Mae in September 2016, and Freddie Mac in May 2017 as stated in the GSEs Selling Guides.

³⁸ For further discussion of the study, see Federal Housing Finance Agency, Credit Score Request for Input, December 2017.

³⁹ The Home Mortgage Disclosure Act (HMDA), 12 U.S.C. 2801 et seq.

⁴⁰ Dietrich, Jason et al., “Data Point: 2017 Mortgage Market Activity and Trends,” Bureau of Consumer Financial Protection, May 2018.

Table 1
HMDA Conventional Denial Data
As of 2017

Income Segment	Credit History	Credit Application Incomplete
(1) Less than 50% of MSA/MD median	4,353	1,279
(2) 50-79% of MSA/MD median	6,620	3,548
(3) 80-99% of MSA/MD median	3,768	2,636
(4) 100-119% of MSA/MD median	3,018	2,575
(5) 120% or more of MSA/MD median	12,661	16,826
(6) Income Not Available	3,219	540
(7) Total Number of Denials*	33,639	27,404

*Note that credit denial reasons could duplicate counts.
 2017 HMDA Platform, Table 8.2. Source: <https://ffiec.cfpb.gov>

It bears mentioning that HMDA data outside of this subset shows that overall, debt-to-income (DTI) ratio is now the main reason for denials — a shift from the years immediately following the 2008 housing crisis, when credit history was the primary culprit. DTI, of course, has no direct relationship to lack of a credit score.⁴¹

The foregoing research tends to show that it may be more difficult than policymakers anticipate for alternative credit scoring to take the step from expanding the universe of scorable credit applicants to expanding the universe of homeowners. How this would affect other programs directly or tangentially tied to credit scoring raises additional questions, which are discussed at greater length in Appendix 4.

IV. Systemic Risk: The Ultimate Consideration

Over the past several decades, taxpayer advocates have urged public officials to approach changes to the housing finance system with an abundance of caution. Infusing even modest policy objectives too directly or quickly into capital flows can have unexpected and outsized impacts that often become known only after the system experiences massive shocks. From a taxpayer standpoint, examining this concept of “systemic risk” is central to understanding why FHFA’s cautious, conservative NPRM on credit scoring is advisable.

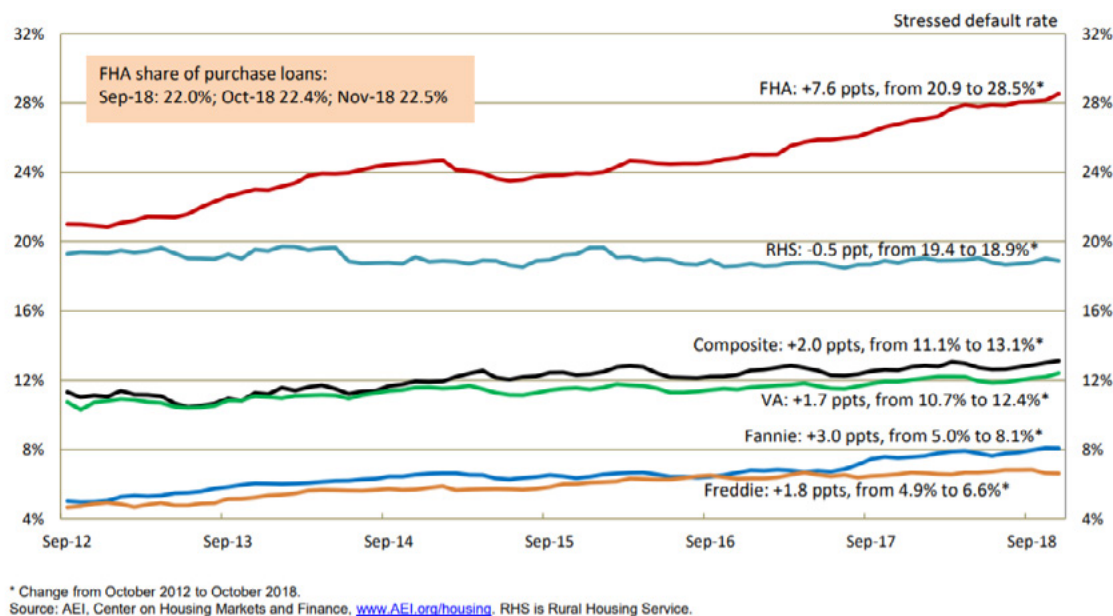
By far the most comprehensive ongoing assessment of systemic risk in the area of government-guaranteed housing loans is the American Enterprise Institute’s (AEI) National Mortgage Risk Index (NMRI).⁴² Utilizing the “performance of the 2007 vintage loans with similar characteristics,” NMRI serves as a stress test to compare the health of this area of finance with conditions surrounding the 2007-2008 crisis. It encompasses nearly 36 million agency purchase and refinance loans spanning the GSEs and federal agencies such as the Federal Housing Administration (FHA), the Veterans’ Administration, and Rural Housing Service. In NTU’s opinion, an index of NMRI’s caliber should have been a policy

⁴¹ For an excellent analysis of this trend, see Mayer, Yanling, “Debt-to-Income Is the Number One Reason for Denied Mortgage Applications,” CoreLogic Insights, October 11, 2018, <https://www.corelogic.com/blog/2018/10/debt-to-income-is-the-number-one-reason-for-denied-mortgage-applications.aspx>.

⁴² For all data, see Pinto, Edward and Peter, Tobias, “AEI Housing Market Indicators,” AEI Center on Housing Markets and Finance, February 25, 2019, accessible at www.aei.org/housing.

prerequisite established by law decades ago; if its findings were employed with sufficient vigor toward developing realistic capital standards for the GSEs and federal agencies such as FHA, the 2007-2008 crisis might very well have been averted.

AEI's Edward Pinto, one of the foremost experts in housing finance, provides regular briefings on NMRI results. The latest findings, released on February 25, 2019, give taxpayers cause for concern, and have bearing on the issue of alternative credit scoring:



- The composite purchase NMRI rose by 0.5 percent points between November 2017 and November 2018.
- All indices of NMRI for government-backed home purchase loans set new highs since the series were begun in 2013, “with FHA leading the way.”
- The share of loans with total debt-to-income of greater than 43 percent (a risk warning level set by the Dodd-Frank law) is above 25 percent for Freddie Mac, over 30 percent for Freddie Mac, and just over 60 percent for FHA.
- NMRI’s “Stressed Default Rates” for GSEs, while historically about one-third as high as FHA’s, nonetheless rose significantly over the past year. Fannie Mae’s computed default rate has gone from 5 percent to over 8 percent in 12 months, while Freddie Mac’s has risen from just under 5 percent to more than 6.5 percent.⁴³

According to AEI, all of these statistical trends are occurring amidst GSE policy developments that indicate “fresh fuel to the long running and accelerating housing price boom,” which include eased standards for DTI at Fannie and Freddie Mac, expansion of Freddie Mac’s 3 percent down payment program, and somewhat looser time periods for documentation of self-employment.

How do these trends relate to alternative credit scoring? They indicate that the environment in which new credit scoring models might be implemented is showing more signs of stress and fewer signs of stability. Additional instability from the introduction of alternative credit scoring models may or may not be sufficient in itself to shock the system, but for these reasons and more to follow, FHFA’s NPRM is wise to take a deliberative, analytical approach.

⁴³ Ibid.

One trend AEI tracked that was not as prominent during the last financial crisis is the rise of nonbanks' agency purchase market share. Among GSE purchase loans, the nonbank origination share was nearly 55 percent, a jump of close to ten percentage points in the space of a year. Over the same period large banks saw their share decline by roughly the same margin (other banks made up the rest of the percentage). This trend boosts overall risk in the portfolio because the MRI for nonbank GSE market share approaches 8 percent, while that of large banks is at 7 percent. The nonbank origination share for FHA is dramatically higher: 85 percent, versus less than 10 percent for large banks. Not surprisingly, the MRI here is massively higher, at roughly 30 percent for nonbanks compared to slightly more than 23 percent for large banks.⁴⁴

Because nonbanks are not deposit-based institutions, they are not subject to traditional banking regulations. This is at once a win and a worry for taxpayers. Onerous federal rules add to the costs of doing business that are in turn passed along to consumers, shareholders, and workers (an argument for carefully evaluating traditional banking regulations as well). Also, because they do not have depositors, nonbanks do not pose a direct bailout risk to taxpayers, who backstop the Federal Deposit Insurance Corporation. And in theory at least, diversification of the lending market could be a salutary trend that avoids concentration of risk.

One stark reality, however, is that nonbank lending trends carry a looming threat to taxpayers in the form of risk layering. As AEI observes, the uptick in housing prices has encouraged lenders to pile risk on risk (e.g., high LTVs, high DTIs, and low credit scores) into packages whose entireties carry greater liabilities than the sum of their components.

This problem has concentrated in FHA, but is hardly confined there. Professor Richard Koss of Johns Hopkins University responded to FHFA's 2017-2018 RFI and remarked on how risk-layering, especially from nonbanks, can affect GSEs. He cited research from the Federal Reserve and University of California at Berkeley finding that "[t]he typical nonbank has few resources with which to weather...shocks" and positing "whether it is wise to concentrate so much risk in a sector with such little capacity to bear it, and a history, at least during the financial crisis, of going out of business."⁴⁵

Koss remarked elsewhere that generally risk layering at the GSEs, which has included higher LTV and DTI ratios, presents a problem for many in the industry: "For underwriters, servicers, investors and policymakers to successfully navigate through this perilous market environment, accurate up-to-date data on loan performance at a micro level is an essential resource."⁴⁶

But as only someone seasoned in the atmosphere of policymaking can possibly understand, Koss also warned FHFA of a more subtle form of risk layering:

As I read through the RFI it is hard to escape the conclusion that this entire process is in place as a back-door method of increasing risk layering, which is particularly ill-advised near the peak of a cycle. Issues associated with the lack of housing affordability, particularly for traditionally underserved parts of the mortgage market, are important social concerns and must be taken very seriously. These are complex matters, and require policies in place that reach beyond housing, in particular with education and labor policy that allows families to build savings so they can gain status as homeowners with confidence. The one clear lesson from the global financial crisis is that the wrong way to approach this issue is to extend credit to a point where this status cannot be reasonably sustained in a downturn.⁴⁷

⁴⁴ Ibid.

⁴⁵ Kim, You Suk, et al, "Liquidity Crises in the Mortgage Market," Brookings Institution, February 27, 2018, https://www.brookings.edu/wp-content/uploads/2018/03/5_kimetal.pdf.

⁴⁶ Koss, Richard, "FHFA On Credit Score Delivery: Forgotten Lessons," HousingWire, April 24, 2018, <https://www.housingwire.com/articles/43190-fhfa-on-credit-score-delivery-forgotten-lessons>.

⁴⁷ Koss, Richard, "Comment on Credit Score Options," Johns Hopkins University, Letter to the Federal Housing Finance Agency, March 28, 2018. Retrieved from: <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submission-detail.aspx?RFID=951>.

Still others might argue that because FHFA's NPRM is confined solely to the jurisdictions of Fannie Mae and Freddie Mac, FHA's risky practices should not be a consideration in the development of credit scoring models under this rule. NTU strongly disagrees with this assertion.

As a practical matter, this paper has already noted that FHA makes extensive use of credit scores in down payment requirements. (See Appendix 4)

As a political matter, FHA's institutional culture is driven by underwriting the greatest number of borrowers, without any mandate to price risk. The agency would therefore have a predilection to employ virtually any tool, including a less sound alternative credit score, to add more borrowers at lower down payment requirements.

Indeed, as AEI noted, Fannie Mae appears to be in an "unhealthy competition with FHA" by attempting to pick up market share in the middle four "buckets" of NMRI's mortgage risk evaluation (mortgage risk index of 8-24).⁴⁸ Historically, GSE loans have largely occupied the two least risky buckets (index of 4-8) while FHA's have occupied the three riskiest (24-32+). Without the type of strong guardrails envisioned in FHFA's proposed rule, this race toward risk at Fannie Mae could become reckless.

For all of the problems associated with taxpayer conservatorship of the GSEs – and proposals for resolving this situation – any policy that could incentivize either entity to act more like FHA should be unthinkable. Alternative credit scoring models must therefore be given rigorous analysis over time, as FHFA has planned in its NPRM.

The weight of evidence is clear – attempting to rush implementation of alternative credit scoring at this particular point in the market's evolution would be particularly risky. As AEI's Pinto sagely observes in his "Principles of Housing Finance:"

Dual Underestimation Principle: Never underestimate the government's willingness and ability to (i) add leverage to stimulate the market and (ii) ignore its impact on raising home prices and default risk under stress. ... Housing debt [and] default risk has increased with over 60 years of housing policies focused on increasing leverage.⁴⁹

Credit scoring must therefore serve as a reliable tool that informs decisions rather than biases decisions.

V. Moving Forward: Developing Models

FHFA has established specific standards for model development, and testing. These standards and processes provide a series of operational steps and output comparisons; however, they do not incorporate recognized model development and validation standards such as those jointly published by the Office of the Comptroller of Currency and the Federal Reserve System (OCC 2011-12) as well as actuarial standards of practice. FHFA's standards for compliance are provided in Appendix 1 of this paper, while the OCC/Federal Reserve Standards appear in Appendix 2.

In the sections below, we define terms and suggest other model validation approaches that could enhance the FHFA's proposed framework.

⁴⁸ Pinto, Edward and Peter, Tobias, "AEI Housing Market Indicators," AEI Center on Housing Markets and Finance, February 25, 2019, accessible at www.aei.org/housing.

⁴⁹ Ibid.

Model Development

Model development should begin with a clear stated purpose to ensure that the model is consistent with the model's intended use, a thorough description of the scenario to be modeled, and a statement of the model's design objective. The process includes sound design, theory, and logic underlying the model, robust model methodologies and processing components, and rigorous assessment of data quality and relevance and appropriate documentation. An integral part of model development is testing, to show the model is performing as intended, and to demonstrate that it is accurate, robust, and stable and to evaluate its limitations and assumptions.⁵⁰

Model Validation

The growing complexity of the global financial system, coupled with sophisticated computing capabilities and advanced modeling techniques, have resulted in great reliance on mathematical models within the financial services industry. Despite the advancement of robust risk management frameworks, however the potential misuse and failures of these models can present large risks as well. A model validation process should be consistent⁵¹ with documentation jointly published by the OCC and the Federal Reserve. The framework consists of: core element review of past validations and existing documentation, evaluation of key inputs, conceptual model design, internal procedures, as well as outcome analysis. Of particular importance is the requirement to evaluate alternative methods potentially undertaken and provide recommendations and suggestions for improvements to the model.

FHFA's proposed rule establishes standards for assessment of model accuracy, but additional procedures such as those outlined above (and detailed in Appendix 2) will assist in the overall goal of providing needed updates to the credit scoring methodology.

Model Risk

Model risk is the risk of loss resulting from model errors or the incorrect use or application of model output. The Federal Reserve supervisory regulation letter emphasizes that "banking organizations should be attentive to the possible adverse consequences (including financial loss) of decisions based on models that are incorrect or misused, and should address those consequences through active model risk management." These adverse consequences could be further mitigated with approaches such as those used by actuaries.

Recommendations for Data Analysis and Model Validation

Model developers have expertise in designing models based on specific best practices. Predictive modelers that are actuaries use actuarial standards of modeling that reinforce data accuracy, assumptions, communication, and documentation (found in Actuarial Standards of Practice, or ASOP). These predictive analytics⁵² standards require rigorous methods of determining assumptions, evaluating data, and

⁵⁰ Board of Governors of the Federal Reserve System, "Letter to the Officer In Charge Of Supervision At Each Federal Reserve Bank on Guidance on Model Risk Management," SR 11-7, April 4, 2011.

⁵¹ On June 7, the FDIC issued Financial Institution Letter FIL-22-2017 announcing that, in order to provide consistency across institutions and agencies, it is adopting the 2011 model risk management supervisory guidance that was issued by the Federal Reserve (SR 11-7) and the OCC (OCC Bulletin 2011-12) thereby making the guidance applicable to certain FDIC-supervised institutions, namely those with \$1 billion or more in total assets. The FDIC guidance defines the term "model" as "a quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates." The FDIC indicated that banks' heavy reliance on models in financial decision-making could come with costs, especially when the decisions are "based on models that are incorrect or misused."

⁵² Karo, David et al, "Predictive Analytics ASOPs: Modeling and Setting Assumptions," Presentation at the 2017 Society of Actuaries Annual Meeting, October 16, 2017. Retrieved from: <https://www.soa.org/pd/events/2017/annual-meeting/pd-2017-10-annual-session-049.pdf>.

providing transparency to the end user of the model. Detailed information about these standards and practices is included in Appendix 3.

Recommendations for FHFA

To properly evaluate the impact of non-traditional credit scoring, our recommendations for FHFA and the GSEs include:

- FHFA should evaluate and run two sets of credit scoring methodologies on the historical data of Fannie Mae and Freddie Mac over multiple economic cycles in a champion-challenger exercise (see Appendix 1) for scores that have demonstrated market usage.
- After sufficient testing and comparisons are performed, FHFA and the GSEs can develop well-defined pilot programs for scores that do not have demonstrated market usage. These programs should incorporate acceptable GSE requirements for alternative credit scoring using automated underwriting as well as manual underwriting procedures.
- Develop a system for reviewing and validating models beyond standards in the proposed rule such as:
 - o Model validation activities should continue after a model is implemented owing to the lifecycle and long term impact estimate techniques that actuarial standards can provide;
 - o Model developers should follow the OCC/ Federal Reserve 2011 bulletin to reduce model risk by identifying model errors, corrective actions, and appropriate use;
 - o FHFA should consider adapting ASOPs (See Appendix 3) as another form of model development and validation framework for testing, owing to their strict standards for evaluating risks and loss potentials; and
 - o The standards should include ways to evaluate models for learning and changes in data over the long term.

Conclusion: Count the Costs to Taxpayers

The research and data presented here has been culled from a variety of sources to demonstrate the considerable costs and modest benefits of alternative scoring, the size of the scorable universe, the systemic risk of careless policy, and finally recommendations for sound modeling. The following conclusions may be drawn:

- FHFA has requested a thorough analysis and validation of any future models. We agree with their assessment of new models and validation processes.
- This process may take many years and many resources to approve and implement.
- Innovation and validation of new methodologies must ultimately answer the question of whether those methodologies are delivering more value than their cost.

- Unintended consequences may result if new methodologies are implemented without proper analysis. These consequences may include increased risks associated with adding potentially higher default rates to the GSEs existing portfolios.
- Credit scores are broadly used outside of the GSEs' underwriting processes. Investors, mortgage insurers and other key stakeholders use credit scores for default and capital projection analysis, which deserve consideration.
- Investors and other market stakeholders must have time to review and vet methodologies with their internal controls as well as regulators. Transparency and time are required to limit any impacts of tiered pricing for loans in mortgage securities with differing credit score methodologies.
- The universe of consumers who may need alternative credit scoring methodologies to obtain a mortgage is not clear.
- Consumers may not benefit from the use of new or alternative credit scoring models. Incomplete or inaccurate information may produce credit scores that provide either more credit than a consumer can handle or unfairly restrict credit and/or increase mortgage loan pricing.
- Credit scoring models may include the use of alternative credit scoring methodologies. However, the use of alternative credit scoring must be thoroughly vetted. FHFA has established a structured process, but sufficient and seasoned data is not readily available for lenders, investors, analysts, and other interested parties to analyze and evaluate for models with no demonstrated market experience.
- A carefully designed pilot process should be considered if there is insufficient demonstrated use of the model.

Whatever the future may hold, it is NTU's hope that the analysis presented in this report will convince policymakers that the future of taxpayers is closely tied to credit scoring issues. Any changes and updates to credit scoring must be done carefully and thoughtfully, following a rigorous examination of costs, benefits, and acceptable risk.

About the Authors

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Appendix 1

FHFA Proposed Standards for Validation and Approval of New Credit Scoring Models

Section 310 of the Economic Growth, Regulatory Relief, and Consumer Protection Act of 2018 directs FHFA to create a process by which new credit scoring models can be validated and approved for use by the GSEs when they purchase mortgages. Following a half year of interpretation, analysis, and drafting, the proposed rule was issued in December 2018. The rule proposes standards for compliance, which sets forth several factors that must be considered in the validation and approval process, including the credit score model's integrity, reliability, and accuracy, and its historical record of predicting borrower and credit behaviors and consistency of any model with GSE safety and soundness.

The proposed rule would establish a four-phase process for the validation and approval of credit score models:

1) **Solicitation of applications from credit score model developers.** Proposes that solicitation for new applications occur at least every seven years, or as determined necessary by FHFA.

2) **Initial review of submitted applications.** Each GSE would obtain the data from the data provider on behalf of the applicant.

3) **Credit score assessment.** During this assessment phase, each credit score model would be assessed for accuracy, reliability, and integrity. Approaches for assessing accuracy include:

- **Comparison-based.** This approach will not require the applicant's credit score to be more accurate than the existing credit score in use by the GSEs. This approach would be more subjective and indicate reasonableness of the credit score's accuracy.
- **Champion-Challenger.** The applicant's credit score must be more accurate than the existing credit score in use by the GSEs. This would be a bright line test.
- **Benchmark-Based.** An absolute statistical standard would be established and all scores would have to surpass the standard. For example, a K-S or Gini score could be established that must be surpassed.
- **Transitional Approach.** This approach would allow one of the other approaches to be applied for the initial credit score assessment and a possible different approach for subsequent credit score evaluations.

4) **Enterprise Business Assessment.** During this phase, a GSE would assess the credit score model in conjunction with the GSEs' business systems and processes. In addition, the GSE must consider impacts on the mortgage finance industry, assess competitive effects, conduct a third party vendor review, and any other evaluations established by the GSE.

The validation and approval process, which produces the resulting approved credit score model, must meet these five statutory requirements:

- Satisfy minimum requirements of integrity, reliability, and accuracy;

- Have a historical record of measuring and predicting default rates and other credit behaviors;
- Be consistent with the safe and sound operation of the corporation;
- Comply with any standards and criteria established by the Director of the Federal Housing Finance Agency under section 1328(1) of the Federal Housing Enterprises Financial Safety and Soundness Act of 1992; and
- Satisfy any other requirements, as determined by the corporation.

Appendix 2

Model Validation Standards of the OCC and Federal Reserve

According to the Office of the Comptroller of Currency (OCC) and the Federal Reserve, a model is:

A quantitative method, system, or approach which uses mathematical, statistical, economic, or financial theories, techniques, and assumptions; and processes quantitative or qualitative inputs into quantitative estimates or approximations of as yet unknown conditions or outcomes to inform human or computerized decisions, to measure or manage risk, or to populate budget or financial reports.

OCC/Federal Reserve uses the following steps:

1. Review of the past model validations and existing documentation is required to better understand the inputs, assumptions, modules and uses of the model;
2. Evaluate the key inputs to the model;
 - The model validation process includes a review of all inputs of the model including a detailed review of source data, the potential for user error in construction of source data, and the potential for user error while importing key inputs to the model.
 - A more complex model, such as a credit scoring model generally requires a larger scope for validation. A complete model validation includes a number of steps that should be performed by an independent party that is familiar with the exposure being modeled and the techniques in the model.
3. Evaluate the conceptual model design and practical construction;
 - Fundamentally, model form (usability and complexity) dictates the validation process. The conceptual model will be evaluated by assessing whether the model form matches its intended use.
4. Review of the internal procedures for operating and monitoring the performance of the model;
 - Subsequent to evaluating the conceptual model design and practical construction of the model, a review of the institution's internal procedures for operating and monitoring the performance of the model is required. Operating and monitoring procedures in order to gauge the performance of model is required as well.
5. Evaluate the model performance through outcome analysis;
 - Evaluation of the accuracy and reasonability as approximation of reality is accomplished through outcome analysis. Outcome analysis answers the question of how well a model's results align with the expectations by comparing the model's estimates with historical data or with synthetic data to test alternative assumptions.

- Outcome analysis as it pertains to mortgage loan scoring should be conducted on several portfolios of historical loans. The results of these portfolios should be tested against the model's estimates to validate its performance against actual past results.

6. Evaluate alternative approaches potentially undertaken;
7. Provide recommendations and suggestions for potential modifications to the model; and
8. Assemble a report on the model validation analysis that will provide an effective challenge to the model development team.

In the final phase of the analysis, results of the model validation analysis should be provided in a written report. The report may include recommendations and suggestions for potential modifications to the model. The recommendations and suggestions will be derived from all previous phases of the analysis and may cover items such as changes to the institution's internal monitoring/control procedures and alternative methodologies and/or assumptions within the model.

The report will include an executive summary of the validation analysis, the recommendations and suggestions related to the various phases, and required qualifications, limitations, and disclosures related to the analysis.

Appendix 3

Actuarial Standards of Practice (ASOP)

Predictive Analytics ASOPs

This emphasizes the scope of the guidance from ASOPs including materiality, practicality, professional judgment as well as deviation from scope. Compliance is emphasized as ASOPs are binding per the Actuarial Code of Conduct. The following contain direct quotes from ASOPs as well as draft proposals.

ASOP 23 - Data Quality

This ASOP references practice changes in the industry. For example, increasing use of non-traditional data sources for predictive models, and legislatively mandated data submissions.

The overall intention of ASOP 23 is to emphasize actuarial professional judgment. General considerations include available and relevant data including the credibility of any such data, as well as whether there are reasons to expect that “future experience will differ significantly from past experience”.

Additionally, is it relates to data deficiencies, “The actuary should consider to what extent it is appropriate to adjust assumptions to compensate for known deficiencies in the available data. The actuary should document any such adjustments made and should consider making disclosures, as appropriate...” This also includes the reasonableness of the material assumptions and the methodology selected.

“In assessing the reasonableness of assumptions, the actuary should consider any material changes in conditions or experience that were known to the actuary by the information date and that might cause assumptions that reflect prior conditions or experience to no longer be appropriate.” Examples include internal circumstances regarding the entity such as changes in the mix of business, external circumstances affecting the entity such as changes in economic, legislative, regulatory, demographic, technological, and social environments.

“If appropriate to the intended purpose, the actuary should consider using sensitivity analysis to evaluate the potential effects of reasonable alternative assumptions on the findings.”

ASOP 25 – Credibility Procedures

Credibility procedures are often employed in tasks such as pricing and ratemaking. They provide a framework for determining whether subject experience has credibility and how subject experience and relevant experience can be balanced. “A variety of approaches are used in credibility procedures. In some cases, the approach is based on judgment; in other cases, mathematical models are used.”

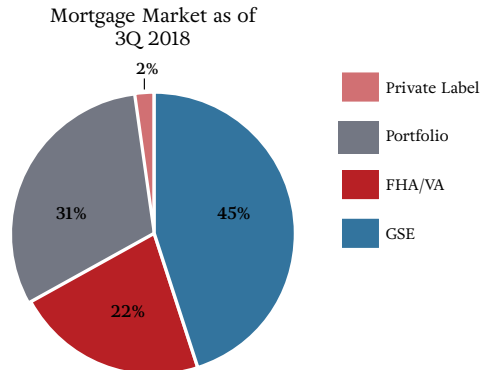
ASOP 41 - Actuarial Communications

This ASOP states that if practical and relevant, the actuary should disclose material assumptions (input) and material changes in assumptions (output).

Appendix 4

Credit Scoring: The Taxpayer Connection

To understand why taxpayers have such a major stake in credit scoring, it is important to explore how this analytic tool is used, and how widespread those uses are in both the private and public sectors.



Macroeconomic Issues

The chart above shows the composition of the mortgage market as of third quarter of 2018.⁵³ Mortgage market first lien originations totaled \$1.26 trillion at that time. As noted elsewhere in this paper, virtually all types of mortgage originations will incorporate credit scores in some fashion: for evaluating risk, setting down payment requirements, or establishing other qualifications. Taxpayers are most concerned with secondary market loans through Government-Sponsored Enterprises (GSEs), which exist to provide stable and liquid funding for residential mortgages but are now under federal conservatorship. Running close second are loans through the Federal Housing Administration (FHA) and Veterans Administration (VA) loans. With GSE and FHA/VA volume at two-thirds of the total depicted above, some \$844 billion of market originations late last year involved programs that were taxpayer-backed in some form or another. All told, GSE and FHA/VA mortgages (along with other small agency loan programs) cumulatively comprise close to \$7 trillion⁵⁴ : the equivalent of more than one-third of Gross Domestic Product.

Any increase of risk in a “market” of this size could mean major disruption to the entire economy and the deflation of liquidity and securitization of housing finance that is the essential mission of the GSEs. These are major reasons on their own to move cautiously with alternative scoring. There are, however, more specific grounds for proceeding with a great deal of circumspection, as the FHFA’s NPRM contemplates.

GSE Loans: Pricing Issues

Mortgage lenders use FICO Scores for underwriting and risk management to rank order risk of loan repayment based on data in Credit Reporting Agencies’ files. Fair Isaac Corporation (FICO) is an analytic company that has distribution agreements with CRAs to develop models used to generate credit scores.⁵⁵ VantageScore Solutions, which is owned by the CRAs, has developed models as well, but as explained

⁵³ See Goodman, Laurie, et al., Housing Finance at a Glance: A Monthly Chartbook, Urban Institute, February 2019, “Overview: Origination Volume and Composition,” p.8.

⁵⁴ Ibid; “Overview: Agency Mortgage Backed Securities,” p. 7.

⁵⁵ For background, see Federal Housing Finance Administration Credit Score Request for Input, December 20, 2017, https://www.fhfa.gov/Media/PublicAffairs/PublicAffairsDocuments/CreditScore_RFI-2017.pdf.

elsewhere in this paper FICO cores and VantageScores are not directly comparable or interchangeable.

Although Fannie Mae has an automated underwriting system—Desktop Underwriter—it does not rely upon scores for credit assessments per se. Freddie Mac’s automated underwriting system, Loan Product Advisor, uses a “Classic FICO”⁵⁶ Score as one of several attributes considered in making a credit assessment. Outside of the mortgage lending process, the GSEs use consumer credit data provided by the CRAs to build their internal models and as inputs to their models. The data can be employed as well in the service of stress testing, regulatory disclosures, and capital reserve calculations.

Despite the different uses of FICO scores between the agencies, they both utilize the FICO Score as a benchmark to attach risk fees (in addition to the base guaranty fees) on a loan’s basis. Additionally, FICO Scores are used in evaluating loan eligibility guidelines. For example, some mortgage products require minimum credit scores for eligibility. A change in the process to include alternative credit scores not only alters the information calculus that would determine borrowers’ eligibility, but also the risk. The result may be a change in the pricing of the loan and the amount of fees a borrower must pay to obtain the mortgage.

Yet, how would GSEs possibly be able to price the risk of historically non-scorable populations which, by definition, have no performance record on which to base such pricing in the first place? For taxpayers, there is currently no satisfactory answer to this important question.

Fannie Mae and Freddie Mac recently revised their policies on underwriting borrowers that rely on nontraditional credit to qualify for their mortgage loan⁵⁷. Among other stricter qualifications, the GSEs have established lower debt-to-income and loan-to-value thresholds for borrowers who do not have credit scores but must be able to show documented nontraditional credit histories. These tighter guidelines may serve to reduce some risk, but they cannot possibly substitute for the predictive capability of credit scores.

GSE Credit Risk Transfer: Stability Issues

Perhaps most important, however, investors of the GSE credit risk transfer (CRT) vehicles rely on credit scores to evaluate the financial risk of the underlying collateral in the securities or structure. This is a critical taxpayer protection in that it allows the federal government to lay off risk to private investors. Proven-dependable and accurate credit scoring is the bedrock for allowing CRT to function as intended. Without it, investors would be hesitant to commit their financial resources to these vehicles, and the original premise of the GSEs – relying primarily on investors rather than the Treasury to shoulder the burden of credit risk. NTU would also note that introducing alternative credit scores without proper testing and validation would be particularly ill-advised at this point in time, as legislative and executive branch proposals for ending GSE conservatorship continue to proliferate.⁵⁸ None of these plans to release the entities more fully into the private sector can possibly function as intended without investor confidence in the underlying pricing accuracy of CRT. Under ill-timed or ill-planned alternative credit scoring, taxpayers could wait years, or even decades, for a credible exit from conservatorship.

This potentially volatile situation could be foisted upon entities uniquely ill-equipped to handle it. Unlike other financial institutions such as banks, Fannie Mae and Freddie Mac have very thin capital cushions, made worse by the Treasury’s “net worth sweep” that has filled government coffers with

⁵⁶ Classic FICO is defined as the collective use of Equifax’s FICO 5, Experian’s FICO 2, and TransUnion’s FICO 4.

⁵⁷ See, for example, Fannie Mae, “B.3-5.4-01: Eligibility Requirements for Loans with Nontraditional Credit,” Selling Guide, Issued December 19, 2017. Retrieved From: <https://www.fanniemae.com/content/guide/selling/b3/5.4/01.html>.

⁵⁸ National Taxpayers Union and Council for Citizens Against Government Waste, Letter to Joseph Otting, Acting Director, Federal Housing Finance Administration, February 13, 2019. Retrieved from: <https://www.ntu.org/publications/detail/taxpayer-groups-urge-immediate-reform-to-fhfa>.

more than \$285 billion⁵⁹ since the two GSEs were placed into conservatorship. NTU believes that while the sweep initially helped to make taxpayers whole for the risks of conservatorship, an offsetting risk of a new taxpayer bailout exists precisely because the net worth sweep acts to starve the entities of backup capital. FHFA's decision in December 2017 to allow Fannie Mae and Freddie Mac to retain capital cushions of \$3 billion each⁶⁰ was at least an acknowledgment of this problem, but this amounts to a capital-to-asset ratio of barely more than 0.1 percent.⁶¹ If alternative credit scoring risk were not to be correctly priced in GSE portfolios – and without sufficiently or thoroughly tested data, the odds of error are considerable – taxpayers could very quickly be on the hook for new post-conservatorship liabilities well in excess of these paltry capital cushions.

Government Loans and Private Industry: Spillover Issues

Additional uses of credit scores in the mortgage lending process include mortgage insurers, servicers, and investors. Mortgage insurers quote rate premiums by mortgage product, original loan-to-value ratio and the borrower's credit score among other underwriting risk attributes.

Besides the conventional loan mortgage market, several government loan programs also rely on credit scores as one of the components of screening loan applicants. The Veterans Administration does not have a minimum required credit score. Instead, VA requires a lender to review the entire loan profile to determine eligibility. Additionally, loan underwriting includes an analysis of residual income as one of the components. Lenders often require a minimum credit score benchmark, some as low as 580.⁶²

Credit scores help to evaluate mortgage applicants that apply for Federal Housing Administration loans. FHA requires a mortgage insurance premium that is based on LTV. Nonetheless, credit scores determine down payment requirements and if they are not sufficiently risk-based, the overall total premiums charged may tilt the solvency balance of the fund if over-weighted by weaker credits. Generally, most FHA loans have a credit score higher than 580. Average borrower credit scores were 670 in FY 2018, down from 676 in FY2017.⁶³ FHA has no genuine mandate whatsoever to manage risk in its own loan portfolio.

The Government National Mortgage Association (GNMA, or Ginnie Mae) provides guarantees on Mortgage Backed Securities (MBS) backed by loans from FHA, VA, and several other federal agencies, which in turn have provided guarantees of various levels on the original loans. GNMA carries an explicit claim on the full faith and credit of the United States (taxpayers).

Notably, all of these standards and practices have been established using FICO scores, and lenders have no capacity to evaluate during an application process the programs for which a borrower might eventually qualify – FHA, VA, GSE or other products. Thus, as a practical matter, introducing alternative scores in the GSE space would necessitate the wholesale retooling of these standards across all government-backed products in order to align evaluation systems and reconstruction of models. This entails significant expense to industry as well as federal agencies like FHA and VA. It also precipitates

⁵⁹ Wathen, Jordan, “Why Fannie Mae and Freddie Mac Shares Are Soaring – Again,” Yahoo! Finance, January 22, 2019.

⁶⁰ U.S. Treasury, “Treasury Department and FHFA Modify Terms of Preferred Stock Purchase Agreements for Fannie Mae and Freddie Mac,” December 21, 2017. Retrieved from: <https://home.treasury.gov/news/press-releases/sm0242>.

⁶¹ Based on NTU calculations from Goodman, Laurie, et al., Housing Finance at a Glance: A Monthly Chartbook, Urban Institute, February 2019, “Overview: Agency Mortgage-Backed Securities,” p.7.

⁶² For further discussion of guidelines, see U.S. Department of Veterans Affairs, “Lenders Handbook – VA Pamphlet 26-7”, Last Updated March 19, 2019, https://www.benefits.va.gov/warms/pam26_7.asp.

⁶³ U.S. Department of Housing and Urban Development. “Annual Report to Congress on the Financial Status of the FHA Mutual Mortgage Insurance Fund,” Fiscal Year 2018, page 13.

exposure to an entire state-level regulatory re-certification process. Finally, a “spillover effect” from increased risk of alternative credit scores at GSEs would likely be seriously magnified at FHA when that agency almost inevitably would have to follow the lead of Fannie Mae and Freddie Mac in adopting them.

Regarding the government’s own expenditure on the entire alternative credit scoring exercise alluded to above, Richard Koss, a former senior official at Fannie Mae, provided candid commentary during FHFA’s 2017-2018 Request for Input on credit scoring options:

The RFI states ‘FHFA concluded that the Enterprises’ empirical findings revealed only marginal benefits to requiring a different credit score than Classic FICO’. As a result, any change should be implemented only if the transaction costs are modest. While consideration needs to be given to costs across the entire mortgage value chain, FHFA should give primary consideration to the costs imposed on the Enterprises in its role of Conservator. ... [I]t is important that the public be made aware of the estimated dollar costs of this transition. Are taxpayer resources being well-used for a result that promises ‘only marginal benefits?’⁶⁴

When it comes to alternative scores, taxpayers are exposed to several potential pitfalls: failure to properly measure default risk, system adjustment costs at agencies well beyond FHFA and the GSEs, and worst of all, a rush to embrace new methods for achieving political goals instead of accuracy or stability.

⁶⁴ Koss, Richard, “Comment on Credit Score Options,” Johns Hopkins University Letter to the Federal Housing Finance Agency, March 28, 2018. Retrieved from: <https://www.fhfa.gov/AboutUs/Contact/Pages/input-submission-detail.aspx?RFID=951>.



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