

***FINREGLAB TO EVALUATE THE EXPLAINABILITY
AND FAIRNESS OF MACHINE LEARNING IN CREDIT UNDERWRITING***

WASHINGTON, D.C., April 14, 2021 - FinRegLab is working with researchers from the Stanford Graduate School of Business (GSB) to launch a ground-breaking evaluation of emerging market practices to improve the transparency and fairness of machine learning underwriting models in consumer credit. This will be the first public research shaped by input from key stakeholders – including executives from banks and fintechs, technologists, consumer advocates, and regulators – to address questions about explainability and fairness that have made lenders hesitant to adopt machine learning underwriting models at scale.

This research comes as profound societal challenges have lenders and policymakers alike looking to new underwriting approaches with unprecedented urgency: a viral pandemic; a severe, uneven economic shock; and a mass movement for racial justice. Adopting machine learning to assess the creditworthiness of loan applicants is among the more promising options for improving current underwriting in consumer credit. In machine learning, stakeholders see significant opportunity to help improve the efficiency, fairness, and inclusiveness of lending. But the potential complexity and opacity of machine learning models pose risk, particularly with respect to their reliability in the face of changing economic conditions and questions about their ability to help overcome, rather than amplify, historical inequalities.

Given these risks, lenders and policymakers have focused attention on critical threshold questions about how well we can understand the functioning of complex models and when we can trust these models to inform sensitive decisions about who gets a loan and at what price. Many lenders are choosing not to use machine learning in credit underwriting – or only to use it in an indirect way that sacrifices much of its potential benefits – because of uncertainty about being able to manage explainability and fairness concerns with sufficient skill to satisfy themselves, their regulators, and other potential critics. This research is designed to address that gap.

“The pandemic has sharpened focus on innovations that have the potential to improve the inclusion, fairness, and efficiency of the financial system. Machine learning’s powerful analytical tools and ability to incorporate nontraditional credit data has transformative potential, especially for addressing racial injustice and economic inequality,” said FinRegLab CEO Melissa Koide. “Just as clearly, there are important questions to ask about how to protect against bias and adapt existing law and regulation to foster responsible and inclusive use of new analytical processes in credit underwriting. This research will advance our understanding of the reliability and fairness of machine learning models and emerging approaches to managing more complex models in the context of providing credit. It will also point to opportunities to improve their trustworthiness.”

“Advances in machine learning are likely to reshape lending in the coming years,” said Jonathan Levin, the Philip H. Knight Professor and Dean of Stanford Graduate School of Business. “Understanding how these algorithms can be designed to make credit allocation both more efficient and more equitable is an urgent challenge.”

“This research focuses squarely on important questions about how more powerful models and better data can help improve the lives of individuals and communities,” said Susan Athey, the Economics of Technology Professor at Stanford Graduate School of Business and founding director of the Golub Capital Social Impact Lab. “These innovations have enormous potential to improve our economic recovery.”

Research Overview

The study will analyze the capabilities and performance of model diagnostic and compliance tools developed by six technology companies in three areas of risk management critical to the use of machine learning underwriting models in consumer credit:

- **Model Risk Management:** the ability to satisfy prudential regulators and investors about the performance, reliability, and governance of machine learning models.
- **Fair Lending:** the ability to demonstrate that these models operate without creating impermissible discrimination, including disparate impacts on protected classes.
- **Adverse Action Reporting:** the ability to comply with legal requirements for providing applicants with individualized “adverse action” notices explaining why they were denied credit or offered less favorable terms.

The technology companies participating in this research are: Fiddler Labs; H2O.ai; Relational AI; SolasAI/BLDS, LLC; Stratyfy; and Zest AI.

The purpose of this research is to inform decision-making by policymakers, firms, industry groups, and advocates as the financial services sector develops norms and rules to govern the responsible, fair, and inclusive use of machine learning for credit underwriting. This includes proposing a framework for evaluating how well such models meet expectations for explainability and fairness. The policy component of this project will identify ways in which existing law, guidance, and compliance assessment techniques may need to evolve in light of the features, benefits, and limitations of currently available approaches to explainability and fairness.

The project’s aim is not to identify a particular “winner” among available tools for managing machine learning models, but rather to help stakeholders who are grounded in processes designed for traditional underwriting models get a broader sense of the range of approaches and outcomes that are possible in the context of machine learning.

FinRegLab and Stanford GSB researchers have assembled an Advisory Board comprised of senior representatives from more than 30 institutions from all relevant sectors – bank and nonbank



financial services, technology, government, consumer and civil society advocacy organizations, and academia – in order to make sure that our research prioritizes high-value topics and is disseminated to key audiences in a timely way.

For media and other inquiries about this research, contact us at AI@finreglab.org. To receive periodic updates on this research, please subscribe to FinRegLab's newsletter [here](#).

About FinRegLab

FinRegLab is an independent, nonprofit research organization that conducts research and experiments with new technologies and data to drive the financial sector toward a responsible and inclusive marketplace. We also facilitate discourse across the financial ecosystem to inform public policy and market practices. The research team at FinRegLab is led by P-R Stark, Director of Machine Learning Research.

About the Stanford Graduate School of Business Research Team

The research team at Stanford GSB is led by [Laura Blattner](#), Assistant Professor of Finance; and [Jann Spiess](#), Assistant Professor of Operations, Information & Technology. The research team is advised by [Susan Athey](#), the Economics of Technology Professor; and [Kenneth Singleton](#), the Adams Distinguished Professor of Management, *Emeritus*.

Support for the Research

Flourish Ventures

[Flourish](#), a venture of the Omidyar Group, has provided operating support to FinRegLab since its inception. Flourish is an evergreen fund investing in entrepreneurs whose innovations help people achieve financial health and prosperity. Established in 2019, Flourish is funded by Pam and Pierre Omidyar. Pierre is the founder of eBay. Managed by a global team, Flourish makes impact-oriented investments in challenger banks, personal finance, insurtech, regtech, and other technologies that empower people and foster a fairer, more inclusive economy.

"Policymakers are grappling with hard-to-answer questions about the use of machine learning methods in financial services," said Kabir Kumar, Director, Flourish Ventures. "FinRegLab's unique approach in combining in-depth stakeholder discussions with an independent assessment of machine learning tools will address some of those questions and provide meaningful benefits for policymakers, industry and, most importantly, consumers."

The Mastercard Center for Inclusive Growth

[The Mastercard Center for Inclusive Growth](#) advances equitable and sustainable economic growth and financial inclusion around the world. The Center leverages the company’s core assets and competencies, including data insights, expertise, and technology, while administering the philanthropic Mastercard Impact Fund, to produce independent research, scale global programs and empower a community of thinkers, leaders, and doers on the front lines of inclusive growth. The Center has provided funding to support this research.

“In the coming years, advancements in technology will have a transformative effect on the financial services sector,” said Salah Goss, senior vice president for social impact at the Mastercard Center for Inclusive Growth. “FinRegLab’s research presents a unique opportunity to ensure that machine learning can be a force for good that drives fair, equitable and transparent outcomes, enabling inclusive and sustainable growth for everyone. We look forward to viewing data insights that can inform our ongoing commitment to reducing the wealth and opportunity gap in America.”

JPMorgan Chase & Co.

JPMorgan Chase is [committed to advancing an inclusive economy](#) and racial equity. The firm uses its expertise in business, public policy and philanthropy, as well as its global presence, expertise and resources, to focus on four areas to drive opportunity: careers & skills, financial health & wealth creation, business growth & entrepreneurship, and community development.

“As part of JPMorgan Chase’s commitment to advance racial equity, we’re accelerating our effort to improve financial health and access to banking in Black and Latinx communities,” said Heather Higginbottom, President, JPMorgan Chase *PolicyCenter*. “Expanding access to credit is a key component of building resilient and financially stable households and we look forward to seeing the results of FinRegLab’s research as we work to address this critical priority.”

About the Companies Participating in the Research

Fiddler AI

[Fiddler AI](#) provides artificial intelligence platforms that are designed to help enterprises create and offer AI and machine learning services that are transparent, explainable, and understandable. The company's platform offers business and statistical metrics, model performance monitoring, and model explanations, which enables businesses to analyze, manage, and deploy machine learning models at scale.

H2O.ai

[H2O](#) provides Driverless AI, an enterprise AutoML platform that enables customers across industries from financial services to healthcare to rapidly prototype and deploy competition grade ML models, built with a focus on explainability. H2O.ai has a long history of researching, identifying, and developing leading methods to make algorithms more transparent and explainable and building frontier technology for data scientists to understand and trust their AI.

Relational AI

[RelationalAI](#)'s cloud-based relational knowledge graph management system offers truly revolutionary speed and seamless integration of information already in enterprise databases. Our unique technology accelerates deployments at scale and unlocks the commercial potential of a wider array of Artificial Intelligence algorithms - including counterfactual reasoning. Our knowledge-centric approach connects business intelligence with prediction systems. RelationalAI serves customers across sectors, from financial service to retail and telecom.

SolasAI / BLDS, LLC

BLDS provides consulting services relating to the application of statistics and economics to questions of law and regulation. The firm has extensive experience in deploying statistical methods in the context of credit and marketing decisions that comply with anti-discrimination laws. The firm has also helped clients in a variety of other industries, including insurance and healthcare services. In recent years, BLDS has focused on the development and implementation of techniques that provide a clearer understanding of AI decision-making and evaluate the fairness of such models. BLDS established an algorithmic fairness software company and corresponding product, [SolasAI](#), used by many of its clients to find fairer and highly predictive models.

Stratyfy

[Stratyfy](#) is an ethical artificial intelligence (AI) company that offers predictive analytics and decision optimization software for credit and risk teams, helping lenders provide more people with access to fair and transparent credit. Stratyfy's unique solutions provide the level of understanding and control that regulated institutions require to proactively identify and mitigate bias and make better credit decisions. With Stratyfy's solutions, users can seamlessly combine the precision of data and the wisdom of domain expertise, optimizing risk-based decisions without introducing regulatory or operational risk.

Zest AI

[Zest AI](#) machine learning software and services help lenders make more accurate and fairer credit underwriting decisions. Zest's Model Management System allows credit teams to build, analyze, adopt, and operate ML decisioning models using hundreds or thousands of FCRA-compliant data points with speed and transparency. Since 2009, Zest has provided credit scores for hundreds of millions of prospective borrowers worldwide, including those with little to no credit history.