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July 1, 2021

Chief Counsel's Office
Attn: Comment Processing
Office of the Comptroller
of the Currency
400 7th St. SW, Suite 3E-218
Washington, DC 20219

Ms. Ann E. Misback
Secretary
Board of Governors of the
Federal Reserve System
20th Street and Constitution Ave. NW
Washington, DC 20551

Mr. James P. Sheesley
Assistant Executive Secretary
Attn: Comments-RIN 3064-ZA24
Federal Deposit Insurance Corporation
550 17th St. NW
Washington, DC 20429

Comment Intake
Bureau of Consumer Financial Protection
1700 G Street, NW
Washington, DC 20552

Ms. Melane Conyers-Ausbrooks
Secretary of the Board
National Credit Union Administration
1775 Duke St.
Alexandria, VA 22314-3428

Re: Request for Information and Comment on Financial Institutions' Use of Artificial Intelligence, Including Machine Learning

Agency/Docket Numbers:

Docket ID OCC-2020-0049

Docket No. OP-1743

Docket No. CFPB-2021-0004

Docket No. NCUA-2021-0023

RIN 3064-ZA24

Linear Financial Technologies ("Linear") appreciates the opportunity to provide its perspective in response to the joint Request for Information and Comment (RFI) released by the Office of the Comptroller of the Currency ("OCC"), the Board of Governors of the Federal Reserve System ("Federal Reserve"), the Federal Deposit Insurance Corporation ("FDIC"), the Bureau of Consumer Financial Protection ("CFPB"), and the National Credit Union Administration ("NCUA") (jointly, "the agencies") regarding Financial Institutions' Use of Artificial Intelligence ("AI"), including machine learning. As an integral technology services provider to a number of large and regional financial institutions, Linear's views on the balance between technology-driven innovation and the need to ensure both customer protection and the safety and

soundness of both individual financial institutions and the financial system as a whole are based on our unique experience working alongside highly regulated banks and lending to small businesses off of our own balance sheet.

About Linear

Linear is a market-leading digital platform that provides integrated, private-label origination solutions to five of the largest 25 banks in the United States, among others, and is a leading non-bank provider of affordable credit for the small business community. Our list of clients is expansive and diverse, ranging from top U.S. banks such as Citizens Bank, PNC Bank, Fifth Third Bank, Huntington Bank and Bank of the West, to non-bank lenders and SMB service providers. To date, our 25 super regional, regional and community bank clients have provided over $13B in capital to businesses through our platform. We also recently expanded into the Canadian and Australian markets with American Express.

Linear helps to provide small businesses the affordable credit they need by connecting them with lenders via our digital private label loan origination solutions. We also act as a lender ourselves, using our balance sheet to lend where a bank either does not want to or simply cannot due to credit criteria or concentration or risk limits. In addition to providing obvious benefits to the borrower, the bank also wins by being able to facilitate a responsible credit product for the customer even when not willing or able to lend directly.

Our own credit products attract prime and "mid-prime" borrowers, with effective yields that on average, have rates in the mid/high-teens, inclusive of interest and fees. Our loans and lines of credit have no prepayment penalties and no hidden fees. They feature standard interest rate coupons (not factor rates), monthly or twice-monthly payments, and straight-line amortization schedules, similar to a traditional car loan or mortgage. We also incorporate a cash flow analysis to ensure that the small business has the capacity to make the payments on the money they borrow.

Importantly, Linear caps interest rates below all state usury limits rather than opting to invoke choice of law as is the practice of other market participants, with some non-bank small business lenders offering products well above state-imposed usury caps for consumer loans. Linear employs a highly data-driven and automated lending process using multiple Fair Credit Reporting Act ("FCRA")-compliant data sources.

Linear has also been heavily involved in the Paycheck Protection Program ("PPP"), both as a partner to large financial institutions and as an approved fintech lender. Our flexibility as a digitally native enterprise allowed us to assist in the rapid and unprecedented deployment of over a billion dollars' worth of loans through this novel program. Our pre-existing "plug and play" technology stack proved critical in meeting the unparalleled time-sensitive need for small business credit extension. The average size of PPP loans that we facilitated was well below $100,000, underscoring our experience as a provider of critical credit access to the smallest of small businesses in the United States.

While Linear is not an insured depository institution, our business has many operational similarities to banks due to our close and long-standing banking relationships. As an integrated service provider to the banking industry, we undergo a minimum of eight comprehensive bank vendor due diligence exercises annually, provide access to affordable credit for small businesses in all 50 states, and are indirectly subject to third-party risk management guidelines issued by the prudential regulatory agencies.

Regulatory Ambiguity Hinders Widespread AI Deployment

The questions posed by the agencies in this RFI underscore the ambiguity in which those financial institutions and their partners that currently deploy AI-enabled tools currently utilize them. While AI-enabled tools have been utilized, to a limited degree, in the financial services ecosystem, widespread deployment of these tools is unlikely barring further clarity from the agencies regarding their collective supervisory expectations.

As the agencies implicitly recognize by submitting this request for information to the public, the current AI landscape, compared to legacy banking, lacks a depth of formal research, and has less established legal and regulatory precedent on which to rely. Since predicting the future has always been a fanciful endeavor, we feel our best contribution is to simply share with regulators the ways in which our enterprise is currently deploying AI and the challenges we face in more broadly doing so.

Along with our colleagues and competitors in the small business ("SMB") lending market, we at Linear understand that AI can lead to superior credit decisions for the betterment of consumers and SMBs. When properly designed, AI can help reduce the cognitive biases and counterproductive heuristics which are inherent weaknesses of all human analysis. These analytical improvements can help data-driven institutions to better manage risk and to enhance their internal operations; but recent history has shown that many enterprises are reticent to adopt such technology if they are not confident that they can effectively explain how algorithmic decisions are made to their regulators, audit committees and customers.

While implicit bias is an important consideration for the use of AI, mistrust in AI technologies is largely born out of a lack of understanding of the technology, rather than simply as a safeguard. Gartner research found that 79 percent of business executives in finance attributed "fear of the unknown" to their reticence to adopt AI.[1] In instances where AI is adopted today by financial institutions, it is typically as a protection against fraudulent transactions (i.e., risk mitigation), rather than as an accelerator of superior products and services. The high rates of development and adoption of AI in compliance and cybersecurity are driven by the significant potential for cost-savings in the highly regulated banking sector.[2]

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[1] "Life Sciences CIOs, Accelerate Clinical Development With New Applications of Artificial Intelligence." Jeff Smith and Michael Shanler, Gartner Research. Published January 17, 2019.
[2] "Fintech: Overview of Innovative Financial Technology and Selected Policy Issues." Congressional Research Service. Published April 28, 2020.

The key for adopting AI in finance more broadly is to build an environment of trust whereby the banking agencies signal to regulated financial institutions that they embrace the deployment of AI tools when done with proper safeguards in place. Formal embrace of these technologies by agencies would support broader adoption of AI in the financial services market which would have a significant positive impact on consumers and small businesses, unlocking, for example, the ability to greatly expand access to affordable credit using AI-enabled credit models.

How Linear Currently Uses Artificial Intelligence Technology

Linear has been making use of AI for its own lending program as well as to protect against fraud; however, our ability to significantly expand our use of AI-enabled technologies for our platform clients to better serve their small business customer base is hampered by a lack of clarity for regulated financial institutions from the agencies.

Traditionally, business lending has been limited by both the creditworthiness of the borrower *and* sophistication level of the credit risk assessment framework of the financial institution making the loan. The legacy underwriting process of finding, requesting, and collecting the necessary documentation can be very time-consuming. Further time and human labor are spent reading and identifying the relevant information from such documents. To further complicate matters, this information is often stored across multiple internal and external systems, available only in paper form and is often manually entered. All these steps can increase the number of inaccuracies and create delays—if not denials—for otherwise creditworthy borrowers. In addition to the scalability of the traditional credit assessment processes, decisioning accuracy can also be improved.

In contrast, particularly for new and smaller enterprises with limited relevant credit history, our advanced credit-decision models use AI to increase extension of credit, reduce defaults, and utilize applicant-permissioned, FCRA-compliant alternative data that is not readily available for traditional assessments of creditworthiness. This alternative data – information such as checking account transaction data, education level, employment status and history, and utility bill payments – has the potential to continually expand access to credit to consumers with little to no or blemished traditional credit history. These data provide a more holistic picture of an individual or an enterprise's creditworthiness. As such, AI is enabling us to provide more financing at lower costs of credit for SMBs by streamlining the application process by utilizing AI-based predictive algorithms to drive optimal outcomes.

Much of our business is enabling our bank partners originate various products (loans/lines/credit cards). Our process begins with customer self-serve, bank-specific interfaces, each configured to support the distinct channel and product being requested. Our decision model is integrated with all of the leading data providers for SMB credit and fraud assessment, and the decision engine configures distinct exposure, business and credit rules by product line. While the bank maintains full control of its credit policy, Linear configures the existing bank policy on our decision engine where applicable. We also typically perform closing procedures, including KYC and CIP for streamlined products or deliver a decisioned file to the bank for specified products when the bank prefers to perform closing for those products.

Our AI-empowered ability to rapidly access and analyze the transaction flows of a SMB applicant via access to their commercial checking account statements is largely what allows us to make fast and competitively priced loan offers. Real-time capacity analysis and cash flow assessments have also reduced or eliminated the need for additional financial documents for smaller loans. This AI-dependent underwriting process also includes technology driven parsing of bank statements provided by the applicant. This process results in creating multiple structured cash flow attributes which are inputs to various rules and the cashflow model.

Following submission, each application is filtered through two rule tiers: an automated "knock-out" (immediate decline) rule, and a rule that signals key risk factors to assist the underwriter. We then deploy a logistic regression model that predicts the probability of default. Since our risk model is built across several disparate data sets, it has proven to be superior to generic commercial bureau scores. At the end of the pipeline, a final risk rating is assigned to produce a risk-based price for the loan. We also rescore our line of credit accounts on a 90-day frequency using an account management model.

Unfortunately, much of the SMB underwriting process still depends on the receipt of official tax information from the Internal Revenue Service (IRS). This antiquated process still involves the collection and mail delivery of physical documents, which can delay loan approval by several weeks. We have long advocated for the IRS to develop an API for business tax information, similar to its platforms for personal tax information that are used to power the Health Insurance Marketplace. Such an API would drastically shorten loan approval process, particularly for the smallest businesses looking for smaller credit lines or shorter-term loans.

We also utilize AI technology to identify and prevent fraud. Linear Defense is a financial services product which can help clients minimize application fraud risk by using one of its kind, highly predictive tool powered by alternative data and advanced machine learning algorithms. This product helps a client in mitigating all kinds of fraud risk and can be incorporated in both automated and manual decisioning systems.

AI Adoption Challenges

The Challenge of Validation

In many ways, the development of each AI-enabled product is comparable to the development of a hypothesis in a science experiment. Both steps rely on combining deep understanding of previously developed knowledge with a drive for further inquiry. The scientific process involves the controlled, repeated testing of hypotheses against real-world conditions; accordingly, the evaluation of AI conceptual soundness can be conducted with more usage of product across diverse sets of populations.

For example, AI decision engines can be audited by attempting to replicate the results of the data analysis through traditional, manual methods. At least initially, the results of any AI process must be repeatable through these manual methods, and any AI model that is fed identical information should produce the same results every time. If the results are not repeatable, the AI analyst can work backwards to identify the faulty elements of the algorithm.

Soundness can also be tested through the reverse process- by changing the data input values one at a time, to see what effect that may have on the algorithmic outcome and its drift. The ultimate signal that a model needs to be retrained is when it starts making incorrect predictions that affect important business outcomes or customer treatment. There should be a business process to compare what happened to the model's prediction and its impact on a business' key performance indicators. One also needs to identify the drivers causing that incorrect prediction.

Additionally, even if an AI model is built in compliance with non-discrimination requirements, the sophisticated and complex nature of underlying algorithms can introduce bias indirectly in the decision outcome. These outcomes therefore need to be tested regularly via standard documented methods.

Although AI is not directly addressed in the Federal Reserve Board and OCC Supervisory Guidance on Model Risk Management (SR 11-7) from April 2011, we feel that this document can serve as a useful resource to direct AI validation techniques. And since the deployment of AI is in no way exclusive to financial services, it could be useful for the agencies to cooperate with other AI specialists across the federal government, particularly as the Department of Transportation attempts to assess and regulate automated driving, and the National Artificial Intelligence Office, created by the National AI Initiative Act of 2020, stands up its all-of-government AI coordination activities.

Fair Lending Concerns

A major source of understandable concern that is holding back AI adoption in the financial services ecosystem is compliance with fair lending requirements under the Equal Credit Opportunity Act ("ECOA"), as well as other statutes. While ECOA was passed in 1974 partially in response to concerns from the growing adoption of complex credit scoring algorithms, its implementing regulations, like almost all others, were promulgated well before AI was deployed in financial services. Therefore, modern industry participants would greatly benefit from agency guidance and a clear regulatory framework that directly addresses how AI can be deployed in credit decisioning in compliance with the Act. To be effective, such guidance should be clearly articulated to all lenders and technology service providers and should provide a clear methodology for identifying disparate impact from a supervisory perspective.

Specifically, we believe regulators should make clear to industry participants exactly what types of documentation would be acceptable to demonstrate that an AI lending model is *not* discriminating against protected classes. Lenders would also benefit from clear agency guidance on the drafting of adverse action notices resulting from credit denials based on AI-enabled underwriting models, as the scope of data utilized in these underwriting models combined with the complex algorithmic processing required to build them may not fit precisely within the existing guidance set forth under Regulation B. The ultimate purpose of informing the consumer of the reasons for denial of their credit application is so the consumer can precisely work to remediate the deficiency in their credit in whatever means they choose, to increase their chances of future approval. As such, AI-based credit denial disclosures should be presented in language

that the consumer can both understand and use to their benefit, while providing regulatory certainty to lenders that utilize AI-enabled underwriting tools.

We agree with previous CFPB staff statements published on July 2020 blog post that "the existing regulatory framework has built-in flexibility that can be compatible with AI algorithms," and that the "Official Interpretation to Regulation B provides that a creditor need not describe how or why a disclosed factor adversely affected an application...and that a creditor may disclose a reason for a denial even if the relationship of that disclosed factor to predicting creditworthiness may be unclear to the applicant."

We suggest that similar statements from the remaining agencies with jurisdiction over Regulation B would further provide lenders with the confidence to continue using and developing their AI lending systems.

Moving Forward

Linear commends the agencies for their coordination on this RFI, which demonstrates precisely the kind of interagency approach that will be necessary to harness the power of emerging technologies in a safe and customer protective manner. But more of this kind of work is critical. The use of "tech sprints," where a wide variety of experts from the private sector, nonprofits, academia, and government come together in the same space to collectively develop responses to challenges, could be a way of facilitating exactly the type of public-private relationship required to meaningfully improve understanding of AI-enabled technologies in the financial services ecosystem, and to identify and develop regulatory expectations regarding their deployment.

As part of a supervisory relationship, lenders should be able to furnish all the relevant algorithms, and both explain and demonstrate to examiners how and why the algorithm is functioning as it is supposed to. Regulators could take the additional step of attempting to replicate these results by using their own hardware platforms to run the same algorithms through the same datasets to eliminate the possibility of exogenous influences, providing an objective supervisory test for ECOA, Regulation B, and other fair lending requirements.

Greater deployment of AI in the financial services ecosystem would greatly benefit from clear regulatory guidance for what exactly constitutes an acceptable level of a model's explainability, and how examiners might review a lenders' AI-based credit approval process. Since the problem of AI being a "black box" can be remediated by providing an appropriate level of detail to explain the credit decision, regulators should establish standards on what makes an AI solution reliable and fair, providing much-needed clarity to financial institutions and other lenders that will allow the safe promulgation of these tools to move forward.

Any new AI model can be deployed in conjunction with the traditional models in place. For example, a new AI model can be used to approve incremental customers who may have been declined for their loan request by the existing decision model. Such innovative deployments can help banks gradually increase their comfort level with AI-based models.

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Conclusion

Financial institutions have been operating under a regulatory framework designed well before modern AI technology existed. Though it was designed to keep banks operating safely and soundly, and to protect borrowers, the existing reliance on legacy technology for compliance purposes is hindering the adoption of AI across the industry, to the detriment of consumers and small businesses.

Clear regulatory expectations must be published that allows the existing framework to evolve in a manner that continues to protect customers and the safety and soundness of the financial system while providing much greater clarity for lenders that wish to deploy AI technologies that can improve access to affordable credit, expand financial inclusion, and significantly reduce fraud and other financial crimes.

On behalf of Linear Financial Technologies, thank you for your consideration of our perspectives.

Sincerely,

Sandip Nayak

Sandip Nayak
Chief Strategy and AI Officer
Linear Financial Technologies