

# Investing in digital loans with data science



October 2022

For many individuals looking for loans, the traditional borrowing process leaves a lot to be desired. Weighed down by legacy systems and analysis, the approval process often passes over viable borrowers who do not fit narrow credit criteria.

There are, however, better options. For over a decade, digital lending platforms (also called marketplace lenders) have offered borrowers quicker access to credit, and often at better terms, than loans from traditional channels. Using larger and broader data sets as well as alternative data sources that go beyond credit scores like FICO, digital lenders apply data science to more accurately predict a borrower's ability and willingness to repay a loan. This paper examines how Franklin Templeton Fixed Income uses its own bespoke machine-learning technology to actively select and invest in loans from digital lending platforms.

**In section one:** We start with an overview of how digital lending evolved in the wake of the global financial crisis. Over this time, the early peer-to-peer (P2P) model that matched online borrowers with retail investors has transitioned to one comprised mostly of institutional buyers such as hedge funds and asset managers. Many digitally native lenders have distinguished themselves from banks by using alternative data to gauge a borrower's creditworthiness. In recent years, a new generation of lenders has sprung out of the software industry.

**In section two:** We explain how our bespoke machine-learning algorithms analyze hundreds of credit signals to measure default probabilities and expected returns for individual loans. We can combine statistical discoveries with human insights from our seasoned credit analysts and portfolio managers to improve the quality of credit pricing decisions. We believe we are one of just a handful of asset managers that dynamically analyze, price and purchase individual loans in real time.

Throughout this paper, we have incorporated our observations of the evolving state of digital lending. The fintech industry is undergoing massive change. For each firm attempting to leverage its proprietary data to augment an existing product suite with a new fintech offering, several others are mired in decades-old technology and paper-driven loan applications.

## Digital lending evolution

In early 2020, just weeks before COVID-19 arrived in the United States, Lending Club announced a new milestone: US\$12.3 billion of loan originations for 2019.<sup>1</sup> During the pandemic, originations dipped to US\$4.3 billion in 2020 then rebounded to US\$10.4 billion in 2021.<sup>2</sup> Since its founding in 2006, the company has issued over US\$70 billion in loans

to more than 3.9 million customers, making it the largest online digital lender in the United States.<sup>3</sup> With large volumes of loans and auction-based buying programs, digital lenders like Lending Club offer institutional investors ample access to actively select individual consumer loans.

At a high level, the core mission of digital lenders—matching small borrowers with investors on digital platforms—has not changed since the first platforms launched over 15 years ago. Other aspects of the industry, such as using alternative data to gauge credit quality, have changed significantly and are rapidly evolving.

### **Alternative data disruption**

The original business pitch behind digital loan platforms was straightforward—give borrowers quick and easy access to affordable personal loans by matching them with investors online. That business model received a huge competitive boost from the 2008 financial crisis. Burdened by post-crisis regulations, high overheads, and clunky technology, some traditional lenders retreated from consumer loans, ceding space to savvy fintech lenders.

In the decade following the crisis, some banks voiced concerns about an uneven playing field. They pointed out that digital loan platforms used alternative data to vet online borrowers. Unlike FICO scores which strictly analyze historical and transactional credit data, alternative data can include rent or utility payments and information like occupation and education. Regulators soon took a closer look, and many came away with a positive outlook. According to Richard Cordray, the first director of the Consumer Financial Protection Bureau, by “filling in more details of people’s financial lives, this [alternative] information may paint a fuller and more accurate picture of their creditworthiness.”<sup>4</sup> In a 2018 study on marketplace lending, the US Federal Reserve concluded “credit card borrowers may receive potentially significant interest rate reductions as a result of obtaining loans from online P2P platforms.”<sup>5</sup>

### **COVID-19 data acceleration**

It is worth spotlighting how the pandemic has accelerated the uptake of alternative data. With the passage of the CARES Act in 2020, digital lending platforms were suddenly restricted from reporting a borrower’s delinquent status to credit bureaus. Seemingly overnight FICO scores rose artificially across the board. With delinquent status temporarily out of the picture, credit bureaus suggested digital platforms fill in the gap with payment histories on items like rent and utility bills.<sup>6</sup> This data has always existed inside bank accounts, but it was mostly invisible to credit bureaus because it was not categorized as credit-related. In forcing credit bureaus to re-examine the utility of alternative credit data, the pandemic changed their minds.

With respect to data sharing and consumer privacy, we have noticed the convenience of lower-cost digital loans has convinced many consumers to voluntarily lift data privacy barriers. Indeed, this is already playing out in the fine print of Lending Club’s privacy policy. Consumers applying for loans can now opt to provide historical bank account data via fintech companies like Plaid and Finicity.<sup>7</sup> As an investor in consumer loans, we think this move strengthens digital platforms’ underwriting capacity and the quality of the loans we buy.

### **The embedded lending revolution**

Along with the uptick in consumer data sharing, there is another shift happening in the industry that is still flying under the radar of some banks and credit unions. Small business owners no longer need to ask banks (or even digital lenders) for loans. Instead, the loans come directly to them on payment terminals, pre-approved by the terminal providers themselves.

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In this new paradigm, payment solutions providers can bolt on lending services to increase customer engagement, retention, and loyalty while also increasing revenues. Armed with real-time sales data, fintechs are feeding this data directly into algorithms to determine which business has the strongest ability to repay loans. Based on algorithmic results, merchants may receive pre-qualified loans with fees tailored to match their business momentum. In many cases, when analyzed with machine learning this data reveals a creditworthy business that a simplistic FICO framework might not recognize.<sup>8</sup>

### The loan analysis debate: traditional vs. AI methods

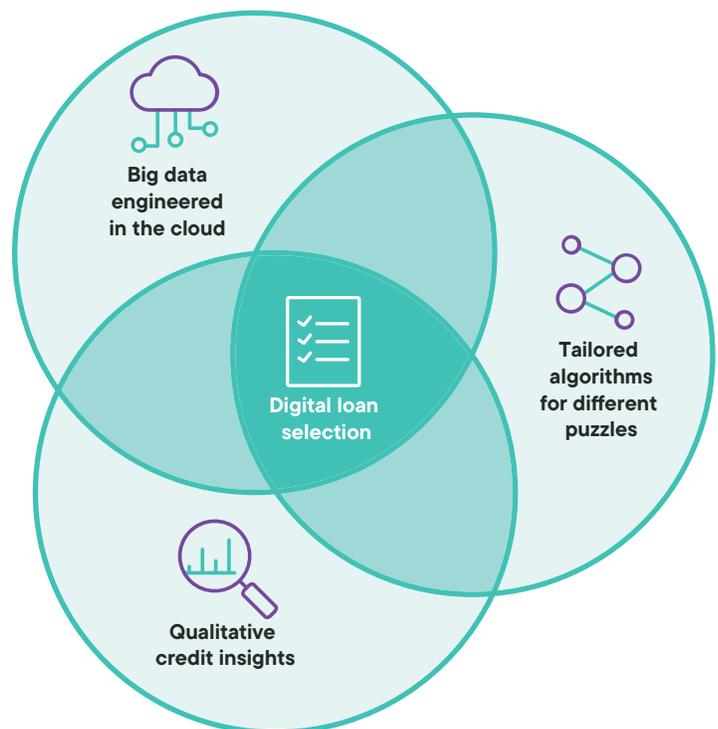
With machine-learning tools now spreading to more traditional lenders, it is surprising how some asset managers and hedge funds have been hesitant to embrace new data science methods. In a 2019 survey, the CFA Institute learned the majority of senior portfolio managers still rely on Excel and traditional market data tools. Just 10% said they had recently used Artificial Intelligence (AI) or machine learning techniques.<sup>9</sup> In conversations with senior executives of major asset managers, the CFA Institute got the clear impression that after an initial push into alternative data, many became disillusioned when the early foray failed to deliver.<sup>10</sup> A handful of managers, however, are seeing success.

For our digital lending team based in San Mateo, we recognize that data science and machine learning can sharpen our statistical analytics and security selection. Equally important, though, is our team's deep expertise in private and structured credit and specialty finance. In our view, it is the overlap of data science with the deep credit expertise of pricing loans and managing dynamic market cycles that represents active management in its best light, as shown in Exhibit 1.

In section two, we explain how we incorporate data science and AI-driven underwriting to analyze millions of credit-related signals.

## Integrating Data Science

### Exhibit 1: Combining Statistical Discoveries with Credit Analysis and Human Insights



For illustrative purposes only.

## AI-driven credit analysis

For large asset managers investing in digital loans, data-driven credit analysis offers the ability to generate alpha versus a more passive approach. Consider this math: a typical unsecured consumer loan of US\$15,000 may come with 800+ data points. To invest US\$1 billion, human credit analysts would need to survey 70,000 unique loans, comprising 56 million credit-related signals. Using AI-driven underwriting, our team can arrive at a finely tuned credit assessment across thousands of loans at incredible speed.<sup>11</sup>

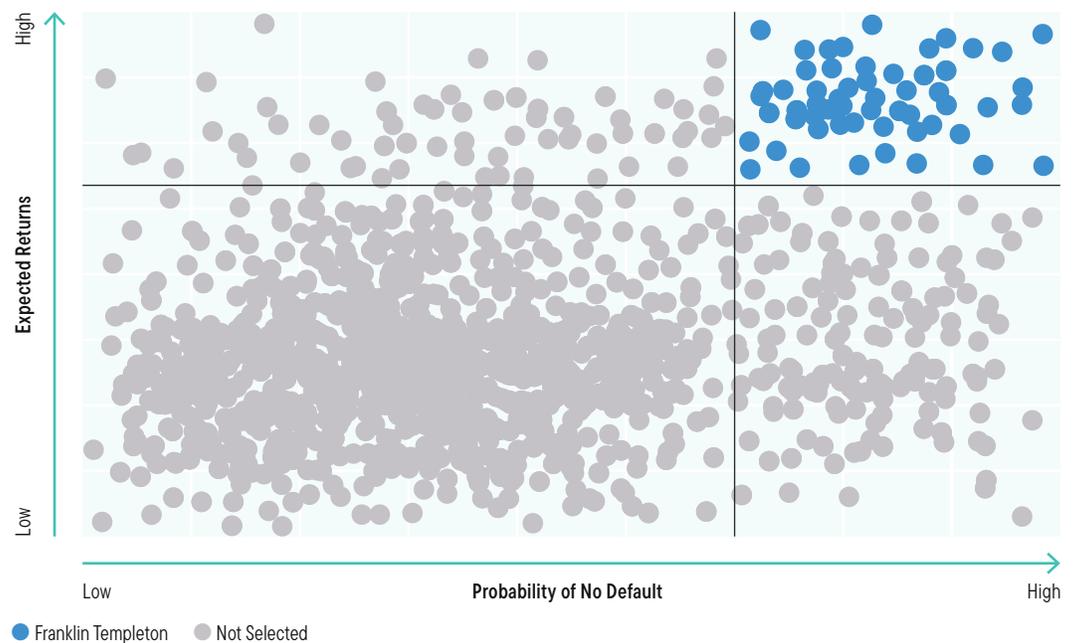
With a team of data scientists and engineers working alongside our credit specialists, our active approach to whole loan selection on digital loan platforms involves:

- Exchanging loan-level data—this involves data vetting, cleansing, and storage
- Building custom machine learning model(s)—transforming data into credit signals
- Deriving a proprietary risk score called p0 (probability of no default) for each loan
- Generating expected cash flows (internal rate of return or IRR) for individual loans
- Selecting our preferred tranche of loans, then negotiating a competitive price

Our machine learning models are bespoke to each digital platform partner, generating a p0 and IRR for individual loans. For illustration purposes, Exhibit 2 demonstrates a digital platform offering 1,000 loans, of which Franklin Templeton's AI-driven algorithms selected what we believe to be the best 70 loans, as indicated by the blue-shaded dots. Our coding also includes custom risk capabilities, which automatically eliminate loans that do not meet our team's preferred return and default risk parameters. Armed with this high-resolution snapshot of default risks and return expectations, our portfolio managers seek to negotiate better prices, which we believe can translate into better returns for our investors.

### Pinpointing Loan Opportunities

#### Exhibit 2: Using Data Science to Select 70 Digital Loans



For illustrative purposes only.

## High-resolution risk pricing

The ability to generate a p0 starts with some of the same credit factors (annual income, debt-to-income ratio, homeownership, etc.) that encompass the credit analysis that traditional lenders have practiced for decades. For our team, however, this is just the start; by opening up our credit lens with a much wider machine-learning aperture, our AI-driven algorithms can easily tap into hundreds of credit signals. Rather than precisely following linear instructions coded by data scientists, machine learning algorithms self-adjust through a process of trial-and-error training to produce a statistically accurate snapshot of credit risks.<sup>12</sup>

## Data engineering

For our data science team, constructing machine learning tools from scratch starts with an in-depth examination of the historical loan tape from a new digital platform. The raw data typically requires cleaning—filling in errors or incomplete sections of data—and vetting to understand different variables. Once all the prep work is complete, our data scientists host and reconfigure the data.

The work of transforming raw data into machine-usable signals (known as “features”) dovetails with the process of selecting an ensemble of machine learning algorithms that best suit the available data from a digital platform. Ideally, we prefer a significant history of loan data to train our bespoke algorithms. However, we have learned to accommodate much tighter training cycles for young origination platforms with short loan tapes.

## Vivid credit snapshots

If you look at the individual credit signals inside our algorithms one-by-one, they might seem nonsensical. For example, one signal may show there is a correlation to higher default rates based on the day of the month a loan is originated. Another signal may show that there is a correlation to default rates to the degree of specificity in a loan amount. Other loan types may show us different signals; for example, on delinquent loans, we may find that a platform’s “C” graded consumer loan has a 30% chance of reverting back to current, but their “D” rated delinquent loan has just a 5% chance of reverting back. How do we make sense of all these seemingly unrelated signals?

First, each signal is simply a predictive measurement. But a signal does not tell us about the underlying economic mechanisms or equilibria driving the prediction.<sup>13</sup> We still need credit specialists with deep domain expertise to evaluate whether patterns detected by machine learning are sensible, consistent, and additive.<sup>14</sup> Second, it is also important to remember our p0 metric is not based on an isolated signal. It is by considering the totality of hundreds of signals that our bespoke algorithms produce a high-resolution snapshot of default risk and expected IRR.

Think of this process like standing very close to a pointillist painting by the artist Georges Seurat. An inch away from the canvas the human eye sees a random collection of tiny colored dots. As you step farther away, your brain automatically rearranges the tiny dots into a vivid picture of a crowded park in summer. In this painting scenario, machine learning functions like the human brain and pattern recognition.

## Investing across different program types

The “auction-based” buying program represented by the previous scatterplot—whole loan active selection—is just one of multiple unique buying programs we may use with a given digital platform. Each buying program varies by the parameters a platform imposes, within which we must operate. For example, with a “posted-price” buying program we still actively pick individual loans using our AI-driven default and return probabilities, but only purchase

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them at par (i.e., no price negotiations). Other buying programs afford us wide flexibility to select individual loans and prices that we believe other investors never see. Each buying program is bespoke to the data set, model, and platform.

### Franklin Templeton digital lending

It is no secret that global crises tend to transform markets, as we have seen with the evolving digital lending landscape. By using narrow credit criteria, the traditional loan approval processes can overlook a large portion of individuals, creating an opportunity for alternative solutions. Technology innovations birthed the early peer-to-peer model, connecting online borrowers with retail investors before shifting to mostly institutional buyers. To differentiate themselves, digital lenders now use alternative data to measure a borrower's creditworthiness, accelerating innovations in data storage, procurement, and analysis.

Franklin Templeton's digital lending team understands that data science and machine learning not only help us identify attractive investment opportunities, but they also support greater access to credit for borrowers. Our approach combines high-resolution risk pricing via proprietary machine learning with human insights from our credit professionals and portfolio managers. Through strategic partnerships, our team supports the shift from a narrow credit evaluation process to one that improves the lives of lenders and borrowers with technology and innovation.

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## Endnotes

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