Credit Scoring in the United States

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cial hierarchies, political struggles for economic inclusion, and power dynamics between consumers and corporations. The public policy debates presented here reflect long-time problems in U.S. lending, especially racial bias, as well as novel issues about how credit scores do—or do not—capture individuals, and the visibility of scores themselves. The final section continues to locate credit scoring in the larger ecosystem of American life by tracking the spread of credit scores into non-lending domains and detailing rapid expansion in the kinds of data companies use to create scores. The article ends with a discussion of how the techniques, assumptions, and justifications of credit scoring are now being replicated throughout the consumer economy as the commodification of personal data enables the mass adoption of algorithmic prediction.

Introduction

Credit scoring is the paradigmatic example of algorithmic governance (Fourcade and Healy 2017; Pasquale 2015). Corporations take information about thousands of individuals, data mine it for patterns that predict people not repaying their loans, and then make decisions about future lending—who gets money, how much interest they pay—based on variables that predicted default in the past. This is not the only way to make lending decisions, but in the U.S. it has become the dominant one (Mays 2001). This article explores how that came to be the case and the ramifications it has had in order to provide a window onto the credit-centric U.S. economy and an illustration of how predictive algorithms take hold.

The article proceeds in four parts. The first section presents an historical overview of the rise of consumer credit data and early attempts at evaluating creditworthiness quantitatively. This section shows that credit scoring sits atop a complicated social infrastructure that took generations to construct (Guseva and Rona-Tas 2001). Only when personal information was sufficiently standardized, computerized, and rendered objective could scoring systems function at scale and achieve widespread legitimacy. The second section maps out how credit scores facilitated some of the 20th and early 21st centuries' greatest financial innovations. Yet at the same time, credit scoring and its close companion, risk-based pricing, helped undermine basic precepts of sensible lending and paved the way for financial firms to recklessly prioritize profit over loan repayment.

The third section of the article zooms out and starts to consider how credit scores intersect with so-

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Historical background

The story of credit scores in the United States begins in the late 19th century when East Coast businessmen created the nation's first consumer credit bureaus (Lauer 2017a). Credit scores themselves would not come along for another hundred years, but the long history of consumer credit information in its raw form brought important practices that laid the groundwork for the ascent of credit scores.

In 19th century America, retail life underwent great transformation, as it did in Europe (Calder 1999; Miller 1981). Merchants who had historically been embedded in the same communities as those to whom they extended credit increasingly lacked social ties to the people they let take merchandise ahead of payment. The rise of the department store, mail-order catalogs, and other innovations in mass consumerism meant that retailers had less information about their customers, which made it difficult to solve the thorny problem of deciding who to trust—of judging whether a particular individual was likely to pay off their balance (Carruthers 2009; Guseva and Rona-Tas 2001).

In the 1870s and 1880s, merchants started banding together through trade associations to share lists of delinquent and non-paying customers. Around the

same time, independent businessmen launched the nation's first consumer credit bureaus. These organizations collected information about individuals to sell to retailers, as well as to landlords, employers, and anyone else who might be interested (Lauer 2017a; Stuart 2003). Agents asked around about individuals' debts, as well as other details that might reflect on moral character, such as drinking and gambling habits (Lauer 2008; Sandage 2005). The premise: third-party information could speak to a person's trustworthiness just like direct social connections could.

This arm's length approach to information, the kind that would later support credit scoring at scale, was not the only solution companies came up with. The late 19th and early 20th centuries also saw the emergence of credit managers within department stores and mail-order companies (Lauer 2017a). The methods of these managers reflected long-standing beliefs about the importance of assessing borrowers' moral character, since just because a person can repay does not mean that they will. Credit managers met with applicants to ask about their financial and personal affairs, as well as to observe their comportment and dress (Lauer 2017b; Marron 2007). Advances in filing technology and record-keeping helped retailers systematically store and recall the data they gathered, and the spread of telephones made it easier to access the information credit bureaus collected (Lauer 2017a). Credit information was thus increasingly well-ordered and portable, important steps toward the development of scoring.

The first quantitative approaches to credit assessment appeared in the 1930s. Certain retailers, most notably the Chicago mail-order outfit Spiegel, as well as some banks and finance companies, introduced points-based systems for anticipating who would and would not pay their credit charges. Firms took information from credit applications and assigned points for a person's occupation, marital status, race, income, neighborhood of residence, and more (Capon 1982; Lauer 2017a; Marron 2007). Professionals earned more points than laborers, home owners more than renters, and so on. Companies then offered credit to those whose total passed a pre-set threshold. These early efforts at quantification marked the first steps away from a character-centric understanding of who was creditworthy, although as Lauer (2017a) notes, the designers of these points-based systems partly chose which characteristics to include based on what they thought indicated moral fiber.

The first application of statistical methods to the question of who would repay a loan is typically cited as a 1941 report from the National Bureau of Economic Research, a non-profit research outfit (Anderson 2007; Marron 2009; Poon 2007). In it, doctoral student David Durand used a relatively new technique called discriminant analysis to analyze installment loan data from several dozen banks and finance companies. Some of the loans were "good" (i.e., being paid on time) and some were "bad" (i.e., delinquent or in default). Durand's task was to figure out which traits of borrowers best predicted the bucket loans would wind up in (Durand 1941). Fellow academics found the results interesting—down-payment size mattered more than income; women were better risks than men—but the approach was largely ignored by industry (Lauer 2017a; Sowers 1942).

Indeed, it took a lot of hard work to convince lenders to give credit scoring a chance (Lewis 1992). The company Fair Isaac, purveyor of the now-ubiquitous FICO credit scores, could barely muster interest in the late 1950s when it pitched the idea to 50 banks and consumer finance companies. Only one, the American Investment Company, responded, and for being game they got Fair Isaac's first custom-built scorecard, an easy-to-use decision-making rubric produced from a statistical analysis of the company's lending successes and failures (Poon 2007). Part of the resistance to credit scoring was cultural. Credit managers were loath to give up the idea that character assessment was the cornerstone of smart lending (Lauer 2017b). But there was a difficult technical reality as well. A large part of what Fair Isaac did in its early years was laboriously collect, organize, and digitize loan records kept on paper (Poon 2011). Before credit scoring could take off, personal data had to be computerized on a mass scale.

That began to happen in the 1960s, when organizations of all sorts—insurers, government agencies, health care providers, and so on—started to computerize the records they kept about individuals (U.S. Privacy Protection Study Commission 1977). Talk about the power and dangers of "data banks" became a national obsession, and Congress held a series of hearings, including one, in 1968, about consumer credit bureaus (Miller 1971; Warner and Stone 1970). The hearing included testimony from Harry Jordan, president of Credit Data Corporation, a California credit bureau that in 1965 had computerized all of its Los Angeles records—unheard of at the time—with an eye to growing the volume of data it could handle and expanding nationally (Rule 1974). By the time Jordan appeared before the House's Special Subcommittee on Invasion of Privacy, the company had computerized records on 20 million Americans. When Jordan said it took just two minutes to retrieve the contents of any of those 20 million files, members of the committee thought he was joking (U.S. Congress 1968).

An important shift on display at this hearing and the others which followed was that as credit bu-

reaus aggregated and computerized personal information, they rationalized it as well. Using standardized categories and codes—such as ones to mark late payments as 30, 60 or 90 days behind—made it easier to collect and share data among thousands of lenders. It also funneled credit records into a format conducive to quantitative manipulation (Kiviat 2017; Liberti and Petersen 2019).

This enabled a growing distinction between data and analytic methods that were objective and those that were subjective or judgmental. As Harry Jordan told Congress, his company had no use for "qualitative opinion" (U.S. Congress 1968). The U.S. government reified such differences in new law and regulation. The Fair Credit Reporting Act of 1970, for example, labeled consumer reports that included insights from interviews, the stock-and-trade of credit managers, as "investigative" and applied additional restrictions (Fair Credit Reporting Act 1970). And in implementing amendments to the Equal Credit Opportunity Act of 1974, which banned using race, sex and other personal traits in lending, the Federal Reserve drew a bright line between "statistically sound" ways of making lending decisions and everything else. The government presented credit scoring as a way to make decisions consistently and without human prejudice, which pushed lenders toward credit scores as a strategy for deflecting accusations of discrimination (Capon 1982; Hyman 2011a).

By the end of the 1970s, when Fair Isaac president Bill Fair appeared in front of Congress, he was able to report that lenders used scoring in 20 to 30% of all credit decisions (U.S. Congress 1979). Credit scores were well on their way.

Changing business models and understandings of creditworthiness

Credit scoring changed the nature of existing lending decisions, but it also facilitated new business models and ways of thinking about who in society ought to have credit. In the context of the broader U.S. political economy and its increasing reliance on personal borrowing to provide for social welfare (Calder 1999; Trumbull 2012), it is difficult to say how much credit scoring increased lending overall (Federal Reserve System 2007). Nonetheless, certain characteristics of credit scoring, such as its scalability and seeming impartiality, put it at the center of some of the biggest changes in consumer lending over the past half-century, including those related to credit cards, risk-based pricing, mortgage lending, and securitization.

The first general-purpose credit cards—those not tied to a single retailer—appeared in the U.S. in the 1950s and 60s. In 1970, 16% of U.S. households had such a card, a figure that grew to 68% by 1998 (Durkin 2000). While a number of factors, including interest rate deregulation, contributed to the growth of credit cards, credit scoring brought something crucial to the table: a faster, cheaper way to screen applicants. In the early 1970s, it took Bank of America about a week to decide whether to grant a person a credit card (Rule 1974). Staffers reviewed information on the application (income, education, bank accounts, current loans, etc.), pulled credit reports to look for negative marks such as defaults, bankruptcies, or tax liens, and, in some cases, called creditors and employers to fill out the picture of the applicant. With credit scoring, screening applications became quicker, cheaper, and more consistent.

Credit scoring also fueled a novel approach to lending: offering people credit when they had not asked for it. Early on, credit card issuers mailed people unsolicited cards (without enough cardholders, merchants will not sign up), but this often led to high default rates, since issuers did not have a good sense of the people they were soliciting (Guseva 2005). Issuers sought guidance from credit bureaus like Equifax and TRW (today, Experian), but how they did this—by querying bureaus with rules about who to include and exclude—was a blunt approach that eliminated many potential customers (Mierzwinski and Chester 2013; Poon 2007). The creation of a new type of credit score, one produced exclusively with credit bureau data, made this pre-screening process fine-grained and precise. Lenders could simply specify cut-off points for the scores, which had, effectively, become a tool of marketers (Poon 2007)

These "bureau" scores, which credit bureaus sometimes created in conjunction with Fair Isaac, marked another important development in that they only used bureau data. Lenders could now extend credit with literally no first-hand knowledge of a person. The social disembedding of credit was complete. Using only bureau data also meant the scores did not include the types of information lenders normally collected on applications, such as income and occupation (Hyman 2011a). Bureau scores thus eased the way for the idea that credit scores capture how people behave—whether they borrow a lot, repay their loans, etc.—and not where they stand in society.

Perhaps the most far-reaching change credit scoring facilitated was the rise of risk-based pricing, first in credit cards and auto loans, and then in mortgage lending, during the late 1980s and 1990s (Staten 2015). With risk-based pricing, a lender offers people different interest rates and loan terms based on how

likely the lender thinks they are to default. Credit scoring statistically sorts people into hundreds of groups, which helps discern a broader range of possible offers (Johnson 2004). The larger shift, though, is in the paradigm. A decision that used to be about whether or not to lend a person money becomes a decision about the terms under which to lend (Marron 2007). Instead of avoiding high-risk borrowers, lenders embrace them, albeit at a high price. Credit scoring brings more people into the market and expands the definition of who is "creditworthy," but at the same time it demarcates new moral boundaries, such as the one between "prime" and "subprime" borrowers.

Importantly, default risk is not the only thing scoring can predict. Even if a borrower is calculated as unlikely to repay a loan, they may still prove a useful source of revenue from interest charges, late fees, and other products they buy down the road. That is to say, the chance that a customer defaults and the chance that a customer is profitable are two different things.

Since the mid-1990s, credit scoring has increasingly been used in this way, to predict and price in line with customer profitability (Marron 2009; Thomas 2000). The shift is a significant one, because it changes who companies see as valuable customers. High-risk borrowers who default are undesirable, but low-risk customers, who now pay little in interest, may be as well, especially if they fail to buy additional products or are quick to switch to competitors offering better deals. As Anderson (2007, 514) explains in his credit scoring textbook: "The ideal customer could then be described as someone who has a high ongoing balance, misses the odd payment but does not default, takes out credit insurance, and probably has a low bureau score. Indeed, they are often the messiest, and closest to the cliff's edge." This is the outlook that encouraged huge amounts of subprime mortgage lending in the 1990s and 2000s (Langley 2008).

That said, the central role of credit scoring in mortgage lending began not with lenders looking to maximize profit, but with government officials looking to make the allocation of home loans more consistent and fair. Since the 1930s, the U.S. government has played a key role in mortgage lending by buying loans from lenders so that they do not have to wait to be repaid to lend again. This means the government needs a way to evaluate (control, really) loan quality. In the 1990s, the housing agency known as Freddie Mac set out to make evaluations more consistent and reliable and, in a momentous decision, decided to do this in part by using FICO credit scores to classify loans. This was not the only way the agency could have achieved its goal, and in fact the decision, announced in a letter to lenders in 1995, caught Fair Isaac off guard. Overnight, Freddie Mac institutionalized the use of credit scoring in mortgage lending, alongside long-time metrics such as loan-to-value ratio, and established a FICO score of 660 as the dividing line between prime and subprime loans (Stuart 2003; Poon 2009).

One of the most consequential aspects of mortgage lenders' mass adoption of credit scoring was how it greased the wheels of private-sector mortgage securitization in the early 2000s—and the housing finance crisis that followed. The U.S. government had long securitized mortgages, which involves pooling loans and then selling off shares that entitle investors to a portion of what homebuyers pay in interest and principal reduction (Quinn 2019). In the hands of government, this is a way to add liquidity to the mortgage market. In the hands of Wall Street, it was a way to profit off of quickly rising house prices and drive demand for high-yield loans while plausibly claiming that risks were being properly managed. Credit scores contributed to this system by acting as highly legitimate, easy-to-articulate signals of loan quality (which bond-rating firms like Standard & Poor's demanded)—credentials, essentially (Raiter and Parisi 2004). And they contributed to its collapse by failing to fulfill their promise of accurately predicting how loans would perform in the future (Rona-Tas and Hiss 2010). For credit scoring to work, the future must resemble the past, and when that is not the case, scores do not predict.

While credit scoring is central to U.S. lending, there is important nuance to note. Not all lenders use credit scores, not all lenders that use credit scores rely heavily on them, and credit scores are still subject to human interpretation and discretion. There are plenty of ways to borrow in the U.S. without crossing paths with a credit score—from the federal government to pay for college, from a pawn shop in exchange for collateral—and some types of loans give more weight to scores than others.

Moreover, in many situations, lenders can discount the significance of a credit score in light of other information or intuition (Stuart 2003; Anderson 2007). Studying lending at banks, credit unions, and community development organizations, Moulton (2007) finds that lenders often try to get the story behind a credit score, especially when it is middling or low. In addition to deciphering if extenuating circumstances are at play, lenders draw on behavioral clues that speak to personal character—showing up on time, being polite—in order to contextualize scores. "Bad numbers," Moulton (2007:322) writes, "do not look as 'risky' when they are attached to 'good people'" (see also, Kiviat 2017; O'Brien and Kiviat 2018). To a first approximation, credit scoring systems are mechanical. In practice, human judgment can easily reappear.

Bias, exclusion, and visibility

Consumer credit is not only about lenders figuring out whom to trust and how to make money when not everyone repays their loans. Acts of borrowing and lending also reflect and are shaped by social hierarchies, political struggles, power dynamics, and cultural understandings (Graeber 2001). In the U.S., where borrowing is typically seen as a pathway to self-betterment, questions of credit have often intersected with debates about racial and gender equality, and the importance of individuals being able to fully participate in markets (Quinn 2019; Trumbull 2012). As credit scoring has played an ever-greater role in the allocation and pricing of credit, scoring has been drawn into these debates, at times cast as a solution to long-standing problems and at times as a practice that quietly perpetuates them.

The U.S.'s shameful history of racial segregation and discrimination looms large in credit markets (Pager and Shepherd 2008). Lenders, often aided by government, have systematically denied African Americans loans that might have helped start businesses or invest in property, and steered minorities to borrow under high interest rates or other unfavorable conditions (Satter 2009). Early points-based systems for quantifying loan decisions codified the notion that blacks were less creditworthy by using race as a criterion and granting minorities fewer points. Into the early 1970s, lenders routinely used an applicant's race, both to allocate points—in one example, 7 for being white, 4 for being Hispanic, 0 for being black—and to flag applications for extra scrutiny (Hyman 2011b).

Access to credit emerged as a civil rights issue in the 1960s, for minorities as well as for women, whom lenders marginalized in other ways, such as by requiring a husband's permission to borrow (Krippner 2017). Formally, such unequal treatment ended in the mid-1970s with the passage of the Equal Credit Opportunity Act. The new law banned lenders from considering certain types of information, including a person's sex, marital status, race, and national origin. The hitch, as policymakers discovered, was that lenders could still use information correlated with prohibited traits (Hyman 2011b; U.S. Congress 1979). Postal codes, for example, acted as proxies for race, which effectively preserved the influence of race in lending decisions (Cohen-Cole 2011). Credit scoring, with its broad use of data and opaque statistical models, did not do away with such proxies, but it did make them harder to identify (Citron and Pasquale 2014).

The problematic connection between race and credit has not gone away. In 2007, 52% of blacks and 30% of Hispanics had credit scores in the lowest two deciles of the credit-score distribution, compared to only 16% of whites (Federal Reserve System 2007). Yet the evolution of credit scoring has made these and other disparities easier to wave away by cementing the idea that creditworthiness is something people can control.

Over time, scores have increasingly relied on data about financial behavior—whether a person repays loans promptly, opens and closes credit cards, gets close to credit limits, borrows from different types of lenders, etc. Industry portrays these actions as decisions individuals choose to make, even though larger social forces may sit in the background (Gandy 2009). It is harder to maintain good credit when one faces precarious work, has no wealthy family members to turn to in emergencies, is sold predatory loans, and otherwise experiences the disadvantages minorities in the U.S. disproportionately do (Bradford 2009; Rugh and Massey 2010). Credit scores may seem to simply capture how individuals manage their finances, but that is only because social complexities do not show up in a person's score, a single number in which underlying inequalities "magically disappear from view" (Espeland and Stevens 1998; Fourcade and Healy 2013, 565).

In the mid-2000s, U.S. policy discourse around fair access to credit took a significant turn with the emergence of the idea that a core inequity of the system is that some people lack credit scores. About 26 million Americans do not appear in the files of the major credit bureaus (Equifax, Experian, and TransUnion), and an additional 19 million have files that are either too sparse or too old to calculate a score—so-called credit "invisibles" and "unscorables" (Brevoort, Grimm, and Kambara 2016). These people may have never borrowed, borrowed from lenders that do not report into credit bureaus (e.g., small banks, family members), or repaid borrowed funds long ago.

To make such people visible, a broad coalition of credit scoring companies, lenders, legislators, and financial regulators began working to supplement credit bureau files with additional sorts of information, such as bill payment records from utilities, cell phone providers, landlords, and cable television companies. The goal: to draw in enough new data so that people could be scored and, ostensibly, get the loans they needed but were going without (Turner et al. 2006; Wherry, Seefeldt, and Alvarez 2019). These efforts followed an earlier, international movement to expand the reach of credit registries (Miller 2003), though in the U.S. the endeavor took on a particularly moralistic flavor, with frequent claims that credit invisibles and unscorables were not getting the credit they *deserved*.

This re-framing of not having a credit score as a social problem further institutionalized credit scoring

as an official marker of creditworthiness. It also focused policy attention in a way that benefited large financial firms looking for new customers and sidelined other ways of thinking about financial inclusion. Having a credit score is not the same thing as having access to safe and affordable credit. In fact, a subprime score is a quick way to attract the sorts of loans that often get people in trouble (Wu 2015). Moreover, defining the public policy goal as the creation of scores leaves little room for conversations about whether some people would rather not be surveilled by consumer credit companies and why it is so hard for scoreless (or any other) Americans to get the goods and services they need without resorting to taking on debt.

While companies have long been eager to expand the information they have about consumers, they have until recently resisted individuals knowing much about the files they keep and the scores they generate. At a 2000 Congressional hearing on whether companies should have to disclose credit scores to consumers, one Congressperson after another argued that people ought to be able to see their scores and an explanation of why they were low or high, so that they could take steps to improve them and have power in negotiating loan terms. This approach to consumer protection—helping people be better market participants by eliminating an information imbalance that would, as one Senator put it, "make Adam Smith turn over in his grave"—spanned the political spectrum (U.S. Congress 2000, 7). Fair Isaac worried that if consumers knew how scores were calculated, they would game the system and make scoring less predictive (Marron 2009). But a California law requiring disclosure pushed the issue forward, and by 2003, Congress, too, mandated that consumers get to see their scores, albeit for a price.

One of the consumer data industry's concerns about disclosure was that people do not have just one credit score. In fact, a person might have dozens or even hundreds, since lenders use various combinations of data and algorithms (Clemans 2013). Moreover, companies use scoring to predict different things. That complicates the idea that people can find out their scores and then take steps to improve them. A profit-scoring model, for example, might show a high score because a consumer is likely to miss payments and incur penalty fees, but this does not mean that consumer will get good terms on a new loan—in fact, quite the opposite (U.S. Congress 2000).

Selling consumers their credit scores and reports is now a billion-dollar business. Yet multiple studies have shown that even "educational" scores designed specifically for consumers can vary quite a bit depending on where they come from. A Fair Isaac score is different than one from VantageScore, a rival scoring company created by the three major credit bureaus, which differs again from the scores individual bureaus produce (Consumer Federation of America and National Credit Reporting Association 2002; Consumer Financial Protection Bureau 2011; 2012). At times, differences are large enough to knock a person from prime borrowing into subprime. Consumer advocates and policymakers chide industry for such outcomes, arguing that it reflects inaccuracies in the data and leaves people not knowing where they stand.

The reality, though, is that variation is a feature of the system, not a bug. Credit scores speak to whether a person is likely to behave in a way a company wants him to, and different companies want different behaviors from different people at different times. Credit scores get attached to particular individuals, but that obscures the fact that scores are relational, reflecting both borrowers' past actions and financial institutions' current objectives. Risk scoring does not just detach the idea of creditworthiness from notions of moral character. Risk scoring detaches the idea of creditworthiness from any stable meaning at all.

The proliferation of credit scores and the future of data

In the U.S. today, it feels like credit scores are everywhere. Fair Isaac advertises during the national football championship to remind people to check their credit scores at MyFico.com (Poon 2012). Bank statements and credit card bills arrive with scores prominently printed at the top. The *New York Times* even reports that people ask about credit scores on dates (Silver-Greenberg 2012). Credit scoring—as a practice and as an idea—continues to expand its reach over Americans' lives. This final section explores three main ways that is happening. First, companies besides lenders are using credit scores to make decisions. Second, novel sorts of data are being drawn into credit score calculations. And third, the lending industry's blueprint for risk scoring is being adopted far and wide as the commodification of personal data enables countless new algorithmic predictions throughout the consumer economy.

Information gathered by credit bureaus has long been used beyond lending. Credit bureaus have sold their files to employers and insurers for more than a century, uses that were codified as "permissible" in federal law in 1970. Since lenders began scoring, the practice has migrated to other industries, facilitated by many of the same factors, including easier access to data, advances in statistics, and product-development

savvy at firms like Fair Isaac. These days, car insurers use credit scores to predict who will file insurance claims; landlords to gauge who will make rent; utility companies to anticipate who will pay the bill on time; hospitals to decide whose debts to try to collect; and more (Fremstad and Traub 2011; Rosenberger, Nash, and Graham 2009).

All of this "off-label use," as Rona-Tas (2017) calls it, brings the potential for cumulative disadvantage. A person who falls behind on loan repayments is now not only charged more for future loans but is also charged more for auto insurance, required to pay a large deposit to rent an apartment (or denied it altogether), looked at more skeptically by potential employers, and faced with other challenges in non-lending markets. Through the sharing of data and spread of scoring, starting disadvantage (or advantage) in one domain of life carries over to others (Gandy 2009; Maroto 2012). Rona-Tas (2017) points out that this is especially pernicious since credit bureau data are riddled with omissions and mistakes. Policymakers and consumers have pushed back against some of these non-lending uses, but companies have averted major regulation with the argument that credit scores help predict behavior they are justified in predicting, such as whether a person will file an insurance claim (Kiviat 2019).

Credit scoring is also expanding its reach as lenders pull additional types of personal data into the scores they use to allocate and price credit. Consumer loan balances are at a high, and new data are a way to keep selling loans by scoring people who previously were not scored and by upselling those who have already borrowed (Andriotis 2018). Major players like Equifax, Experian, Fair Isaac, LexisNexis, and TransUnion are supplementing their scoring models with information about individuals' bank account balances, cash flows, and bounced checks; utility, cell phone, and rent bill payments; employment and residential history, tax data, income, home values, and much more. Technology entrepreneurs, many of whom got into credit scoring as a way to put newfound data assets to use, are integrating even more far-flung information. Credit scoring models now might include information about college major, social media connections, and occupation; cell phone use, including how long people talk and at what time of day; the ways people use their computers, including how quickly they scroll through terms of service and whether they fill in forms in all capital letters; and much more (Deville and Velden 2016; Hurley and Adebayo 2016; Koren 2015; Reisinger 2015).

Credit scores thus increasingly rely on a person's socioeconomic status, lifestyle, and habits, the exact sorts of information that went out of favor in prior decades. The use of such data can be controversial, but companies defend their innovations by evoking images of scientific rigor and objectivity—algorithmic predictions produced from thousands of variables and the latest machine learning techniques. At the same time, credit scoring executives moralize people for the way they show up in the data. A person with worse grades in school is less likely to take his financial obligations seriously; canceling a prepaid wireless phone may indicate a person is trying to disappear from those he knows (Hardy 2015). This rhetorical combination of claiming both scientific and moral standing is a powerful one in establishing new practices as legitimate.

Policymakers are trying to figure out how to fit new sorts of data and models into existing regulations, but so far there are no clear answers. The Fair Credit Reporting Act, one of the U.S.'s few data privacy laws, requires companies to tell consumers when their credit files contribute to an "adverse action," such as being denied a loan, insurance policy, or job, as well as the main reasons why. As credit scoring models become more arcane, giving an understandable answer as to why a model produced the score it did becomes increasingly difficult, if not impossible (Brainard 2018). And as information sources become more dispersed, it is not obvious how consumers can dispute inaccuracies in the data, another legal requirement.

Yet what is perhaps weightier than the expansion of credit scoring is the diffusion of the *idea* of credit scoring. Credit scores are not only financial and technological objects but cultural ones as well. Predictive analytics are in vogue, and the well-known credit score provides an easy mental model for how decisions can be reconstituted as problems that statistical analysis and consumer data can solve. For example, when Fair Isaac launched a new score to predict whether patients would take their medications as prescribed—of great interest to insurance companies—the company's CEO explained: "We started thinking about how do consumers behave as patients. The problem, from a math standpoint, is not all that different from banking and other industries" (Parker-Pope 2011). To predict health behavior, Fair Isaac imagined patients as consumers and built a model from information about things like whether or not people own cars.

Credit scoring embodies particular epistemological assumptions and moral worldviews, and as the logic of credit scoring spreads, so do those principles. Credit scores teach that the right way to think about the future is to look at the mathematical patterns of the past; that the relevant standard is correlation, not causation; and that the important types of information to pay attention to are those which are easily rendered into discrete, quantitative fields. Moreover, the legiti-

macy of credit scoring rests on a particular rendering of fairness in which it is fine to decide what people get based on how other people have behaved (Kiviat 2019). This is the cultural apparatus of credit scoring, the beliefs that justify letting consumer-data-fed algorithms slot people into positions of market advantage and disadvantage (Fourcade and Healy 2013; 2017).

Finally, the culture of credit scoring trains individuals that the key to getting additional or better things from the market is to shore up one's own behavior. Scores are objects that elicit reaction (Espeland and Sauder 2007), and once people know their credit scores, they start behaving more as lenders would want them to (Homonoff, O'Brien, and Sussman 2019). Individuals often cannot recognize themselves in their scores, thinking that they are more creditworthy than the number suggests for reasons not captured in the official data. Yet the reaction to this is not resistance, but a doubling-down on actions that might boost scores (Kear 2017; Wherry et al. 2019). Credit scores, and the algorithmic predictions that follow in their footsteps, render knowledge of the world in ways that suit corporations and other large organizations. This is among the many reasons why it is important to study credit scores closely and see where they go next.

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