

UNIVERSITY OF CALIFORNIA, SAN DIEGO

What Lenders See –
A history of the Fair Isaac scorecard

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by

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The Dissertation of Martha Ann Poon is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

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PROLOGUE

Voiceover: *“Your home, your family, your life.”*¹

The Sunday championship of the National Football League is the most watched television program of the year. With a viewership of some 90 million plus, it is regarded as the ultimate assembly of a national constituency of mass consumers. A coveted forum for promoting branded products of all kinds, ‘Super Sunday’ is the occasion when the advertising elite clamors to grab the public’s attention. For spectators, even those who are not diehard football fans, the event is eagerly anticipated as the premier showcase for the ad industry’s most expensive, entertaining and eye-popping creations.

The investment in having a product placed at the Super Bowl™ signals a producer’s ambition to sell in volume and to make it big. It is a telling sign of the times, then, that alongside quick-fix pre-packaged comestibles, comfort enhancing household durables and self-actualizing devices, recent additions to the line-up have included an array of financial products promising consumers ‘a piece of the action’². Once the reserve of the well-heeled elite, everyday access to the world of finance through VISA™ credit cards, AmeriQuest™ mortgages, and the personal investment assistance offered by firms such as e-Trade™ and Charles Schwab™ is now also being routinely hawked to the masses.

From within this category of financially oriented ads a peculiar and puzzling spot aired during the fourth quarter of ABC’s coverage of Super Bowl™ XXXVII, held in San

¹ *How Lenders See You* (2003). This ad was created by Space 150, an agency in Minneapolis, and aired during Super Bowl XXXVII, January 26th, 2003. The italicized passages quoted above are from my transcription of the voiceover. A version of the ad is available at <http://www.spike.com/video/2459176>.

² Joseph Nocera, *A Piece of the Action: How the Middle Class Joined the Money Class* (New York: Simon & Schuster, 1994).

Diego in 2003. It is entitled “What lenders see”. Filmed in a palette dominated by lawn greens, muted browns and pastel yellows, the ad features demure images of racially representative nuclear families inhabiting spacious tree lined avenues. A narrator’s soothing voice speaks: *“When making major purchases, there’s a lot you have to think about. And eventually, you’re going to have to think about how lenders see you. Because they determine what you pay for a loan.”*

While suburbanites pose gracefully around sun-flooded, two-story, picket-fenced homes, the scripted promotional text points to what is now a simple truth for the US consumer—that there is a seamless continuity between a materially comfortable way of living and access to consumer credit products to finance those purchases. The purchasing power of contemporary U.S. household as agents within consumer markets, from retail to real estate, is heavily dependent upon their ability to command the instruments of consumer finance. To the detriment of personal savings, these new financial products devour big proportions of monthly incomes.

Surely, however, beyond this presentation of a mundane fact of life, this strategically placed game-day ad offered something of more substance to the cheering masses. What kind of bauble did it suggest that they purchase? What additional product did it incite them to consume? The commercial closes by directing viewers towards a website called ‘MyFico.com’. Promoting one of the rare dot.coms during that year’s football extravaganza, the plainspoken voice assured them that through this portal they would find the tools to ‘gain control of their financial lives’ and to ‘strengthen their futures’. The core content of the site is *“the credit score that lenders use to make their decisions.”*

So subtle as to be nearly dissimulated, the commercial did, then, do more than reflect the obvious. Despite its placid imagery it promoted a unique consumer commodity that was

indeed being unveiled before the public at large. The implicit message was that people need to reach beyond the private boundaries of their own experience if they are to know how they are being ‘seen’ and treated by financial institutions. Yours but not in your possession, of you and up for sale, the artifact accompanying the lived reality of consumer credit is a mass market picture of oneself that mediates one’s place in the credit market.

A permanent companion to the consumer credit industry, a piece of statistically engineered information for differentiating between people, a proprietary three digit score—this is what was being promoted for the first time on national television as an object of mass consumption in and of its own right. What the ad announced was that there is more to borrowing than meets the eye. Your home, your family and your life—the delicate opening line and its accompanying images did not gesture to what lenders see about you, but instead to a disjunction, to what they no longer see and no longer look for.

In a remarkable reversal, the stylized albeit mundane depiction of a culturally valorized upper middle-American way of living portrayed in the marketing vignette does not show the attributes that people must have in order to borrow, but rather a common and hoped for outcome of having borrowed. Strangely designed from the point of view of product placement, the familiar confected images of daily living eclipsed the very novelty of the product being proposed. Present but imperceptible, at work but not seen, credit scores themselves, these rather complicated things to communicate, remain completely absent within the commercial’s appeasing string of visuals.

Had the product been described in all of its complexity, the ad might have appeared to offer the consumer something interesting and wonderful. In the annals of game-day marketing, however, this passive little piece will go down as having created very little stir. At

least one online financial journalist expressed his utter disappointment, retorting that “People are unlikely to remember this commercial or the company that paid millions of dollars for it.”³ If, true to the ad’s title, credit scores are what lenders now see, then it is odd that they should be so difficult to put on visual display. What elusive stuff are these scores made of and why are they obscured from sight?

This transparent little commercial, this seeming non-event disappearing into the vast digital archives of forgotten footage, inadvertently captures and recapitulates an important contradiction in US history. Neither a conventional retail item nor an instrument of finance, FICO[®] scores have become a powerful participant in the production of US consumer credit that have had an important impact in shaping both social and economic life. Yet these scores have been present in much the same way they are portrayed in this, their first public appearance. They have remained largely invisible while carrying out their transformative work right in front of everybody’s eyes.

*

In the US, a person’s credit standing is determined by private enterprise. Data that are analyzed to produce these ratings comes from individualized credit reports compiled by specialized institutions called credit bureaus; the pieces of information that results are called credit bureau scores. Commercially available bureau scores come in many varieties; they are calculated by different teams of statistical analysts and are distributed by a variety of commercial partnerships and organizations. But one trademarked version of a bureau score engineered by a firm called Fair Isaac stands out above the rest. Within the credit industry it has long been recognized that this brand of scores—known as FICO[®] scores—is the *de facto*

³ The quotation is from Dustin Woodard at the website About.com. It is available on the Wayback Machine (an internet archive) at <http://web.archive.org/web/20050918111836/mutualfunds.about.com/cs/v/myfico.htm>.

standard being used by financial institutions to mediate transactions in consumer credit. Sold in distinct versions by the three major competing credit bureaus, it is this specific brand of scores that was released for private consumption as announced in the Super Bowl ad.

Credit bureau scores were almost fifteen years old when they made their debut into US public life, and the techniques for calculating them had existed for nearly half a century. I say this to emphasize that broad-based usage within the credit industries was not enough to drive these scores out from behind the curtain and into the limelight. Since then, FICO (pronounced **Fī-kō**) has become a household word. Although I did not recognize it when I began this research in early 2004, this project is intimately bound up with the work-up to the current upheavals emanating from the financial world, triggered by transformations in the relationship of capital markets to residential US real estate. It is no secret that the city of San Diego, where the price of homes went up an estimated 115% between 1999 and 2005, was a hotspot of turn-of-the-century housing excess. In the early 2000s when I lived there, who was buying what, where and for how much, was a topic at the heart of everyday activity. The roadways were dotted with ‘sign twirlers’ (people hired to point the way to new condominium developments) and the city was flush with the material spoils (the gas guzzling SUVs, the tummy tucks, the freshly grouted marble floors) of inflating home equity⁴. As I can see with hindsight, it is no coincidence that this was the crucial moment in which FICO was able to seep its way into public sight.⁵

⁴ Martha Poon, "Aux Origines Était La Bulle, La Mécanique Des Fluides Des Subprimes," *Movements des idées et des luttes* 58 (2009).

⁵ The following reflection on the way that topics of inquiry can be credited with opening themselves up to us, not only because we pursue them but because they seek to be pursued emerged after translating an essay by Antoine Hennion discussing the reflexive nature of attachment between humans and objects. Antoine Hennion, "Bodies, Things and Attachments," in *IKKM Annual Conference 'Open Objects'* (Weimar, Germany: 2010). Hennion's work on 'amateurs' is a reflection on how, through accumulated experience, people develop a sophisticated ability to appreciate fine distinctions in the qualities of things (music, wine,

The circumstances under which FICO could gain currency outside of the credit industry to become my object of inquiry, and their involvement in the rise of temporary financial formations that would eventually crumble to produce global economic discomfort, are one and the same. As I have documented elsewhere⁶, in a profoundly consequential decision FICO scores were adopted into mortgage underwriting in 1995 by the government sponsored enterprises and hardwired throughout the home mortgage industry with the rise of automated underwriting systems. Previously a backstage technology, scores were betrayed by the mortgage brokers, the very group whose wiliness they were supposed to restrain. Brokers unapologetically pointed the finger at FICO to explain why some expectant homebuyers were being rejected and left out of an historic real estate boom. Following legislation in California in 2000 and under the threat of federal regulation to impose score disclosure nationwide, Fair Isaac keeled to the pressure brought on by the waywardness of its own invention. The company created a fee-for-service web portal so that consumers could access and monitor their individual ratings. The message that was soon being pumped out over broadband and airwaves was *'Know your score!'*

This dissertation should be read as a historically situated response to this injunction, although it is perhaps not the kind of reply that was anticipated by the call. What a multi-million dollar ad attempted to achieve in a mere 30 seconds—to expose at once the accumulated significance of this evolving information entity and to convince the public to be interested in it—is undertaken here in a more ample and academic format. Lenders make

mountains). On a second level his work might also be read as a methodological injunction for how social scientists should learn to relate to their objects of research, by modeling themselves after the attentive practices of testing and discovery that he observes in amateurs.

⁶ Martha Poon, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance," *Accounting, Organization and Society* 34 (2009).

decisions about consumers, consumers make decision about credit products, and all parties involved in the whirling flow of consumer goods and financing instruments through middle-America, or so it is imagined, are purchasing brand name credit bureau scores. Elements of this description were temporarily achieved just after the century turned, but the scene itself does little to explain how this peculiar set of connections between people, choices, numbers and things has been so intricately configured. In the wake of the recent financial upheavals, this research begins to trace how commercially produced credit scoring technology has, over half a century, dramatically reengineered the US consumer credit industries into their distinctive and uniquely prolific form.

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ABSTRACT OF THE DISSERTATION

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In the United States, a person's credit standing is determined by private enterprise through a numerical assessment of risk called a FICO[®] score. The basic technology behind this scoring system is a device called a 'scorecard' which was designed by the operations research firm Fair Isaac & Company Incorporated (Fair Isaac) in the late-1950s. The scorecard is a prime illustration of how military-inspired practices were adapted to manage civilian enterprise in the post-war period. Drawing upon insights from social studies of science, technology and finance as well as from business history, this dissertation chronicles Fair Isaac's efforts to introduce computer-assisted statistical techniques for screening credit

applications to department stores and finance companies. Instead of treating risk assessment as a set of universal technical standards, the research examines how Fair Isaac labored to build a commercially viable technology that would work in everyday business conditions. The research finds that Fair Isaac has repeatedly shifted its development criteria to respect socially, commercially, and politically imposed mandates. The empirical chapters cross-reference the recollections of former Fair Isaac employees with documentary evidence, and recapture four moments in a long-term process of problem solving and reengineering. In its first twenty years, Fair Isaac set up a process for manufacturing scorecards from paper records (Chapter 1); redesigned the technology so buyers did not bear the costs of implementation (Chapter 2); prepared customized products that reflected the unique policy structures of financial institutions (Chapter 3); and battled regulators over political definitions of discrimination (Chapter 4). Together, these stories demonstrate that risk assessment is not a simple substitute for assessing individual creditworthiness. The original scorecard was a piece of office equipment whose purpose was to mechanically reproduce a previous pattern of performance outcomes. The tool provided creditors with customized ‘operating information’ that projected rates of default given the way each firm processed its credit cases. The dissertation concludes by discussing the relationship between privately-engineered systems of control, internal operating consistency, and the rise of financial predictability. It challenges the claim that FICO[®] scores evaluate the quality of individual consumers and offers an organizational understanding of consumer credit risk.

Introduction

There is no such thing as Financial Revolution, and this is a dissertation about it.

The spirit of this sentence is borrowed from one of the great works in the field of science studies. In *The Scientific Revolution* (1996), historian Steven Shapin revisited a well worn story to show that what has been called a revolution in history books was not an instantaneous triumph of modernity. “The past is not transformed into ‘the modern world’ at any single moment” he told us, and so “we should never be surprised to find that seventeenth-century scientific practitioners often had about them as much of the ancient as the modern; their notions had to be successively transformed and redefined by generations of thinkers to become ‘ours’”⁷. By claiming to be a revolution, modern ways of knowing were said to have unshackled themselves in one blow from other places (the primitives) and from their own origins (the ancients). Revolution was politically expedient shorthand that once allowed historians to ignore the gradual processes through which enlightened practices,

⁷ Steven Shapin, *The Scientific Revolution* (Chicago: University of Chicago Press, 1996), p. 7.

at first deeply entangled in older ways of doing, were slowly, over centuries, worked out.

Like historians, social scientists have also been engaged in a thoroughly modern project that inherits from the narrative tradition of revolution. Big picture scholarship that points to rupture—revolutions (leap forward in progress) but also crises (deviations from progress)⁸—remain among the most valorized works in social scientific research. However, in the stories I am about to tell, the early innovation of one particular financial technology has been anything but revolutionary. As the prologue suggests, credit scoring’s development has been nearly invisible, compelling evidence of its mundane and altogether unremarkable ascent. As I will show, Fair Isaac’s original technology— called a scorecard— was certainly creative, but it did not immediately overthrow the mechanisms of lending that had already been established within the consumer finance industry. Once the fledgling prototype was introduced, it had to be relentlessly adapted and readapted, to respect the organizational and political landscape of mid-century lending.

Credit scoring can nonetheless be situated within a broader movement of managerial change that has already been characterized as a major historical rupture in books such as *The Control Revolution* (1986) by James R. Beniger or *The Coming of Post-Industrial Society* (1973) by Daniel Bell⁹. In its simplest definition, credit scoring is an algorithmic machine that provides

⁸ Anthropologist Janet Roitman has written a groundbreaking essay that exposes the status of ‘crisis’ as an ‘enabling blindspot in the production of knowledge’ within the social sciences. Through a sensitive exploration of the concept’s patchwork history she shows how positing crisis founds the possibility of critique, of judging where we are in relation to time, even though we ostensibly no longer believe in the teleological progress of history. Roitman’s conclusion is that social scientists should become mindful of the contradictions that inhere in claiming there is crisis; because although this position generates a huge body of scholarship, it is also severely constricting our ability to consider other, important political possibilities. Her remarks are particularly astute with regards to the treatment of recent events in the financial system which have spawned a ‘veritably industry of crisis literature’. Janet Roitman, *The Anti-Crisis* (Durham: Duke University Press, 2012, Forthcoming).

⁹ Daniel Bell, *The Coming of Post-Industrial Society, a Venture in Social Forecasting* (New York: Basic Books, 1999), James Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Cambridge, MA: Harvard University Press, 1986).

information to enhance decision making with regards to institutionally provisioned consumer credit. In the universal museum of human artifacts (an archival dream which, as we know, will never be attained) the scorecard will be categorized as ‘information technology’. It will be shelved in the liminal space between the end of ‘The Industrial Era’ and the rise of ‘The Information Age’.

This dissertation extends to business history the work that science studies began with the sciences. Just as the field of science studies has rethought the history of science, I would like to reexamine how business—specifically the business of financing consumers—is being transformed through long-term developments in information technology. To challenge the notion that we have undergone an abrupt shift from industrial productivity towards an information-based, and by extension, financially-oriented economy, I try to retrace how change has been engineered: in slow motion. Describing historical continuity is a distinct form of narrative form rupture, which requires that we draw a stark comparison between the current situation and the way things were at some point we fix in a mummified past. The process I want to show does not depend upon setting up this kind of contrast.

The overarching object of my research is the long journey from the introduction of a technical prototype to an industry-wide information infrastructure. To this end, I analyze scoring technology as a process; not a break with the past, but as a fragile novelty that gets built up into a robust system by being repeatedly modified and reworked. The main finding of this work is that the infrastructures of contemporary financial production—exemplified by the U.S. credit scoring system—are still, in many ways, as bound up in the heaviness of

our industrial past as they are in the weightlessness of our digital present¹⁰. I will describe how the scorecard was crafted through a process of line manufacturing, and how it was designed for a sector mired in the physical and ethical conditions of industrialism. Made by industry for industry, the Fair Isaac scorecard is a technology with solidly industrial origins.

Just as there was no scientific revolution, and there was no industrial revolution; there are no revolutions in finance either. But even in the absence of financial revolution there is historical motion—ways of financing people and projects are constantly being challenged, modified and displaced. Today’s financial system is neither a radical departure from the way things were once done, nor a mere amplification of techniques of financing that existed in the past. Rather, as I will show, the system of U.S. consumer credit has been developed through changes introduced to the industry’s core operating practices. I will conclude that an incremental process of engineering new information-based managerial technologies in the post-war period is the *mechanism* by which contemporary financial value is pulling and tugging itself out from previous modes of industrial productivity.

The U.S. consumer credit scoring system

Credit scoring technologies are used in the consumer credit departments of financial institutions all over the world, and consumer finance managers are awash in risk calculations produced through a variety of statistical techniques. What is unique to the United States is

¹⁰ This claim is not new. Historian of information JoAnne Yates has already demonstrated how the past survive in the future in her work documenting how information systems were introduced to the insurance business. JoAnne Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*, ed. Philip B Scranton, *Studies in Industry and Society* (Baltimore: Johns Hopkins University Press, 2005). My research takes her work on the transfer of information technology into business as a firm starting point from which to address a question about the development, not of computing, but of finance.

the FICO–system, a set of consumer risk scores issued under a brand marking that is a highly visible to both the public and the lending industry. While an infinite number of risk calculations are possible, it is the FICO empire that manufactures and distributes the actual risk information that is ubiquitously employed as a marker of individual financial quality in transactions where consumer credit products are being originated, managed, and packaged (securitized) for global investment. As diesel fuel is to the internal combustion engine, the U.S. consumer finance machine runs the constant inflow of this brand of commercially calculated figures.

Over the course of this research it became apparent that it is one thing to examine credit scoring in terms of theoretical concepts and scientific methodologies; it is quite another to understand the commercial origins and proprietary architecture of credit scoring in the United States. The fundamental contribution of this dissertation lies in its attentiveness to this important distinction. I use the term ‘system’ to refer to three interconnected arrangements: (a) the set of joint ventures between Fair Isaac, a firm specialized in analyzing data for the credit industries, and the three major credit bureaus which collect and manage repositories of data on individuals; (b) the commercial contracts that distribute FICO scores to financial agents as a revenue generating information product; and (c) the managerial routines and decision-making practices embedded within financial institutions (and more recently, consumer protection guides¹¹), that can only be executed and interpreted in relation to the output of FICO[®] algorithms.

¹¹ The consumer is increasingly being equipped with tools that allow them to interact with FICO scores. On May 21, 2010 Fair Isaac released an iPhone app called ‘Score Estimator’ which asks consumers a number of questions and then simulates an approximate FICO score. By seeing how the score estimate reacts to changes in their answers, consumers can play with ways to change their actions that ostensibly affect the status of their actual scores. In relation to the forthcoming discussion, it is noteworthy that the tool is another way of conveying an ‘accessible’ sense of what FICO scores are without revealing their

The conditions in which FICO scores have taken hold were in preparation long before the system was itself established. Exposing how the FICO–system (ca. 1986) was built has therefore been a lengthy and tortuous project. To excavate its development this dissertation goes back to Fair Isaac’s very beginnings in the late 1950s and tells several concurrent stories moving forward from this period. I recount the history of this post-war operations research start-up, as well as the bumpy and eventful development of its basic technology, a relatively simple device called an application scorecard, conceived of thirty years prior to the advent of the FICO–system. I also describe the foundation of an information industry whose original purpose was to transfer risk assessment capabilities developed as a second-party technology product, to the technically conservative, mid-century specialists who once ran the business of consumer finance.

Given the varied and proliferating application of data to manage financial operations within increasingly sophisticated electronic environments, it may sound implausible to trace credit scoring, the scorecard, and data-driven consumer risk analysis more generally, back to a single point of origin. Indeed, although this was by no means widespread, as early as the 1940s an activity known as ‘point-scoring’—assigning points to answers on handwritten application forms—was independently initiated in a handful of retail, mail order, and financial credit services as a method of credit screening¹². Fair Isaac technology can be

content in technical terms. What Hacking would call ‘looping effect’ (with reference to the ways in which people change in the face of new information about themselves and classification schemes) of these types of consumer-targeted communications about FICO should be the topic of further study as an extension of (but not as a substitute for) understanding how the FICO-system functions and grows. Ian Hacking, "The Looping Effects of Human Kinds," in *Causal Cognition: A Multidisciplinary Debate*, ed. Dan Sperber, David Premack, and Anne James Premack (Oxford: Oxford University Press, 1995).

¹² David Lawrence and Arlene Solomon, *Managing a Consumer Lending Business* (New York: Solomon Lawrence Partners, 2002). Most academic writings refer to a 1941 report by David Durand (ca. 1941), published through the National Bureau of Economic Research as the first known application of statistical methods to the problem of selecting credit applicants, but it is unclear how influential this work was on any systems that might have emerged in practice. Spiegel’s, the Chicago mail-order giant, to give one

distinguished from these earlier practices in at least two regards. First and foremost, the company inserted a technical process of point discovery between the application form and the final score. The points assigned by a scorecard were statistically weighted with the aid of a computer, and not assigned according to an expert's judgment of how much each answer should be worth. More importantly, unlike point-scoring which was devised to serve a single organization's credit function, as an information business, Fair Isaac applied its method and sold its scorecards across multiple lending operations¹³.

My purpose throughout is to demonstrate that Fair Isaac's consistent involvement as a commercial provider of calculative technology has had profound consequences on the evolution of what it means to assess risk in consumer lending in the United States. The argument begins from the observation that the prevailing practices of computer-assisted credit scoring did not sprout up organically from within the consumer finance industry. To the contrary, Fair Isaac labored to disseminate its signature way of doing risk calculation through the sale of its manual scorecards, custom devices for calculating scores by hand at the point-of-sale (Chapter 1). The technology was not immediately received with enthusiasm by the credit industry. The problem-framing and problem-solving approaches at the heart of data-driven decision-making were completely unfamiliar to consumer financiers of the post-war period. The old guard of lending could scarcely imagine why they would need an expensive calculation of empirical probabilities to manage their business (Chapter 2).

example, had manual scoring in place in the 1950s. Designed by Henry Wells, the system involved teams of women working with boxes of punch cards and 42 pound Fridan calculators. I am assuming that the vivid reference to Fridan calculators by the interviewee was to the ST-W or STW-10 model mechanical calculators, whose weight is infamous, although by the 1960s the first electronic Fridan models were already available.

¹³ To see how the same argument plays out with regards to bond ratings see Martha Poon, "Chapter 13. Rating Agencies," in *Handbook of the Sociology of Finance*, ed. Karin Knorr Cetina and Alex Preda (Oxford: Oxford University Press, 2012).

Once Fair Isaac's early process of innovation is laid out, it will become clear that the trajectory of this firm in making scorecards an attractive and useful technology has profoundly shaped the fundamentals of how scoring is done. The historical claim of this research is that absent Fair Isaac's long term commercial investment to distribute its technology it is very unlikely that financial markets would have come to an unambiguous definition of consumer credit risk. That we speak of credit scores as discrete and detached, yet highly meaningful entities—that is, as singularized pieces of information relevant to any creditor institution that bears upon the credit quality of individuals—is an artifact¹⁴ of a specific system composed of trademarked material and organizational arrangements. These arrangements were built by Fair Isaac, persisting over half a century to reorganize the US consumer credit industries around a way of managing credit through risk calculation. Whenever I use the term credit scoring it will refer almost exclusively to the activities and products of this company.

I should mention one important caveat about the construction of the dissertation before proceeding. There is an evocative expression in French which means to make the contours of something legible as an imprint in the absence of the thing itself, to show the mold but not the casting. Since the full history of credit scoring through Fair Isaac that I am preparing exceeds the capacity of this dissertation, the contours of the FICO-system, the culmination of decades of Fair Isaac innovation, will be explored here in this manner—*en creux* (*trans.* in relief). This means that although the primary purpose of my text is to understand the contemporary situation, the FICO-system will not be directly discussed

¹⁴ For a treatment of facts as artifacts produced through human intervention see Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge MA: Harvard University Press, 1987), p. 44.. For a call for the study of computers and digital systems as artifacts whose properties are potentially unknown see Donald MacKenzie, *Mechanizing Proof: Computing, Risk, and Trust* (Cambridge MA: MIT Press, 2001).

herein. Instead, a series of stories about how scoring struggled to survive at the outset will serve to demonstrate that the U.S. credit scoring system is an unexpected achievement.

Research on credit scoring in the social sciences¹⁵

Credit scoring has already come to the attention of social scientific authors concerned with the rise of risk management in consumer finance. But none of this work has taken Fair Isaac's credit scoring technology as its object of investigation *per se*, preferring to observe and theorize a more general transition towards computer-assisted management in retail banking. Previous research takes a very different approach to technology than science studies in that it treats technical systems as either 'present' or 'absent', but never as a project in the making. Since scoring is treated as a flat and unchanging technology in the existing literature, its evolving qualities can never be a source for explaining observed differences in how consumer credit and credit markets operate. To demonstrate this point, it is worth reviewing three examples.

In response to rational choice theories Alya Guseva and Akos Rona-Tas have argued that scoring is a form of rationalization rendered possible only under the appropriate institutional conditions¹⁶. They have compared the United States, the oldest credit card market, and Russia, a nascent market where little data on consumers exists, in order to describe how credit card markets (a subset of consumer credit markets) work differently depending on the presence of institutions that house and make consumer data available.

¹⁵ A version of this section was published in Martha Poon, "Scorecards as Devices for Consumer Credit: The Case of Fair, Isaac & Company Incorporated," *The Sociological Review* 55, no. s2 (2007).

¹⁶ Alya Guseva and Akos Rona-Tas, "Uncertainty, Risk and Trust: Russian and American Credit Card Markets Compared," *American Sociological Review* 66, no. 5 (2001).

Drawing on classic concepts in economic sociology and Knight's theory of uncertainty, the study concludes that in the absence of credit bureaus, credit markets run under conditions of uncertainty which gets managed through social networks (Russia), while in their presence uncertainty can be transformed into a risk calculus (United States).

Andrew Leyshon and Nigel Thrift have also taken note of the enhanced role of business information derived from large-scale repositories of data in retail banking. They argue that "databases herald the arrival of a new form of governmentality based on new practices of knowledge", encoded into software and therefore rarely examined¹⁷. According to these authors a 'quantitative revolution' in retail banking is allowing lenders to overcome a problem of information asymmetry. As formulated in economic theory, information asymmetry occurs because borrowers ostensibly know more about their potential to repay a loan and have an interest in keeping this from the lender. Leyshon and Thrift claim that credit scoring is an attractive option to circumvent this problem because digital data analysis can replace a dependence on information drawn directly from people. The title of the piece alludes to the authors' cautionary attitude: when 'lists' are mined for information their contents 'come alive' and supplant the sovereignty of individuals.

Most recently, Donncha Marron has discussed credit scoring in the United States as an emerging technocratic form of expertise that allows lenders to treat borrowers at the level of populations¹⁸. With the rise of scoring, he observes, the credit industry has moved "from

¹⁷ Andrew Leyshon and Nigel Thrift, "Lists Come Alive: Electronic Systems of Knowledge and the Rise of Credit-Scoring in Retail Banking," *Economy and Society* 28, no. 3 (1999): p. 453.

¹⁸ Donncha Marron, "'Lending by Numbers': Credit Scoring and the Constitution of Risk within American Consumer Credit," *Economy and Society* 36, no. 1 (2007). Marron's recent book contains three chapters that expand his argument, with emphasis how FICO scores (not mentioned in the original article) interact with self conceptions of consumers as a form of individual governance. Donncha Marron, *Consumer Credit in the United States, a Sociological Perspective from the 19th Century to the Present* (New York: Macmillan, 2009).

strategies of hierarchized avoidance by lenders to ones of polysemous engagement, from the treatment of risk as a cost to its deployment as a profitable opportunity”¹⁹. Marron argues that risk management systems are in a ‘permanent process of failure’ because statistical prediction is by definition imperfect at the level of individuals. He suggests that ‘credit risk colonization’, the practice of situating consumers within an increasingly complex spectrum of risk segmentations within the marketplace, got its start because of an elective affinity with Keynesian economic governance which was at its peak in the 1970s.

These social scientific analyses seek to decipher the effects that automated quantification practices writ large have produced on the consumer credit industry. Credit scoring is used as a synecdoche for a larger movement in management towards assessing and controlling individuals in terms of risk. Each article captures an aspect of the profound transformation that digital mediation of credit markets brings to how consumers are being governed. While the driving force attributed to the emergence of risk management techniques differs in each piece—the presence of institutions (Guseva and Rona-Tas), the impetus to overcome information asymmetry (Leyshon and Thrift), a compatibility of scoring methods with Keynesian thinking (Marron) are all invoked—what these authors do have in common is they portray credit scoring as a sweeping phenomenon, an all-or-nothing binary, a flip of a switch.

Each of these pieces seeks to capture and account for a paradigmatic shift towards risk management in consumer finance. As a body of scholarship they recognize that calculative technique has accompanied consumer credit’s dramatic evolution over the last

¹⁹ Marron, "Lending by Numbers': Credit Scoring and the Constitution of Risk within American Consumer Credit," p. 105.

half century from an adjunct of retail into a booming free standing industry²⁰. Writing from a position that is grounded in economic sociology, the story these scholars tell is that if technology (singular) arrives and takes hold, then epochal change (absolute) happens. So although current social scientific analysis acknowledges the crucial role of credit scoring in performing social and economic transformations, it can be critiqued for ascribing it an overbearing amount of agency. Science studies scholarship, in contrast, moves beyond general claims about the power of calculation and hones in on firmly entrenched technical systems. It provides a concerted inquiry into the multiple organizational arrangements of technology that have been formed to support a transition to an information age.

In an era that arguably is overwhelmed by economic discourses, control through calculation seems to be tumbling forward, relentlessly spreading like brushfire now that mechanized processes for collecting and digitizing consumer data are securely in place. From a distance, scores can appear to be the undifferentiated product of an overarching movement of history, the instantaneous result of applying abstract mathematical methods to massive databases appearing out of a global information revolution. Historians and philosophers of statistics have already shown, however, that the uptake of statistics in a new field is always complicated and unique²¹. Statistical techniques change as they insinuate themselves in new domains, and the places they are implemented must be painstakingly reorganized and reequipped to accommodate the burden of calculation. This is why refitting an entity around risk assessment gives rise to operating structures that will, at least initially, distinguish one firm's way of calculating risk from the next (Chapter 3).

²⁰ Edward Lewis, *An Introduction to Credit Scoring* (San Rafael: Fair, Isaac and Co., 1992), Robert Manning, *Credit Card Nation: The Consequences of America's Addiction to Credit* (New York: Basic Books, 2001).

²¹ See for example Gerd Gigerenzer et al., eds., *The Empire of Chance: How Probability Changed Science and Everyday Life* (New York: Cambridge University Press, 1989).

At the expense of false binaries in which calculation is or is not happening, technology is or is not being used, this dissertation unearths the politics and construction of specific technical instantiations that permits risk calculation to begin²². The research being presented here has drawn upon the studies cited above, but it also departs from them in several key ways. Instead of holding credit scoring up to universal standards, or treating statistics and data analysis as a set of delocalized methods or generalized expertise, it explores scoring pragmatically, as the evolution of a concrete and situated system. In exploring the scorecard's long-term development I will show the cumulative work that has been done to reformat an entire industry around a common technology of consumer risk assessment. Like Morgan's *Drosophila* flies, Edison's light bulb, or McLean's shipping container²³, the FICO standard is the results of a sustained process of innovation and engineering.

Fair Isaac makes military science into a business

Understanding how FICO scores have been established as the way lenders see the credit market begins by unpacking the historical origins of Fair Isaac's original approach to risk calculation and product engineering. Fair Isaac's credit scoring methods developed out of a particular scientific field called operations research (OR). OR is an umbrella term that originally referred to the deployment of interdisciplinary research teams composed of

²² Michel Callon and John Law, "On Qualculation, Agency and Otherness," *Environment and Planning D: Society and Space* 23, no. 5 (2003), Michel Callon and Fabian Muniesa, "Economic Markets as Calculative and Calculated Collective Devices," *Organization Studies* 26, no. 8 (2002).

²³ Thomas Parke Hughes, *Networks of Power: Electrification in Western Society, 1880–1930* (Baltimore: The Johns Hopkins University Press, 1983), Robert Kohler, *Lord of the Fly: Drosophila Genetics and Experimental Life* (Chicago: University of Chicago Press, 1994), Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton: Princeton University Press, 2006).

statisticians, mathematicians, physicists, and engineers, whose original mandate was to improve the success and efficiency of military endeavors during WWII²⁴. The Fair Isaac scorecard marks a tremendously successful transfer of military-inspired methods for managing operations to the civilian domain²⁵. The logic of OR is an important part of the Fair Isaac story that distinguishes its approach to data analysis from the more recent data mining techniques²⁶.

It can be tempting to assume that Fair Isaac's operating techniques were immediately powerful because of their association with the might of the military-industrial complex. To the contrary, assisting military commanders meant that operations researchers were relegated the part of second fiddle. OR would only succeed in consumer finance as it did in the military—by insinuating itself into routine practices and established structures, not by being overtly disruptive or confrontational. The first OR teams yanked scientists out of the comfort of controlled laboratory settings and thrust them into the chaos of wartime situations. The particular prowess these teams developed was to adapt scientific analysis to the melee of open combat. Their objective was to balance scientific rigor with practical

²⁴ Russell L. Ackoff, "The Development of Operations Research as a Science," *Operations Research* 4, no. 3 (1956): p. 266.

²⁵ The idea that scientific knowledge and practices must cross boundaries at the points where groups with different cultures interface is at the heart of the science studies approach based on social worlds. For case studies that explore how boundaries are crossed between scientific practitioners of different specialties. On interdisciplinary cancer research, see, Joan H. Fujimura, "The Molecular Biological Bandwagon in Cancer Research: Where Social Worlds Meet," *Social Problems* 35, no. 3 (1988). For trading between physicists, see Peter Louis Galison, *Image and Logic: A Material Culture of Microphysics* (Chicago: University of Chicago Press, 1997).

²⁶ Discussions about data mining, an activity that has exploded with the rise of digital tracking, tend to center around issues of privacy and identity. See for example Oscar H. Gandy, "Exploring Identity and Identification in Cyberspace," *Notre Dame Journal Of Law, Ethics & Public Policy* 14 (2000). Operations researchers do mine data, but as the dissertation will show, they are fundamentally interested in managing operations, not individuals.

considerations in order to enhance executive decision-making despite severely constrained field conditions²⁷.

In this regard, many aspects of Fair Isaac's civilian business did not differ from the original practice of military OR. The company faced similar positional constraints as its wartime predecessors, and worked, so to speak, under the gun. When Fair Isaac introduced scorecards in the late 1950s, it was very much beholden to the ways and means of its customers, the lenders. Basic scoring technology was frugally fashioned out of whatever records researchers could dig up, organized according to a limited set of transparent categories that depended upon whatever a lender considered worth noting in their ledgers. Of necessity the early scorecard was born out of the ethos embedded in mid-century paper records. The tool automated a decision set made under the existing process for screening credit applications; it reproduced the habits and assumptions of a prior way of lending.

Credit scoring was a make-do solution. In keeping with a philosophical agnosticism about the nature of things, the company purported to build algorithms with a complete disregard for the meaning of factors or models of causation. In practice, however, purely data-driven analysis is an ambition that has never been fulfilled. Although Fair Isaac inherited its philosophical outlook from cybernetic theories of control and communication, it did not initially have access to the cornucopia of digital traces dreamt up by cyberneticians²⁸. What accounts for credit scoring's progressive use and acceptance by credit

²⁷ One would not necessarily draw this conclusion by reading only the formalized discourse that proliferated as OR attempted to professionalize in the post-war period. For an example of this kind of statement, which effaces the working conditions under which the endeavor was born see Ackoff, "The Development of Operations Research as a Science." Just over twenty years later, the very same author would declare the discipline dead. Russell L. Ackoff, "Resurrecting the Future of Operational Research," *The Journal of the Operational Research Society* 30, no. 3 (1979).

²⁸ Cybernetics is largely discussed as an imaginary that has impacted the design of computing systems. See Paul Edwards, *The Closed World*, ed. Weibe Bijiker, Bernard Carlson, and Trevor Pinch, *Inside Technology*

agents is not the statistical perfection of Fair Isaac algorithms in reproducing a pattern detected from a wellspring of data. Quite the opposite—the content of scorecards has been designed, and at critical junctions redesigned, to adapt to material limitations on data.

This research demonstrates that what has driven credit scoring innovation forward are persistent constrictions, and not, as others have argued, the torrential unleashing of data in the digital age²⁹. The content of the commercial credit scoring system has been progressively shaped through a continuous struggle in which Fair Isaac has reluctantly acquiesced in a piecemeal fashion to build algorithms under restrictive conditions. At first, these conditions were inherited from finance operations that leveraged considerable influence on scorecard design both indirectly, through choice of manual data storage in credit files, as well as directly, as Fair Isaac's paying customers with explicit opinions on how the technology should be built. The federal government would inject its own constraints in the 1970s when it took on in the project of ensuring Equal Credit Opportunity (Chapter 4).

Science studies scholarship has already observed that flexibility and compromise are necessary for the universal adoption of technologies. A running theme in studies of technological transformation is that nascent technologies must constantly be adapted to the

(Cambridge: MIT Press, 1997). It has been recently been explored more broadly as a distinct system of thought that has had much broader influence by historian Orit Halpern. Orit Halpern, *The Eye of Time: Histories of Representation, Perception, and Archiving in Cybernetic Thought* (Durham: Duke University Press, Forthcoming). Halpern's thoughtful historical and philosophical excavation of an internal logic of cybernetic that emphasizes prediction, action, and process over a linguistic description of stable ontology resonates profoundly with novel elements of epistemology that Fair Isaac introduces to consumer credit through their technology. My purpose is to trace the details of how this logic gets hybridized by Fair Isaac with other forms of knowing with which it is in theory incommensurable, in order to be transferred. What matters to me is not cybernetics for cybernetics sake, but only how it manifests itself in scoring technology.

²⁹ Leyshon and Thrift, "Lists Come Alive: Electronic Systems of Knowledge and the Rise of Credit-Scoring in Retail Banking."

environment³⁰. Technical entities which manage to become widespread are therefore never the ones that hold most rigidly to an ideal prototype, but are those that are flexible enough to bend and fold into existing pathways of action. If resolving controversy is a productive engine of design and innovation, then technologies grow more robust as they face and overcome disputes and resistance; they must accumulate solutions to satisfy various constraints as they mature into full-fledged systems. Technical systems are not freed of constraint as they grow. To the contrary, they become increasingly idiosyncratic as they are adapted to new locations and get anchored into more and more places.

The observation that philosophical perfection must be irreversibly sacrificed when it comes to establishing large-scale networks blurs the line between interestedness and disinterestedness in technical solutions. A pragmatic attitude towards design is arguably intensified in commercial situations where scientific experts are not isolated authorities but must work as vendors of transferrable products within the complex balance of power negotiated with buyers and regulators³¹. To account for the prominence of Fair Isaac in U.S. credit scoring, I cast the process of commercial negotiation as a powerful mechanism that has promoted socially responsive—although not necessarily socially accountable³²—technical adaptation. I show that to make a marketable product that could sell and take hold, Fair

³⁰ This position was developed in SCOT (the social construction of technology). See Wiebe Bijker, Thomas P. Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge: MIT Press, 1987), Bruno Latour, *Aramis, or the Love of Technology*, trans. Catherine Porter (Cambridge MA: Harvard University Press, 1996).

³¹ For a review of the broad range of approaches to controversy studies, see Brian Martin and Evelleen Richards, "Scientific Knowledge, Controversy, and Public Decision-Making," in *Handbook of Science and Technology Studies*, ed. Sheila Jasanoff, et al. (Newbury Park: Sage, 1995). The Paris School exposes French students to science studies through what it calls 'Études de controverses' (trans. Controversy studies).

³² There is some especially informative research from French sociologists on how corporate social responsibility is being measured and turned into ratings. See Pauline Barraud de Lagérie, "Construire La Qualité Sociale: Heurs Et Malheurs Militant," *Sociologie pratiques* 18 (2009), Jacques Igalens and Jean-Pascal Gond, "Measuring Corporate Social Performance in France: A Critical and Empirical Analysis of Aresé Data," *Journal of Business Ethics* 56 (2005).

Isaac conceded to fill its algorithms with a commercially, socially and politically recognizable content that conformed to entrenched, but also changing expectations of how credit should function.

When Fair Isaac got started there was no natural affinity between consumer credit and data-driven risk assessment. This dissertation demonstrates that if credit scoring has been implanted into lending it is only because this private company has constructed apparatuses that respected traditional operating conditions within the credit business. Fair Isaac never willingly abandoned its strict adherence to the principles of OR. In fact, its scientific staff vehemently disagreed with almost every adjustment to technology production that its partners, buyers, regulators, and more recently consumers, imposed. What motivated the company to be accommodating was an imperative common to all small businesses—the need to stay afloat. In my story, commercial pressure is neither a pollutant nor a source of inauthenticity. It is the very force that gave this firm the agility and perseverance to drive a fundamental change in operating procedure throughout an entire industry.

Research approach

How the wartime sciences such as operations research have been deployed to remake and manage market economies is a topic that is only beginning to be studied³³. The challenge posed by technical objects such as the U.S. credit scoring system is to unpack the new political orders—the unfamiliar forms of organizing relationships—which these science

³³ For a history of how theories drawn from the wartime sciences have been applied in the discipline of economics see Philip Mirowski, "Cyborg Agonistes: Economics Meets Operations Research in Mid-Century," *Social Studies of Science* 29, no. 5 (1999).

have brought into being. As Von Clausewitz, author of the *Treatise On War*, famously insisted, “We see, therefore, that war is not merely an act of policy but a true political instrument, a continuation of political intercourse, carried on with other means.”³⁴

Sociologist of science Bruno Latour has suggested the same goes for science, that “Science is not politics. It is politics by other means”³⁵. Given that ‘war’ and ‘science’ are both ways of achieving political ends then it should come as no surprise that the sciences-of-war have proven to be formidable instruments of social transformation.

This dissertation begins to unpack how wartime science was engaged by one company to remake consumer finance in the post-war period. I pursue a specific process of commercial technology development because my purpose is to understand how scores have actually been implemented into financial practices. My focus on a commercial system is, admittedly, unconventional for a social scientific researcher. The study puts working technology before the concepts dreamt up by operations researchers, or untested statistical techniques proposed in academic papers. This is a deliberate analytic choice that impacts on the conclusions I will make. Instead of using the case to generalize a greater movement which social theorists alternatively refer to as quantification, rationalization, digitalization, post-industrialization, marketization, financialization, neo-liberalization³⁶ and so on, I seek to characterize how this shift has been carried out within one distinct area of life.

³⁴ Carl von Clausewitz, *On War*, ed. Michael Eliot Howard, trans. Michael Eliot Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984). 44

³⁵ Bruno Latour, *The Pasteurization of France* (Cambridge MA: Harvard University Press, 1988), p. 229.

³⁶ Each of these –izations has become standard fare in the academic literature. In the vast majority of studies the claim to having done an analysis consists of classifying an empirical situation as a case of X, but few describe the body or content of X, that is, the detailed processes through which X is happening. For a key statement that puts process at the heart of what it means to study economic topics see Michel Callon and Koray Çaliskan, "Economization: New Directions in the Studies of Markets," *Economy and Society* 38, no. 3 (2009).

Social scientists are cognizant that new technical systems play an increasing role in shaping our social, political and economic existence, yet for the most part they have not cultivated new expertise for analyzing these entities. The cost of this omission is steep. In forgoing a detailed analysis of technical networks, these disciplines have let slip their ability to make salient and actionable critique. Almost anyone can stand on a soapbox and observe that things are changing. The outraged denunciation raised by former Fox News commentator Glenn Beck—that this is no longer the America he grew up in—and the resonance this stokes in the millions of viewers who make up his audience is enough to signal a widespread awareness that something significant is happening. But taking hold of and redirecting the widely distributed material processes through which change is occurring, showing how and not just that change creeps forward, is another task altogether.

Michel Callon's much fussed over concept of 'performativity'—the claim that certain theoretical descriptions of how economic markets work are becoming real³⁷—has offered the social sciences a new footing. However, the key message has been diluted in the dialogue between science studies and other social disciplines. Ideas can coordinate action to a degree, but a central claim of science studies is that ideas cannot sustain order of any widespread significance until they are built into a shared environment. Performativity is *not* about shifting cognitive beliefs and the analysis is never centered solely on the propagation of knowledge or even practices between people. Callon's point is that concrete economic formats are being materialized into everyday realities through organizational arrangements being actively engineered by specialized groups such as, among many others, operations researchers.

³⁷ Michel Callon, "What Does It Mean to Say That Economics Is Performative?," in *Do Economists Make Markets? On the Performativity of Economics*, ed. Donald MacKenzie, Fabian Muniesa, and Lucia Siu (Princeton University Press: Princeton, 2007).

Descriptive statements of how economic phenomena should work do get performed, but what *does* the performing is material infrastructure. If we want to understand the rise of new economic forms, then we must examine how particular economic infrastructures are being built into the fabric social life. To this end, this research pursues a material anthropology of contemporary financial risk. ‘Material’ refers to the built environment in which sustained practices become possible; ‘anthropology’ to the historical specificity of value producing activities in time and geographic space³⁸. The science studies literature has already provided some precise guidelines for what this kind of study might look like. The name Callon gives to the process through which a plan is whittled and modified until it becomes feasible is ‘translation’³⁹. An initiative will only stick depending on how the available resources can be stretched and remolded, and whether stakeholder positions can be realigned to support it⁴⁰. Political debate does not happen in the ‘context’ surrounding emerging systems. The scheme of order inscribed inside of a technology— its technical ‘content’—is always the accumulation of negotiated settlements, never the projection of unprocessed ideals.

This is why the dissertation treats the innovation of credit scoring technology and the historical transitions social theorists worry about as one and the same event. As I chronicle the long process of translation through which early Fair Isaac credit scoring gained

³⁸ Like anthropologists I treat all forms of value, including financial value, as artifacts of human activity. See Martha Poon and Robert Wosnitzer, "Liquidating Corporate America: How Financial Leverage Has Changed the Fundamental Nature of What Is Valuable," *Journal of Cultural Economy* 5, no. 2 (2012). But I am not as directly concerned as anthropologists with the practice of ethnography or the constitution of the human subject.

³⁹ Michel Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay," *Power Action and Belief: Sociological Review Monographs* 32 (1986).

⁴⁰ For a tale that addresses how technological plans meet with failure see Michel Callon, "The Sociology of an Actor-Network: The Case of the Electric Vehicle," ed. Michel Callon, John Law, and Arie Rip (London: McMillan Press, 1986), Latour, *Aramis, or the Love of Technology*.

efficacy in the consumer finance industry I am simultaneously shows how a greater historical shift is occurring in the trenches. The research examines four basic qualities of credit scoring that the credit industries, economists, financial analysts and the U.S. public now take for granted. They are, in chapter sequence, that scoring is intangible (Chapter 1), cost efficient (Chapter 2), generically predictive (Chapter 3), and objective (Chapter 4). In two instances (Chapters 1 & 3) I explore a moment when scoring did not express a quality now considered technically essential. In the other two, (Chapters 2 & 4) I demonstrate how a temporally situated definition of the technically expressed quality in question was achieved through aggressive and repeatedly modifying the design of Fair Isaac scorecards⁴¹.

There are important political stakes to the historical observation that intensive haggling is an unavoidable part of turning abstractions into technical realities. If squabbles and their resolution are an inherent part of how common infrastructures can be established, then there is little to be gained from arguing that a working technology is scientifically inaccurate, illegitimate, impure, or compromised when compared against a set of theoretical principles. But the inverse also holds—once epistemic perfection is off the table there is no high ground from which to shield a technology against political interrogation. That innovation is inherently political implies that technical qualities are serendipitous, and in principle infinitely flexible, even if not completely arbitrary. This means that systems such as FICO are not immune from reengineering should they face enforceable assertions that challenge the balance of order and disorder they are producing.

⁴¹ Bruno Latour has provocatively suggested “that design is one of the worlds that has replaced revolution!” Bruno Latour, "A Cautious Prometheus? A Few Steps toward a Philosophy of Design (with Special Attention to Peter Sloterdijk)," in *Networks of Design: Proceedings of the 2008 Annual International Conference of the Design History Society (U.K.)*, ed. Fiona Hackney, Jonathan Glynne, and Viv Minton (Boca Raton: Universal Publishers, 2008).

The simple finding that credit scores are built on a network of compromises swiftly undermines the apparent timelessness of the social order inscribed in the contemporary FICO-system. This suggests that if technical mediation is indeed the mechanism through which historical transformation gets propagated then increased technical interdependence need not lead to a dismal apolitical stranglehold. If technological systems can be perpetually reopened and renegotiated, this implies that the new world is a world of potentially heightened political sensibilities. This raises difficult questions, however, about how the political adequacy of these kinds of systems gets decided when systemic transformation is largely occurring through commercial initiatives whose inner workings are tightly guarded as proprietary trade secrets. The strategies I have used for getting inside Fair Isaac are discussed after the chapter summaries, in the following section on methods.

Chapter Summaries

Chapter 1. Scorecard Manufacture

This chapter describes how Fair Isaac made the scorecard, the basic credit scoring tool it introduced in the late 1950s. The original product was a relatively simple algorithm represented by a cardboard table that allowed clerks working in mail-order houses or at the point-of-retail-sale to associate an empirically-assessed odds of defaulting with a fresh application for credit. What is remarkable is that the computer-assisted process for doing the statistics was first worked out within a manual environment, long before computing and digital data capture were adopted into banking. In an economy of computing where access to machines was still rare, a large part of Fair Isaac's value proposition was that it carried out the intensive physical labor of adapting paper-based credit records to statistical analysis. It then returned the results to credit managers in an easy-to-use, non-digitized cardboard format that would aid in application screening. As the company performed the manual labor to transform piles of paper into a single printed table, it looked much more like a factory refining raw materials than a high-tech company engaging in intellectual activity. The concept of manufacturing captures the commercial nature of credit scoring technology, the repetitive production process to carry out the calculations, as well as the physical component of the product from start to finish. Credit scoring is not the application of method; it is a tangible process of technology production. The case of the scorecard shows that risk management does not arise spontaneously from the advent of computing machines, but involves a separate process of innovation that must adapt statistical calculation on an industry by industry basis. This chapter explores points of confluence where industrial

materiality has defined the digital present. It identifies the scorecard as the technical kernel from which to trace forward the contemporary FICO–system.

Chapter 2. Shifting the Costs of Credit Production

When Fair Isaac arrived on the scene in the late 1950s, consumer finance was already an established industry. To attract capital to the business of consumer loans in the earlier part of the century, small loans laws allowed interest rates to rise above traditional rates of usury, but nonetheless continued to cap them quite strictly. The result was a mid-century consumer credit environment in which profit-taking was possible but only if operating expenses were strongly curbed. This chapter describes the conflict between a long standing industry preoccupation with streamlining operating costs and an expensive technology like the scorecard whose purpose was to reduce bad debt, an already infrequent event. To showcase the scorecard as a cost saving device, Fair Isaac redesigned the tool so that it was possible in some cases to draw a conclusion without referring to—and therefore incurring the cost of— credit reports. To survive, scoring had to re-express itself as a solution to the empirical problem the credit industry had (cost cutting) and not only to the one (risk reduction) staked out on its behalf. This chapter offers an explanation for why credit scoring was not immediately attractive to mid-century credit financiers. The basic point that risk prediction ignored was that effort had to be made by the lender to make consistent repayment happen. Even if the scorecard made screening on the front end more efficient, loan quality largely depended on whether loans were properly handled. The appropriate treatment of cases throughout the life of the loan and not just their selection was the art and the burden of lending. In a compromise between public service and private profit, it was this inherent cost of managing small loans—and not the risk of lending—that had justified

uncapping the traditional rate of usury and setting the terms under which lending could be profitable. The chapter opens up a point of comparison for evaluating risk based lending as a novel regime of social justice supported by economic theory.

Chapter 3. Custom Models for Credit Executives

Fair Isaac's application scorecard was a tool of operations research, the science of enhancing the capacities of executive decision makers. Its insertion into lending provided credit managers with a new way of communicating policy within their organizations. Before the scorecard, mid-century credit managers exercised control through policy statements. The problem with the spoken or written word, however, was that it could never be transmitted unambiguously through the organizational line. Through application scorecards customized to each lending firm, managers became responsible for setting tolerable rates of default and were equipped with a mechanical tool for translating these directives through numbers into action on the ground. Beyond enacting a simple substitution in screening methods that strengthened the position of credit managers, scorecards implemented a new theory of how operating control was to be exercised over credit production based on the discourse of cybernetics. In theory, application scoring simplified the question of credit quality by predicting final outcomes upfront while ignoring operating activities. In practice, however, because scorecard models were customized they continued to assess risk as a quality that was crafted within the policy environment of a specific organization. That the first scorecards were custom made provides a clear demonstration that credit risk is a situated quality produced in interaction between the borrower and the operating practices of firms. Scorecards execute a cybernetic project of using archival data to predict future outcomes,

but always within a particular organizational setting. This chapter demonstrates that early ‘credit risk’ was produced by organizations as operating systems and not an independent quality of individuals. This provides a fresh perspective from which to examine the nature of the risk communicated by FICO scores. It suggests that the FICO–system expresses the likely outcome of overall market operations, and not the behavior of discrete persons

Chapter 4. Statistically Discriminating Without Discrimination

Throughout the 1970s Congress conducted hearings to establish equal credit opportunity as a civil right. Legislators would ban creditors from considering sex, marital status, race, color, religion, national origin, or age in credit screening to defend the principle that credit decisions should consider individual merit, and not membership in an arbitrary grouping beyond the individual’s control. Fair Isaac and its customers presented sophisticated explanations for why this approach to political intervention was unnecessary and counterproductive. Reasoning through the logic of statistical differentiation they argued that restrictive public policies were diluting scientific objectivity to the detriment of political intent. The politicians involved in pursuing credit reform disagreed, refusing to exempt credit scoring from the regulations. While regulators would embrace the scientific nature of scoring with one hand, they freely tampered with its autonomy with the other. This review of the congressional record explores the encounter of statistical operating practices with the legislative sphere. This chapter displaces two distinct accounts of how a connection was forged between credit scoring and social justice. Firstly, it disputes the state-centered claim that credit scoring methods were sanctioned by the government. Equally lacking in historical nuance is the economist’s argument that competition provides a natural impetus for lenders

to rid themselves of unwarranted discrimination through recourse to statistical tools. What is meant when the credit scoring is celebrated for being unbiased is not that statistical analysis is above the law; rather objectivity indicates that the content of scoring systems became the location from which lenders were best able to demonstrate compliance with the definition of fairness imposed by the ECOA. Fair Isaac lost the battle to define objectivity in consumer credit. But the scorecard was adopted across the credit industry because it could be refashioned into the handmaiden of legal oversight and administration.

Methods and Opportunity

It remains a little remarked upon fact that some of the most crucial information in an information-based economy is manufactured by private companies. When information flows to market participants in this way it is neither transparent nor is it free. The bond ratings agencies are a classic example. In financial markets, openly circulating ratings play a standard role in the assessment of value in corporate and sovereign debt markets but how the companies come to the AAA is a highly secretive process⁴². Search engines such as Google are another case in point. Unlike an alphabetical card catalogue, search algorithms run on principles of rank ordering that are not transparent to users. The bottom line is that commercial information providers are secretive about what they do. To retain control over an information product that moves markets, companies must guard the processes by which this information is defined and calculated.

⁴² The situation is markedly different in structured finance where there is a lot of communication with the user about what AAA means because financial institutions build products around the rating.

Market structures based on information processing are becoming real. Adam Smith's 'free market', in which goods are exchanged without direct intervention of a sovereign power, is rapidly merging with Friedrich Hayek's 'rational markets', which run on free flowing information. But this convergence has not occurred by throwing the markets back into some primitive, unshackled, pre-regulatory form. Rather, it occurs as corporate interests build up information systems which are privately owned and operated. Information infrastructure is to the information economy what railroads, canals and electric cables were to the industrial revolution. And just as in the previous transition to industrialism, material infrastructure is being developed by private enterprises with the support of state policies⁴³.

Smith's invisible hand, made visible by Alfred Chandler in the form of an industrial managerial class, is shape shifting once again. Commercially controlled information is the economy's new silent hand.

Because of the secrecy surrounding corporate information production practices, writing a history of FICO is not just an academic exercise, but must borrow some strategies from journalistic muckraking. Just as Ida Tarbell exposed how the Standard Oil Company established its pipelines (1904), Nader's raiders unraveled the policies behind the dominance of CitiBank (1971), or Gillian Tett uncovered the origins of derivative structures behind credit default swaps at J.P Morgan (2010)⁴⁴, my purpose is to dig into the technical practices

⁴³ Even when infrastructure is privately built, the state has played an important role in facilitating financing. See Barry Eichengreen, "Financing Infrastructure in Developing Countries: Lessons from the Railway Age," *The World Bank Research Observer* 10, no. 1 (1995). In the case of the internet, the government has played a more direct role in innovation. Janet Abbate, *Inventing the Internet* (Cambridge MA: MIT Press, 1999).

⁴⁴ David Leinsdorf and Donald Etra, *Citibank - Ralph Nader's Study Group Report on First National City Bank* (New York: Grossman Publishers, 1973), Ida Tarbell, *The History of the Standard Oil Company*, ed. David Chalmers (New York: W. W. Norton & Co., 1966), Gillian Tett, *Fools Gold, How the Bold Dream of a Small Tribe at J.P. Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe* (New York: Free Press, 2009).

of Fair Isaac. I seek to draw attention to the particular socio-economic significance of this one company. The anticipated outcome is precisely what many activists and commentators have recently been calling for—a form of argumentation that refreshes avenues for political action. Instead of assigning cause to theoretical abstractions, this study relates changes in consumer finance to the development of a concrete and legally recognizable entity—the FICO franchise.

Studying how technical systems are built

‘You’re fired!’ or ‘We quit!’—It’s not clear who said what on that fateful Friday afternoon at the Stanford Research Institute in 1956. By the following week William Fair and Earl Isaac had set up their own consulting business in Isaac’s apartment in San Francisco. They incorporated as Fair Isaac and Company in 1960. The great advantage of focusing on the history of the FICO–system is that it directs the study towards something concrete—a specific company, an evolving product, an emerging system. This guides the choice of documents and the people to interview; it provides the coherent lead around which to anchor data collection. Sociologist of science Bruno Latour likens this approach to finding Ariadne’s thread and following it through the labyrinth⁴⁵. When the thread is broken and frayed, however, piecing it together can involve some strategy.

The FICO–system is not the outcome of any overarching plan, recorded or archived for later retrieval. Unlike a skyscraper, erected from a blueprint that envisions the majesty of the final structure in geometrically precise and minute detail, FICO’s construction is the

⁴⁵ Bruno Latour, *We Have Never Been Modern* (Cambridge MA: Harvard University Press, 1993), p. 3.

result of an organic accretion of elements designed in disconnected episodes in different places. A distributed system that emerge without any centralized architectural design poses a significant challenge to researchers wanting to get a descriptive hold on a system's properties and dimensions. My methodological entrée has been to return to a point when Fair Isaac's endeavor was still bounded and small. Instead of tackling the U.S. credit scoring system at the apex of its life, at the height of its ubiquity and grandeur, my investigation begins at the moment of credit scoring's inception.

It followed that a major challenge of moving this project forward came from a thinness of historical sources. The brief tale of Fair Isaac's founding moment at the opening of this section reveals much about the record of this company's origins. It is painted in broad strokes, but the details remain shrouded in uncertainty. These kinds of problems are not anticipated in the ethnographic model of observation touted within much of science studies. Conventional ethnography is confined to observing activities taking place in the here and now which are not always the most relevant for understanding the comprehensive architecture of a distributed system⁴⁶. A topic like FICO rapidly runs into the limitations of following 'science in action'⁴⁷. This mantra provides little instruction when Ariadne is long gone and her thread through the labyrinth is disintegrating.

⁴⁶ For two model ethnographies of how people work with technologies (in this case photocopiers) which do not seek a comprehensive overview of a system see Julian Orr, *Talking About Machines: An Ethnography of a Modern Job*, ed. Stephen Barley, *Technology and Work* (Cornell University Press, 1996), Lucy A. Suchman, *Plans and Situated Actions* (Cambridge: Cambridge University Press, 1987).

⁴⁷ Like many students with a science background raised in the sociological branch of science studies I have been heavily influenced by 'laboratory studies', the exploration of what happens day-to-day in the esoteric spaces in which some forms of science are enclosed. In an analogy to the traditional method of anthropological ethnography (living for extended periods with tribes in distant lands to observe them), the idea was that the material realities of science could be most fully grasped by being present as scientific discoveries were being made. Ethnographic inquiry into laboratories has generated a wildly productive perspective on scientific research, but it has also become a formulaic approach. For me, it has become a pedagogical fable for demonstrating that technical statements begin with only local significance

The description I provide of Fair Isaac's innovative process was produced by mining history with an ethnographic sensibility to find stages in the technology's evolution. I have sifted through documents and coaxed informants for data to recapture the initial groundwork carried out by Fair Isaac staff as they developed viable operating forms to implement their invention. In addition to interviewing people in the industry of credit scoring to record their recollections of the work they did—mostly former employees of Fair Isaac, many of them scientific staff who began their careers as early as the 1970s— I have reviewed and analyzed thousands of pages of primary materials related to credit scores and credit scoring, including consumer finance trade literature and congressional records on consumer credit, to excavate Fair Isaac's scientific and production practices. (For a materials inventory, see Table I.1, 46-47.)

My analysis is shaped by the observation that Fair Isaac's technology has grown in fits and starts because the demands the company has faced are not uniform across history. A stepwise description of the scorecard's earliest years is an account of a series of Fair Isaac's problem solving maneuvers. Early credit scoring was frequently being modified as the company experimented with ways to anchor it into consumer lending. I chronicle how the Fair Isaac team repeatedly shifted the development criteria guiding algorithm development and iteratively redesigned their product in response to a patchwork of demands imposed in different periods. Fair Isaac products have gained in function because the company has been politically responsive to new situations. Growth spurts are the result of having resolved controversy through further innovation to overcome fresh tensions.

Rooting through controversies is a useful methodological tool that yanks social scientists back from the periphery (where they have been relegated to understanding public

perceptions and receptions of technology) and allows them to tackle how systems get built over the long term. Examining controversy capitalizes on the established strengths of qualitative social analysis such as archival research, participant-observation, in-depth interviewing and long form narrative, only it puts these empirical skills in the services of understanding the contours of an unfolding technical network rather than capturing the experiences, behaviors and mindsets of groups or individuals for their own sake. In this kind of research informants and sources are not treated as representative samples from which conclusions about a general phenomenon can be induced. They are selected for what they reveal about the construction of a specified technical network.

Even though technical detail is part of what is at stake, eliciting and recording how differing positions meet in a technical debate does not require research skills that qualitative social scientists do not already possess. What this particular kind of study does demand, however, is something that social scientific research rarely hinges on—tightly targeted access. When the goal is to trace full blown systems such as FICO whose importance is already established, getting into the specialized spaces where these systems are being engaged and establishing contact with the people who engage with them is quite difficult. Even more so when these spaces are centers for profit and do not welcome the intrusion of outside observers. The greatest challenge to studying technical systems, therefore, comes from the social connections required to carry out the research, not from the intricacies of deciphering technical materials.

In the kind of study I have undertaken there is a premium to gaining access to the firsthand accounts because there is no substitute for gaining access to whatever sources bear knowledge of specific processes and events. My research has involved finding informants

who are actual participants in a system's development and implementation, not just soliciting the analysis at a distance, from talking heads or opinion makers. When reconstructing the work carried out by technical teams in which each person was assigned a part of the project and is irreducible to any other member of the group, every interview offers a unique professional perspective. So the quality of this kind of research does not depend on brut volume of interviews or statistical salience of the sample. It will depend on the quality of the researcher's contacts and the thoroughness of the reconstruction of the innovative process.

Gaining access to a network of former Fair Isaac employees

My fieldwork began in earnest on a clear California morning in June of 2004 when Robert Sanderson, a former chief operating officer (COO) and executive vice-president (EVP) of Fair Isaac, cheerfully offered to "turn the trunk of his Volvo into my first office". Sanderson's cleanly cropped white hair and attentive blue eye mark a face that is both astute and at ease, demanding but kind. He is every bit the straight shooter, the boy next door made successful, a man whose moral certitude and sense of social purpose have been consistently reaffirmed by a lifetime of fairly rewarded achievements. Sanderson was an extraordinary primary contact whose willingness to cooperate was the cornerstone of the project. Fair Isaac's longest employee still living, he took a scientific position in 1970 as he left Berkeley with a PhD in OR in and would devote his entire career to the company. When Bill Fair retired in 1990 he was considered one of two leading candidates to succeed him. (The position eventually went to Larry Rosenberger.)

Bob greeted me with a firm handshake at the terminal of the Larkspur Ferry, an inexpensive commuter service that runs between downtown San Francisco and the community of San Rafael, located on the north side of the bay. Marin County, which is among the US's most affluent counties⁴⁸, was home to Fair Isaac's corporate headquarters from the late 1950s until May 2004. When the green lid of the trunk popped opened, I found stacks of newsletters relating to the credit scoring operations of Fair Isaac neatly stored in chronological order in thick three-ring binders. Chief among them was a series that had circulated publicly to Fair Isaac's institutional customer base called 'Viewpoints' which began in 1976 and continues up to today. As he had expressed in an earlier email, Bob was willing to let me make an electronic or paper copy of his collection, but he was not willing to let these yellowing pages out of his possession as, in his retirement, he considered them personal souvenirs of the firm to which he had devoted his entire professional career. The mission of this particular journey was to reproduce these volumes for my own use, a crucial first step towards assembling a history of credit scoring at Fair Isaac.

In this encounter, I was in the position of researcher and Bob was the research subject. Yet it was clearly he who commanded the details of how to manage the logistics and economics of this demanding manual exercise. "This photocopying exercise is similar in many ways to the way that Fair, Isaac used to take data samples" he had written in an email as we prepared the trip. "Namely, someone from FI would show up in a finance company office or bank credit department with a portable microfilm camera and run application forms, credit reports, etc. through it."⁴⁹ Bob's messages were replete with copying options, page counts, time trails and cost analyses. In one, he estimated that "based on the measure

⁴⁸ In the last U.S. census in 2000 Marin was the county with the highest incomes per capita at a reported \$44,962.

⁴⁹ Robert Sanderson, personal email communication, June 2, 2004.

that a 1" thick stack of 2-sided pages is about 1000 pages. For the first 16 years of Viewpoints all issues had four pages, thus, the 1" thick stack contains: 16 years X 4 issues/year X 4 pages/issue = 1024 pages⁵⁰. In another, he informed me that “The Kinko's copying manager did a simulation and estimated 30 seconds to do one 4-page issue, or 8 pages per minute. I think a more realistic estimate is 6 pages per minute. That works out to 22.22 hours to copy 8,000 pages, or 3 full normal workdays.”⁵¹

What had seemed a relatively easy task to me was to him a precision exercise to be preceded by swift if simple predictive calculation. If I was initially startled by his approach to planning and decision-making, I would soon come to understand that these statements demonstrated a professional, personal and ethical dedication to the methods of OR. Loosely defined, he told me, OR's non-military purpose “is to clarify the differences between the several courses, indicate their outcome and relate these to the stated objectives of the operation”⁵². Bob authored the statement “Do it right, do it cheap, do it on time”, the longstanding and cherished internal motto at Fair Isaac. For him, even the most modest project might benefit from being subjected the rigor of techniques for improving production efficiency. Conscious of the performance goals he had established and spurred to the task as though Bob were surveying me with a chronometer in hand, I put my years of research assistantships to good use nimbly copying the entire collection, page-by-page, in one and a half work days—well under the time he had predicted. When it was over, the bounce in his step and the amused twinkle in his eyes as he came to collect me from the 2nd Street Kinko's told me that he was satisfied by the job done. He was perhaps, or so I hoped, impressed at my better-than-expected efficiency.

⁵⁰ Robert Sanderson, personal email communication, February, 19, 2004.

⁵¹ Robert Sanderson, personal email communication, June 2, 2004.

⁵² Robert Sanderson, personal email communication, date unknown.

Although I did not grasp it immediately, this early encounter with Bob had brought into view the practical, hands-on work that had brought credit scoring into being. Just as I was learning valuable information about the company's past through my present day interactions with Bob over the way to reproduce historical documents, he had learned to be sensitive to the world of consumer credit by going out to finance companies to collect the credit files originally used to make credit scoring systems. "In my first years at FI," he spontaneously recalled, commiserating with the task at hand, "I did about two sampling trips per year as a form of R&R. It was also educational to see a real live credit operation, especially something like a center city finance company branch office."⁵³ During the car rides to and from the copy centre, he peppered me with numerous other tidbits about the process of building early scorecards and the people who had built them, exuding pride and pleasure at the memory of those days. It was in these exchanges that I first learned of a pragmatic research principle shared by me, a student seeking to examine past scientific practices⁵⁴, and this senior Fair Isaac analyst: if one is interested in practices of calculation then the on-the-ground experience of collecting old records by spending time with the people who made them can be as instructive as the contents of the documents retrieved.

Once Sanderson was convinced that I was serious about researching Fair Isaac, he willingly promoted my cause to the immediate circle of people he still kept in touch with who were associated with the company. At the end of a formal interview he jotted down a list of twenty one people to whom he introduced me. His high-ranking position in the firm

⁵³ Robert Sanderson, personal email communication, June 2, 2004.

⁵⁴ The term 'science scholar' refers to social scientific researchers whose topic of investigation includes the content of scientific knowledge. I have opted for this more specific term to 'science studies scholar', because science studies as a burgeoning inter-disciplinary field is an umbrella term that encompasses a variety of alternative approaches to the one I am expressing. Bruno Latour prefers the term 'science student', a deliberately ambiguous term that invokes the investigation of science as both observer and practitioner.

and the confidence he commanded from his colleagues has much to do with the privileged access I had to a core group of mostly former employees, including the entire R&D department of the 1990s who had left Fair Isaac to start their own rival, analytics outfit. Including Sanderson, my informants include four of the company's senior executive from the generation that succeeded the founders: Larry Rosenberger (1974-2007, CEO from 1991-1999), John Woldrich (1972-2000, COO from 2005), and Gerard de Kechove (1972-1996, CFO from 1983)⁵⁵. I further contacted a handful of people independently whose work I became aware of over the course of the research. In total 50 people participated, and I completed 44 full length interviews. Three requests were declined by people who are no longer with Fair Isaac but were still in the industry.

The space where the personal and professional meet

When faced with a sprawling technical system it is easy to forget that each and every facet, from the underlying code to the business contracts, was thoughtfully crafted by someone who knows the reasons why it was built this way. As companies get entrenched as permanent infrastructure, their production processes become both routine but also more complex. New functions are added so that no single person can remember how each of the moving parts was made or know how it all fits together. Studying how technical entities are made is often called 'studying up' because the people involved matter in their capacity as

⁵⁵ Because of the time period the study covers and numerous internal reorganizations and a proliferation in the number of titles given out over time it is difficult to characterize the sample. Of the 8 executive officers listed in the 1987 annual report, I interviewed all 6 who were still living; of the 25 officers listed in 1993, I interviewed 12; and of the 9 corporate officers listed in the 1999 annual report, I have interviewed 5. It should be noted that until 1999 people with titles were largely scientific staff who had been promoted to managerial positions; they were not professional managers. This distinction has dictated the selection of my interviews as I have pursued individuals who started their careers as analysts.

experts or practitioners and not just as regular citizens. But studying up is a misnomer because it implies a built-in status hierarchy between the researcher and the research subject. It also implies that what is important can only be communicated through specialized language and that the experts have the final word on the overall vision of the research.

To the contrary, getting experts to talk about their professional contributions means having them invite you into a space of intimacy and restricted vision (see *Research techniques*). In a small company where each person makes a distinctive contribution participating in technical achievement is personally charged experience. It is worth noting that in 2004, Fair Isaac was in a much different place than it is today. In 2004, Fair Isaac still retained a personal memory of its founders and its second generation of lifetime employees had only just retired. It was still an essentially low-profile company that prided itself on being nerdy, and was only getting used to its public face having been drawn out from behind the protective curtain of the credit bureaus by the real estate boom. A large portion of the stock was still held by the employees to whom it originally had been issued and the company was only just experiencing the shock of transitioning to its first market-fixated CEO.

In the wake of this century's financial upheavals, much of this has changed. Over the course of my research FICO has become a household word; most of the employees who would remember the old Fair Isaac ways have retired and moved on; and the current CEO, Mark Green, posts videos on YouTube and has appeared as a talking head on MSNBC. What I discovered in the field is that there are two distinct Fair Isaacs: there is the 'Fair Isaac' that I met from the past that was in the process of dissolving, a moral constellation of like-minded individuals interested in community and innovation; and there is a Fair Isaac of

the present, a more or less amnesic multinational, a cultural icon known as the makers of the ubiquitous 'FICO' that is accessible only through an elaborate legal and PR machine.

In 2004, I was also different. I was a backpack-bearing graduate student in Southern California with a basic understanding of statistics, and no significant exposure to the culture of the corporate world in graduate school. To Sanderson's astonishment, I did not even have a cell phone on my first visit. On my earliest field trips he picked me up and accompanied me to the appointments he had helped set up. Over the course of two years I would work my way outwards from this simple but firm starting point. I conducted 13 extended interviews in 2005; the following year I spent two months living in the Bay area, during which time I carried out a second round. A handful of additional US-related interviews were conducted at other locations and times including trips to Las Vegas, Lake Tahoe, Hendersonville (North Carolina), and New York, as well as meetings with some of Fair Isaac's former European team scattered across several countries⁵⁶.

I met some of the interviewees in their own homes in the Marin County hills, some at the Embassy Suites Hotel in San Rafael where Fair Isaac had once rented rooms to hold business meetings, and another set in cafes or restaurants. Two interviews were done with employees still working at the (then) Fair Isaac head office. For my second interview with Larry Rosenberger, he and his wife picked me up on their way to a family picnic for the employees of the Federal Reserve Board of San Francisco where she works. On one occasion in 2006, I was invited to join a group of retired women whose point of connection is that they all used to work at Fair Isaac (mostly manual data coders) who still meet

⁵⁶ Of the 22 interviews I carried out in Europe, 7 bore a direct relationship to Fair Isaac, the other to credit scoring practices in France. All of my travel within Europe, including transportation and per diem, was generously supported as 'missions de recherche' by the agency, EGIDE, as part of the terms of the Bourse Chateaubriand granted by the Ministry of Foreign Affairs, government of France.

periodically in San Rafael to share news and reminisce. And twice I was an overnight guest at an interviewee's home so that I could travel the distance to meet them in person.

The vast majority of the interviews were leisurely and winding, usually lasting well over an hour, and close to three hours on several occasions. With permission, all but one of the U.S. related interviews were digitally recorded, and the dialogue was transcribed in full⁵⁷. I was asked to go off the record only three times, twice to protect the name of the client and none of which involved secrets directly related to FICO. The encounter between me, an aspiring social scientific researcher, and some of the people who made the seemingly monolithic US consumer credit rating system did not look anything like one would perhaps expect. It involved no formal procedures and I never wore high heels.

There is one more point, then, about my field work that has been implied, but whose implications should be fully noted—it has been carried out under the radar without any official contact with the company, through a shadow network composed of loyal and knowledgeable former employees. What matters is that my informants were first hand participants in Fair Isaac's development. They generously donated their private time as individuals to go on record with an academic researcher, and consented to share the personal experiences they had had as professionals in the credit scoring industry. But nobody, with the exception of Larry Rosenberger and one anonymous participant, had any authority to speak on behalf of contemporary corporate Fair Isaac.

There was one attempt at direct contact with corporate Fair Isaac in the summer of 2006 that reinforces the uniqueness of my access. An informant reported having stashed several boxes of memorabilia stashed in a room somewhere in the main building. Since by

⁵⁷ I did the most technically detailed transcriptions myself, but most was done by paid undergraduate research assistants, and a professional service contacted through the Department of Sociology (Data-Word Processing, in Tucson, Arizona, operated by Loretta Sowers).

then I had established a rapport with Larry Rosenberger, who was still active as the head of Research & Development, I contacted him for help to locate the boxes in order to assess their contents. At first, things looked promising. At his behest, a Fair Isaac lawyer was put in touch with the Office of Contracts and Grants Administration (OCGA) at UCSD in January 2007 and some type of data-release contract was shuttled between them. For reasons that were never entirely clear (the case was probably just too low a priority on the Fair Isaac side) nothing was ever signed.⁵⁸

During the early negotiations I showed up, traveling the distance from Berkeley by public transportation, in an attempt to press the issue and get in. A few minutes elapsed during which I entered and exiting the building, attempting to reconnect by phone with Rosenberger's secretary and alternatively with Clarice Park, the lawyer handling the case at UCSD's Office of Contract and Grant Administration (OCGA). I tried to duck into the history room off the lobby that pays tribute to the founders thinking this was a harmless way to wait the situation out, when the receptionist, an unassuming middle-aged woman who was visibly agitated by the unusualness of my presence and unsure of what to do about it, stood up and blurted, 'You can't just be hanging around here!' With the weight of her admonition still hanging in the air, I turned around and left.

⁵⁸ The Non Disclosure Agreement (NDA) that was being negotiating would have allowed me to see the boxes of materials and determine their contents leaving Fair Isaac with the final say on what might be released for use. As part of the agreement I would have had to give them 10 days prior notice to review the content of all publications referring to the Released Information so they could vet them for proprietary materials for a period of, in Fair Isaac's version 10 years, in UCSD's, 5 years. I suspect that a document could have been signed had things proceeded apace, but there were too many intervening contingencies such as the discovery that "the law firm that represents Fair Isaac (and who is assisting with these NDA discussions) also represents the University on patent infringement" (Email communication from Clarice Park, OGSA, January 31 2007)! In the end the labor it would have required to enforce such a contract would have probably made it unfeasible in the long run.

How the system revealed itself

The same conditions that brought FICO to public attention—namely, the turn of the century housing boom which led to the discovery of the scores' existence by concerned consumers—plays a crucial role in the level of interest and cooperation I received from Sanderson and his social network. When I met with Peri Sarganis, Bill Fair's voluble longtime secretary and the company's mother hen, she took me page-by-page and name-by-name through an album with the photos of the 200 smiling individuals who were working for the firm in 1980. By the time I started my research the company had ballooned to 2,400 employees and had suffered the pains of an explosive growth spurt largely based upon FICO scores. After FICO was swept up into the mortgage scene it grew so large that it burst the collar of its leash and chased away its masters.

Fair Isaac receives a royalty every time a FICO score is pulled by a financial institution. (The price per user varies on a contract by contract basis which is never publicly disclosed). For example, when you receive a pre-approved credit card in the mail, this means that the card issuer has designed a product around a certain score range and has paid for your name because you fall in the targeted market segment. (According to U.S. law if a party pulls a score without permission they are obliged to follow up with a firm offer of credit.) As I have recorded elsewhere FICO scores were further adopted into mortgage lending after 1995 through the collaborative efforts of the government sponsored enterprises and the bond ratings agencies⁵⁹. Because of the number of agents involved in mortgage underwriting, scores are pulled not just once, but multiple times in the course of producing loans for securitization.

⁵⁹ Poon, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance."

Like cell phone minutes or nickel-cadmium batteries FICO scores provide a stream of revenue that grows or shrinks based on use volume. Fair Isaac's revenue skyrocketed with the advent of the FICO product. It increased from \$25 to \$250 million, over roughly the tenure of Fair Isaac's second CEO Larry Rosenberger, a period of less than 10 years. The company that results from this explosion is the behemoth that exists today. But for the first 30 years or so of its existence Fair Isaac was run like a family business, a culture Bill Fair continued to cultivate even after the IPO in 1986. Fair managed the business internally by promoting the most senior analytic staff hired in the 1970s into executive positions. By 1999, as FICO's expansion leveled off, the company was in a crisis over how to sustain such astronomical levels of growth. The painful decision was made to turn the reins over to an external CEO.

The person selected to 'lead the company into the 21st century' was Tom Grudenowski, a partner in charge of e-commerce ventures at Andersen Consulting. After a brief honeymoon between the newcomers and Fair Isaac's old guard things soon turned extremely sour. The self-styled technical nerds who had spent their lives in a campus like environment where creative inventiveness was the primary value were shell-shocked by the implementation of management strategy that would cut jobs, downsize research, and according to some allegations, even bilk clients to maximize shareholder value. The conflict is summarized in the outrage expressed to me by Bill Fair's wife, Inger Fair: "I had lunch with the new CEO and all he could say to me over a social lunch was 'Oh, I can get the

stock to go to 90 [dollars]!’ But do I want to hear that? *That’s* not the purpose of the business. The purpose of the business is to do good things’’⁶⁰.

When I approached this research project Fair Isaac was grinding to the end of two intertwined but opposing movements—the enormous success of that FICO product that had inundated the company with an unforeseen stream of renewable use-based revenue (still ongoing as the real estate bubble accelerated) and the tragedy of facing the costs of its own success that had eroded the intimacy of its internal scientific culture under the pressure from Wall Street. The impetus to speak to an outside researcher was in part inspired by a deep respect for academia which, as a scientific company, the founders had always harbored. (I do not think someone presenting themselves as journalist gathering information on behalf of the public would have been greeted with quite the same level of candor). But this willingness to speak was also driven by something more pressing, a palpable feeling of moral conviction mixed with loss, a collective expression of grief.

This small community which agreed to talk to me at the behest of a respected lead figure is defined by two overarching qualities. For the most part they no longer had any immediate involvement with the day-to-day running of the company, but each and every one had a continued personal sense of pride in Fair Isaac and a strong interest in its legacy⁶¹.

There was a desire to save what they considered special about Fair Isaac—a set of shared

⁶⁰ Interview by the author, September 9, 2005. Bill Fair’s wife likened the history of Fair Isaac to the fabled Hewett-Packard and suggested that I look to it as a model for my research. HP began as a two person operation whose success has been credited to its outstanding corporate culture promoted by founders ‘Bill and Dave’ who rejected hire and fire practices and gave employees a shareholder stake. A highly publicized battle that eventually led to her dismissal, broke out between employees and infamous CEO Carly Fiorina because of the way her managerial decisions challenged the ‘HP way’.

⁶¹ The emotion that defined my sample was especially notable in Europe, where I did interviews with several people who had spent considerably less time with the company, or had been partners with Fair Isaac in some capacity from abroad, and spoke about it with the same fond regard. People who did not want to participate in this conversation – defined by a feeling of solidarity, an attachment to the company’s past – were the ones who declined.

company values whose eradication was cause for profound indignation. If these values were going to disappear, they wanted them to be recorded and archived to symbolically demarcate ‘their’ Fair Isaac from the company of the present. On another level, the appearance of a neutral stranger allowed grievances and differences of opinion that might not otherwise have found an outlet, to be aired about how things had ended up this way and why.

Still major shareholders with an investment stake in the company, the people I spoke to could not stand to see sustained scientific innovation and stable terms of employment liquidated for short term financial gain. In their view, values which had once integrated business and science were being violently replaced by a Wall Street oriented CEO with a different logic of value production. To tell me their story was a form of testimony and protestation against what they felt was the introduction of illegitimate ways of sustaining earnings. (There is a distinct element of irony here given the way I will argue that credit scores transform consumer lending into a profit-making proposition.) What was apparent in the interviews was that Fair Isaac people were as possessed by business intrigue as they were with technology development. Innovations in the business of selling scores were intricately bound up in finding new ways to use math and statistics in lending.

The great real estate boom and bust of the 2000s, the irruption of FICO onto the public scene, and the loss of control over the company by the Fair Isaac’s old guard, are all blowback from the same long term process of establishing a new information system. As FICO became systemically important, it could not remain hidden behind the scenes; and as revenues grew from its successes, the disgruntlement inside the company increased. This interconnected set of circumstances— runaway FICO usage, the growing pains of the company, and the willingness of Sanderson’s network to disclose their professional history—

are anything but a coincidence. No method would have mattered in this research had the FICO-system not created a window of opportunity onto itself. The conditions under which this research was possible are a direct result of the system's own relentless activity⁶².

⁶² The idea that things must show themselves has been extensively discussed in an article I translated by sociologist of taste Antoine Hennion. See Antoine Hennion, "Those Things That Hold Us Together: Taste and Sociology," *Cultural Sociology* 1, no. 1 (2007).

Table 1. Summary of major sources used in each chapter

Empirical theme	Major sources	Period	Location
Chapter 1.	Recollections from (former) employee interviews.	See Table 1	Marin County, California
The process of manufacturing scorecards	Formal statement of company history. <i>A Brief History of Fair Isaac</i> , unpublished internal history for employee by Buzz Sawyer Unfinished memoire drafted in a memo to employee by Bill Fair.	c1977 c1992 1991	From personal employee collections.
Chapter 2.	History of Russell Sage Foundation and early history of instalment lending	c1900-1930	Manuscript collection Hagley Museum and Library
The costs of controlling credit	<i>Consumer credit symposium</i> (conference proceedings), selected articles <i>Proceedings of the National Consumer Credit Conference</i> , selected articles	1942-1971 1951, 1954, 1957, 1958, 1959	Collection of Regenstein Library University of Chicago
Chapter 3.	Textbooks on operations research	1960s	Collection of Regenstein Library, University of Chicago
The history of operations research	Disciplinary articles and book chapters on history of OR, traced through references. First article: Blackett, P. M. S. "Operational Research." <i>Operational Research Quarterly</i> 1, no. 1 (1950): 3-6. Last article: Kirby, Maurice. "Operations Research Trajectories: The Anglo-American Experience from the 1940s to the 1990s." <i>Operations Research</i> 48, no. 5 (2000): 661-70.	1950 -2000	Library, University of Chicago

Table 1 *cont.*

Empirical theme	Major sources	Period	Location
Chapter 4. Equal credit opportunity legislation	Consumer Credit Protection Act, May 20, 1968. Report no. 1397 House of Representatives 90 th Congress 2 ^d Session.	1968	US Congressional Record, Nexus-Lexus
	National Commission on Consumer Finance, <i>Consumer Credit in the United States</i> . Washington D.C.: U.S. Government.	1972	Congressional
	Credit Discrimination. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking and Currency. House of Representatives. 93 rd Congress. June 20-21.	1974	
	To Amend the Equal Credit Opportunity Act of 1974. Hearings before the Subcommittee on Banking, Currency and Housing, House of Representatives, 94 th Congress. April 22-23.	1975	
	Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs United States Senate. 94 th Congress. July 15, 17, and 24.	1975	
	Credit Card Redlining. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs, U.S. Senate, 96 th Congress, June 4-5	1979	

Research techniques

Interviewing experts as members of a community

Exploratory field contact was made in January 2004. In a show of defiance towards Grudenowski, Sanderson arranged to hold the meeting at Fair Isaac's former head office, 200 Smith Ranch Road in San Rafael⁶³. We were barely seated when a warm and unprompted discussion unfolded between Sanderson and the two contacts he had invited. At the table were Christian Fair, Bill Fair's son, the only member of the Fair family in the business (he was at the time head of a global strategy group at CitiBank), and Uli Zeisluft, an 'international alliance manager' (expert in credit information institutions) at Fair Isaac. When the conversation rolled along uninterrupted for well over an hour, it became clear that although they were speaking for my benefit, what motivated speech was interacting with each other. I would seek to imitate the dynamic of this first meeting in all subsequent interviews.

Personal memory is a delicate research material that responds altogether differently depending on how it is handled. Placing people who are familiar with one another in interaction is a powerful if unwieldy tool for moving beyond frequently recited narratives (ritualized oral history) which are easily passed around like a picture in a frame, but reveal little about the variability of day-to-day experience. When a researcher seeks to draw out generalizations they will repeat an identical sequence of questions with multiple, detached individuals. In contrast, when tracing a process of innovation I am probing for the

⁶³ Grudenowski is said to have treasonously broken one of his recruitment promises when he moved the corporate offices to his hometown of Minneapolis, Minnesota in 2004.

specificities of each expert's personal contribution to the system⁶⁴. The kind of interview I do is technical not only because of the content it seeks, but because I need to find cues that will tap into memories of technically specific information and controversial episodes.

Moving among people who know one another was a method of finding participants, but it was also an essential element of interviewing technique. Although I began with very little knowledge of credit scoring, I was able to proceed iteratively, posing simple questions about how *this* was different from *that*, or by asking one person to clarify and respond to the comments made by another (unnamed) colleague. Each interview was an encounter with a curious outsider, but one who channeled the familiar voices of colleagues into the conversation. To overcome the obstacle of getting people to speak about specifics when I was still unfamiliar with the system I was navigating, I put people in conversation with other interviewees. The most insightful conversations occurred when participants spoke to me, not as a representative of the academy or of a greater public, but as a medium of engaging with their own collective whose opinion they cared about⁶⁵.

⁶⁴ The topic of the interview was covered in a very informative doctoral seminar at the Center for the Sociology of Innovation on April 3 2007, led by Antoine Hennion and Dominique Linhardt. Comparing conversations with experts, witnesses and victims, the center takes a broad view of the interview as a research technique. Politically and emotionally charged situations reveal that as an encounter, an interview can never be neutral, procedural or clinical. The interview by definition involves interpersonal friction. It is designed, through direct contact with people, to solicit speech. A true interlocutor is one who is in a position to resist, correct, hesitate, rethink, and sometimes even fail to remember. For a compelling example of the complexity of interviewing witnesses to genocide in Bosnia-Herzegovina see Elisabeth Clavérie, "Techniques De La Menace," *Terrains* 43 (2004). What Clavérie shows is that the more the witnesses say, the more they reveal that they did not see what was coming, can not explain what happened, and are struggling to find a language to express how things between neighbors could change so suddenly. The idea, therefore, is not to treat the subject as omniscient by asking the 'right' questions, nor is it to protect their thoughts from contamination. Rather, the purpose of the interview is to engage with people in order to multiply the number of positions in play. For a discussion of how an interview, even one in which the subject does not take interest in the questions, can never fail to give some kind of insight see Hennion, "Those Things That Hold Us Together: Taste and Sociology."

⁶⁵ The unspoken that many participants wanted to talk to each other about was what had happened for the founding faction to lose control of the company to Wall Street interests. Every interview was in a sense an attempt to define one's place, opinion and responsibility with regard to that movement.

Unless practice is already considered important and has been subject to a narrative process of storage, its details can be tremendously difficult to access. Data coders could remember how a piece of gossip was delivered word-for-word 20 years prior, but were not able to recall the codes themselves unless prodded by one another. Statistical analysts were somewhat different. Their work is highly valorized and comes with a formalized language of description. So they had plenty to say about what they do and relish discussions of technical conundrums. In interviews, analysts would begin with an air of reserve citing the non-disclosure agreements they had signed to protect their proprietary contributions. But once a conversation was unleashed there was a great deal they were not shy to speak about. The challenge was to convince them that tech talk is what I was interested in hearing, and to then parse out theoretical discussions from issues that bore relevance to material outcomes.

The novelty of my interviews is that they preserve an account of Fair Isaac's history which is neither constructed and controlled by a professional PR machine, nor overseen by a corporate legal team. By getting into the company's internal dialogue which would never have been systematically enunciated and recorded outside of this intervention, I have externalized a perspective on the US credit scoring system that did not exist before. It is noteworthy that the only person who took a defensive posture towards me was Peter McCorkell, Fair Isaac's first general council (1986–2000), who suspiciously growled, "I'm just not sure what you're up to", repeating it twice as though he was still the faithful watchdog of the company. This project is not founded upon a string of conversation with individuals, but upon an iterative conversation with a cohesive community.

Assembling a documentary history

When I inquired about the company archives Chris Fair pointedly replied that, “History now matters less at Fair Isaac than at any time in its previous history”⁶⁶. The FICO–system is a highly visible culmination of decades of work. But the traces that record the fifty years in which Fair Isaac labored in obscurity are remarkably scant. At the end of the first meeting I was offered a copy of a book called *An Introduction to Credit Scoring* (1992) a pet retirement project of long-time Fair Isaac employee Ted Lewis. A textbook presentation of scoring, this is the only systematic written statement by anyone at the company. The work gives a solid snapshot of how scorecards were being built when Lewis retired in the early 1990s⁶⁷. What most other people remember about Fair Isaac, however, is far less systematic. Like a skeleton, their stories provide pieces that fit loosely together but with gaping holes and empty spaces. The bones of this project come from lengthy interviews, but the meat and the connective tissue come from extensive additional documentary research.

For other documents bearing on the company in addition to Sanderson’s collection of newsletters I have depended on the kindness and organization of my participants. In publicly circulating materials, a number of people offered me original copies of the annual reports and the 10-K filings from 1986 onwards and some Fair Isaac conference proceedings from the mid-1990s. Others contributed whitepapers, sales manuals that describe products and favorite memos that had been kept. One European participant gave me his personnel files with his performance reviews and the employee stock program. A few academic publications by Fair Isaac personnel were published in edited volumes produced by the

⁶⁶ Introductory meeting, Jan. 22, 2004.

⁶⁷ Lewis, *An Introduction to Credit Scoring*. Ted Lewis was hired in 1960 and retired in 1988. Fondly referred to as Uncle Ted, he was considered third in line after Bill Fair and Earl Isaac although he was not given as much of an equity share. Fair was known for his pragmatism and Isaac for his inventiveness. Lewis was known for his salesmanship and charm.

Credit Research Center at Edinburgh University⁶⁸. There are a few articles related to the company in newspaper and trade journals, as well as a few short documents that record aspects of company history, including a 50 year anniversary booklet published in 2008.

Business historian Christopher McKenna describes having encountered a similar research problem in his attempt to trace the history of what management consulting has done for business without having access to the records of a consulting firm⁶⁹. McKenna's solution was inspired. To trace out the history of consulting obliquely he located the archives of firms that had hired consultants and used these records to examine and reconstruct consulting activities over the years. McKenna's strategy does not fully translate because what characterizes Fair Isaac, what gave them a long-term edge in becoming a key financial services intermediary, is the generational continuity within in the company. While people in financial services are constantly being reshuffled and relocated, because of the close-knit environment at Fair Isaac many people made their entire careers and did not leave. (In sales calls, Fair Isaac team frequently had to explain to a financial operation's representative what the scoring technology his firm was using, why it had been implemented years before, and what further analytic capabilities were needed.) So if there is any institutional memory of credit scoring it should definitely be on the Fair Isaac side⁷⁰.

Nonetheless, McKenna's oblique approach is inspiring. In 2007–2008 I relocated to Chicago, the mail order, retail and early consumer credit capital of the US, where I

⁶⁸ This contact was made by Professor Robert Oliver in IEOR at UC Berkeley, a long time confidant of Bill Fair who used to send Fair Isaac his best students. He served as a member of the board for many years.

⁶⁹ Christopher McKenna, *The World's Newest Profession: Management Consulting in the Twentieth Century, Cambridge Studies in the Emergence of Global Enterprise* (New York: Cambridge University Press, 2006).

⁷⁰ This is one of the reasons given for why Fair Isaac was so effective in negotiating with the credit bureaus in the mid-1980s: because the representatives of the bureaus on the other side of the negotiating table were always changing.

discovered consumer credit trade literature in the Regenstein Library, University of Chicago. The account of mid-century finance where credit was offered from retailers (goods on installment payments) and finance companies (regulated cash lending) revealed a great deal about the 1950s credit environment Fair Isaac would have been trying to penetrate. Reading this material gave symmetry to the history of credit scoring because it became obvious to me how little Fair Isaac people had told me about how their consumer finance used to operate or what their customers would have been thinking. Fair Isaac knows that its business was slow for the first 30 years, but they do not have a very good explanation for why. They do not need to. As the ultimate winners they simply resort to Whig history, grinning to each other about the hard-headedness of the credit industry.

At the Regenstein I also assembled a literature review on the history of Operations Research, covering articles and a handful of mid-century textbooks to understand more about what Fair Isaac's OR trained practitioners might have thought they were doing. There are some striking contrasts between methodical OR scientists and the free-wheeling, seat-of-your-pants credit men who were no longer dominating the industry in mid-century but were certainly still very present. Credit scoring is born at a historical moment when the credit industry was in transition from being the domain of retailers (no cash, the price of goods generates profit) and philanthropically-initiated finance companies institutions (cash lending, low profit, tight interest rate caps), to a situation where profit hungry banks will begin their attempt take over both functions (cash lending for purchases separated from the sale of goods). Credit scoring's ascendance cannot be understood in isolation. How OR intersected with a particular moment in the credit industry's evolution also matters.

To learn more about how the histories of industries and of industrial change are written I spent 5 weeks in residence at the Hagley Museum and Library, in Wilmington, Delaware, in the summer of 2008. Industrialization is very much a history of how different things (guns, sewing machines, motor cars etc.) come into being; it is a history filled with accounts of manufacturing processes, organizational structures, labor and machines. Descriptions of industrial processes are a resource for putting what Fair Isaac did into words. Instead of describing calculation as a generically distributed social activity, we can more specifically describe the early ‘scorecard’ as a product targeted at credit managers that is being physically assembled out of raw materials passing through a process of production. The systematic way Fair Isaac organized its own activities sheds light in turn on how scorecard technology, once implemented at the lending operation, functioned as a tool to help credit managers wrest control over their own internal production mechanisms.

When enriched with business history a science studies account of innovation can also become an account of broader transformations in the credit industry⁷¹. The rise of consumer credit as a mass-market banking sector capable of generating profit independently from retail sales is a form of ‘financialization’ that is deeply rooted in the absorption of cybernetically inspired digital computing. When examined closely, it becomes clear that the entire shift could only be actualized through weighty material processes inherited from industrialization. It is one thing to remark upon the shift from the industrial to the information era, it is another to trace the process through which this transition has been

⁷¹ As Geoffrey Bowker has duly noted, “There is in fact an awful lot of history of industrial science, but it takes either the form of business history or the form of history of science. Because of the double filter, it has rarely been the two together.” Geoffrey C. Bowker, *Science on the Run: Information Management and Industrial Geophysics at Schlumberger, 1920-1940* (Cambridge MA: MIT Press, 1994), p. 18.

actualized. Following business historian Joanne Yates, I try to show how industrial practices of production produced the information infrastructures that have ushered in the digital age⁷².

Last but not least, I discovered one rich cache of material about Fair Isaac which can not be recognized as such without knowing the history of the company: the government documents and the congressional record surrounding Equal Credit Opportunity. Credit scoring became a charged topic of discussion between 1972 and 1976 when Congress sought to eliminate a selection of sensitive factors from consideration in credit screening. Statements against the ban were made by some of the biggest retailers and finance companies who were using a newfangled credit scoring system provided by an ‘independent consultant’. It is one thing to read the congressional record as a tale of a generalized science versus governance; it is another to read it as the science of a particular company anonymously put on trial. All of these credit agents provided the same, remarkably uniform information to legislators about how credit scoring works. Recognizing this fact in the congressional record requires knowing that there was only one credit scoring operation in business at that time. The unnamed company was in fact, Fair Isaac.

⁷² Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*.

Chapter 1

Scorecard Manufacture (1957-ca. 1980)

The invention of a new financial tool and its introduction into the commercial world may sound boring, but it is hardly that to those who are trying to do it.

*Edward M. Lewis*⁷³

Numerous social scientific treatises have been penned to say that computing and information driven decision-making demarcate the onset of a radical new age⁷⁴. Sociologist Daniel Bell has argued that we are moving towards a post-industrial society, a society defined by its dependence upon “an ‘intellectual technology’ as against the older form of ‘mechanical technology’”⁷⁵. The statement indicates that a tidy qualitative distinction can be drawn between the order associated with electronic signals and an older order associated with

⁷³ Lewis, *An Introduction to Credit Scoring*, p. xi.

⁷⁴ A version of this chapter appears in Bernardo Bátiz-Lazo, J. Carles Maixé-Altés, and Paul Thomes, eds., *Technological Innovation in Retail Finance, International Historical Perspectives*, vol. 20, *Routledge International Studies in Business History* (New York: Routledge, 2010).

⁷⁵ Bell, *The Coming of Post-Industrial Society, a Venture in Social Forecasting*, p. xxx.. In Bell’s view different versions of technology can cohabit and interact, but he holds that technologies themselves “provide instrumentalities and potentialities” (xxxviii) that are always separate from social choices. This would account for why technical change in his account must be portrayed as an abrupt transition.

mechanical engines. This research seeks to complicate such neatly contrasting pictures. Rather than focusing on revolution or historical rupture, I will suggest that processes of technology manufacturing that inherit from the virtues of industrialization have played a crucial role in bringing about the intellectual or post-industrial turn that Bell and others have characterized.

To contribute nuance and friction to more ambitious accounts of historical transformation this chapter will explore in detail how the transition towards computer-assisted management was initiated within one industry—consumer finance, and along one axis—application screening. I will describe the physically constrained conditions under which the consumer finance industry made its first tentative steps towards statistical forms of operational control. Fair Isaac's first attempts to introduce credit scoring grew out of a raw manual environment, and not the fluidity of a digital setting. What is remarkable is that the company introduced statistical analysis to finance operations well before the widespread digitalization of that domain. This means that Fair Isaac's original value proposition was quite unlike what we think of as an information technology business today. In the absence of digital infrastructure—a built electronic environment composed of cables, transmitters, protocols, programs, signals, and servers that support rapid interconnection—calculation was not carried out by being screen-bound or sedentary people.

In the late 1950s the ability to calculate involved executing a series of physically demanding activities. Credit scoring required a steady traffic of materials back and forth, between Fair Isaac, a second-party firm with access to computers and engineering skill, and storage rooms of credit operations spread out across the country. To change credit screening practices on the ground, the company had to command an intricate process of

moving people, paper and things around. Far from being an abstract intellectual exercise, bringing risk calculation and decision-making into being has required intensive material reorganization that still goes on inside the digitized universe even though it has become more difficult to see⁷⁶. This is why I invoke ‘manufacturing’ as an empirical resource for narrating the labor behind risk management and new information technologies⁷⁷. I use the term literally, not only to underscore that the scorecard was developed through commercial enterprise, but also to emphasize that the rise of risk calculation can involve a genuine process of product innovation, production and delivery by a specific firm⁷⁸.

Drawing from oral histories and company memoirs this chapter will record the unique arrangement akin to a factory line that was put in place by Fair Isaac to make an early credit scoring instrument called a ‘scorecard’. Tracing history through a tangible instrument has benefits because of the close coupling between the specificity of tools and the acquisition of, in this case, managerial capacities. As this dissertation argues, current credit scoring practice did not simply evolve out of a generic or repetitious process of local

⁷⁶ The physical dimension of such digitalization is becoming more difficult to ignore with the appearance of massive amounts of hazardous digital machine waste. Like computer manufacture and digitizing data capture, this basic material aspect of digital society is largely hidden by moving it offshore.

⁷⁷ While numerous historians have studied the histories of corporate research laboratories within firms (for an excellent review, see Michael Aaron Dennis, "Accounting for Research: New Histories of Corporate Laboratories and the Social History of American Science," *Social Studies of Science* 17 (1987).), very few have discussed how specialized firms provide scientific and technological products to client industries. One notable exception is Geoffrey Bowker's study of how Schlumberger had established a form of information infrastructure among oil companies through the production of its geophysical information. Bowker, *Science on the Run: Information Management and Industrial Geophysics at Schlumberger, 1920-1940*. Another is JoAnne Yates' study of how tabulation technology was adapted to the insurance industry. Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*.

⁷⁸ This is the meaning of manufacture as it is used in Karin Knorr-Cetina's 1981 monograph, *The Manufacture of Knowledge*, a foundational work in the sociology of science. Based on a year-long study of a government-funded (and not industrial) biochemical research center Knorr-Cetina sought to show that ‘what happens in the process of [scientific] construction is *not* irrelevant to the products we obtain’ (5). Beyond the title, however, the term manufacturing is invoked metaphorically in this work to refer to science as a generative act. Karin Knorr Cetina, *The Manufacture of Knowledge* (Oxford: Pergamon Press, 1981).

discovery. The fact that credit scoring has been absorbed in a somewhat common form across the US can be largely attributed to the perseverant efforts of a single instrument-making company. That being said, because the scorecard is a flexible and perpetually evolving entity, what is presented here does not capture a definitive description of what the technology is, nor do I propose a fixed definition of what it should be⁷⁹. I have merely sought to recreate a snapshot of an early moment in the scorecard's development with the purpose of locating the technical kernel from which to trace forward the emergence of the contemporary scoring system.

Inventing a device for assigning an odds of default

Fair Isaac began as a two person firm in 1956, founded by William R. Fair and Earl J. Isaac. The business plan the two young partners devised upon leaving the employment of the Stanford Research Institute (SRI) was to set up shop as independent computer consultants who would apply operations research techniques to civilian problems. Some inaugural projects would involve assisting firms to install and utilize computers, but others, like credit scoring, would involve executing computation on behalf of firms who did not have access to a computer of their own. In 1957, Fair Isaac began to do concerted work on what it called 'the credit granting problem', the specific problem of 'account origination' or 'client selection' in consumer finance. Bill Fair unhesitatingly gives credit to the company's first scientific employee, also from the SRI, 'a gentleman by the name of Earl Follett'⁸⁰ for

⁷⁹ Poon, "Scorecards as Devices for Consumer Credit: The Case of Fair, Isaac & Company Incorporated."

⁸⁰ William R. Fair, "Inform History (Unfinished Memo)," (San Rafael: Collection of the author, Saturday, April 27, 1991). 1991

having introduced the idea. When Follett joined Fair and Isaac he had already done work on the potential usefulness of multivariate statistics in consumer credit screening. Eventually, the more general goals of computer consulting would give way to a tight specialization in credit scoring tools, which were at first only one among many of the company's projects.

In a memoir written in 1977, Fair recorded how he and his partners had originally formulated the credit granting problem. In keeping with the principles of operations research, the trio's initial instinct was that "a competent analysis of the large number of factors appearing on a credit application would permit the construction of an accurate odds quoter of the applicant's future payment behavior"⁸¹. (It should be noted that this statement was written retrospectively the 1970s so the word 'behavior' attached to only the applicant (person) and not to the application (case) is an anachronism. This point will be further explained in Chapter 3.) The team's general premise was that with access to a rich source of data, it would be possible to statistically summarize the known outcomes of previous cases in support of forward-looking decision making. Insofar as an imprint of the past was captured by the kinds of information that were being conserved within a lender's administrative records, the assumption was that a pattern of performance could be mapped, and then used as a guide to future credit-granting action. Scorecards were presented as a means of using statistical analysis of performance data to quickly and mechanically replicate the choices that had previously been made by a lending operation.

In its original conception the tool would be a simple aid "used by a credit grantor in deciding which risks he would be willing to accept and which he would prefer to reject"⁸².

Assisted by way of statistics, the Fair Isaac team suggested that a credit organization might

⁸¹ Fair Isaac & Company Incorporated, "History of Fair, Isaac and Co.," (San Rafael: 1977).

⁸² Buzz Sawyer, ed., *A Brief History of Fair Isaac*, *Unpublished* (c 1992). Collection of the author.

not only mechanically replicate its previous choice set, but might further control and reduce the rate of unwanted events. Armed with a summary of their own past experience represented through integers printed on a card, credit managers would be able to use this information to avoid originating the kinds of accounts that had already lead them to a negative experience, while pursuing more of the ones that resembled those known to have resulted in acceptable repayment outcomes⁸³. In comparison to the sophistication of today's statistical risk management practices the purpose of the original application scorecard was modest in the extreme. With increasingly mechanized data capture, credit scoring tools have been adapted to assist in a number of complex credit management tasks⁸⁴. Through to the mid-1970s, however, scorecards were made by analyzing limited data mostly available from handwritten credit files, and their utility was limited solely to the problem of account origination—to assisting in a decision framed as a binary question of whether or not to originate a loan.

To launch its business initiative, Fair Isaac sent letters to fifty of the nation's top consumer credit lenders, a range of both banks and finance companies. The communication not only explained the concept of quoting odds, but it also solicited “[the lender’s] views as to how it would operate in practice”⁸⁵. In an oft repeated story, only one firm, the local subsidiary of the fourth largest finance company in the nation, bothered to respond. For its first scoring job, Fair Isaac was received by the Public Finance Company of Missouri which

⁸³ To emphasize the modesty of the original scorecard, it is worth mentioning that decreasing default is a distinct goal from increasing returns or widening profit margins, even though the latter are a heavily implied result of the former. This is to say, it is one thing to show that the tool decreases default, as Fair Isaac strived to do from the outset; it is a separate proof to show that (and how) the tool serves to increase revenue which may or may not, depending on the operating costs associated with managing the increase in revenue, result in greater profits.

⁸⁴ These tasks include, among others, account management, line limit changes, revenue projections, marketing response assessments and segmented pricing strategies.

⁸⁵ Sawyer, ed., *A Brief History of Fair Isaac*.

operated under its parent company, American Investment⁸⁶. It is noteworthy that the team arrived on location not as product vendors—since no product had as yet been developed—but as “specialists in mathematics and in the use of electronic computers”⁸⁷. By 1958, the world’s first commercially produced ‘odds quoters’ for the prediction of consumer default had been developed and installed. One odds quoter was put in place for screening clients in Public Finance Company’s home base of St. Louis and its surrounding areas. Another was developed for use in the neighboring state of Louisiana which was deemed to be a distinct population of borrowers and therefore to merit a separate statistical analysis⁸⁸.

By 1969, Fair Isaac had engineered seven geographically distinct odds quoters covering the American Investment Company’s eight hundred operations nationwide. Buoyed by this initial success Fair Isaac formed a sub-division called The Risk Evaluation Corporation (TRECORP) which focused exclusively on promoting the sale and production of these credit granting devices. TRECORP was eventually reabsorbed back into the parent company. So although the partners continued to dabble in a number of other types of consultancy projects throughout the 1960s, the major offering of Fair Isaac gradually became a specific product-solution: a table of statistically derived points embedded in a stiff sheet of cardboard that served as an onsite calculating tool for probabilistically sorting applicants for

⁸⁶ Several reports published at that time named American Investment Company as the fourth largest operation in the nation. Sidney Cottle and Kenneth Mickelwait, "Composite Earnings Performance of the Major Consumer Finance Companies," in *SRI Project No. I-2737* (Menlo Park: Stanford Research Institute, 1959), Albert L. Kraus, "Scoring System Begun on Credit," *New York Times*, July 9 1961.

⁸⁷ R. J. Zaegel, "Credit Scoring System" (paper presented at the Consumer Credit Symposium, 1962). The author of this trade journal paper was listed as the director of research at the Public Finance Company of St. Louis, Missouri, which was presumably a regional arm of the American Investment Company.

⁸⁸ In a previous publication, I misreported that the city of St. Louis in question was located in Louisiana. What should have been reported has been restated here. It was also misreported in that piece that the nationwide system was a single comprehensive scorecard when in fact it involved geographical segmentation. Poon, "Scorecards as Devices for Consumer Credit: The Case of Fair, Isaac & Company Incorporated."

consumer credit. The complete product “included the credit scoring table and the voluminous statistical information necessary for its effective use”⁸⁹. If the odds quoter was the bold initial ‘idea’ for the technology, the application scorecard could be considered the pragmatic outcome of its progressive material realization. The scorecard is at once a ‘thing’ (finished product), a set of characteristic design features and a routinized technical process; it is the basic location upon which modifications to consumer credit risk calculation would be enacted over time by dropped, changing or adding to aspects of its design.

Making the first scorecards would prove to be a tedious and physically laborious proposition. It is important to recognize that, unlike consultants, early Fair Isaac was not in the business of selling disembodied intellectual analysis or theory-based scientific expertise. Instead, their value proposition was deeply anchored in their mastery of the material world. In the Fair Isaac method, analysts culled credit data from paper files at finance field offices; transported the contents of these documents to Fair Isaac’s specially equipped central office; processed the raw materials into digital data through multiple sequential stages; and then deployed expensive computational machines adapted to credit scoring which the customer had neither the means to own nor the skill to operate. The turn towards mechanization is costly and requires much effort. It cannot work if it is not accompanied and supported by the very functions that Fair Isaac performed on behalf of their customer: data processing, streamlining, and standardization⁹⁰. After absorbing these tasks, Fair Isaac then delivered a refined analytic product back to the scorecard customer in a tangible, practical, and useful

⁸⁹ Lewis, *An Introduction to Credit Scoring*, p. 8.

⁹⁰ Hubert Bonin, "From Prehistory to the History of Computers in Banking: Mechanization of Data Processing and Accounting Methods in French Banks, Circa 1930-1950," in *Technological Innovation in Retail Finance, International Historical Perspectives*, ed. Bernardo Bátiz-Lazo, J. Carles Maixé-Altés, and Paul Thomes, *Routledge International Studies in Business History* (New York: Routledge, 2010).

manual format. For as with all technical projects, scientific efforts would have been useless unless the findings could actually be taken up by consumer financiers and put to use⁹¹.

The scorecard is designed for delivery and implementation

The first credit scoring devices were to be deployed in small towns and in rural America, often at the point-of-sale. This meant that clerks positioned at the retail level would be required to calculate the scores by hand. For this reason, the tool's final presentation had to be simple enough to be adopted by people with no knowledge of statistics and no access to calculating machines. In addition to performing statistical analysis, then, Fair Isaac was obliged to engineer a stand-alone tool to make results relevant to the everyday practices of lending operations. The choice of an appropriate statistical method as well as the table format for delivering the outcomes were both worked out 'in the field' through an experimental process of trial and error. Instead of providing an intimidating description of what the device was doing—that is, calculating an empirical likelihood of default for a prospective credit transaction (quoting odds)—the strategic name change pointed to the two most obvious features of the technology's manual design: the numerical *score* output and the physical *card*. Calling the tool a scorecard presumably helped to render it familiar by associating it with the point systems in various sports.

These original scorecards exploited the cheapest and most obvious sources of data. They were carefully constructed so that responses provided by a credit applicant to a series

⁹¹ Nelly Oudshoorn and Trevor Pinch, eds., *How Users Matter: The Co-Construction of Users and Technology, Inside Technology* (Cambridge, MA: The MIT Press, 2005), Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*.

of questions could be quickly situated according to the differentiating categories embedded on the printed card (Figure 1.1, p. 69). Applicants' answers assessed either face-to-face or from a written form were classified on a table of point distributions representing the statistical assessment of the algorithm. For each of the possible answers to the questions the algorithm assigned a numerical figure that contributed towards the calculation of a likelihood of defaulting. In simple terms, the scorecard worked as a kind of mathematical analogy. The statistical formula determined which cases an application most closely resembled from among the base of clients with whom the lender had already completed dealings in the past. The algorithm or model then calculated a probability of default—a numerically expressed estimate of the odds that a new case associated with these factors would repay a certain type of loan—according to how the groups constituted by and represented in the algorithm were already known to have behaved. This is how past experience drawn from archival data was communicated forward as an aid in ongoing decision making through the final score⁹².

The statistical content of the scoring apparatus was strongly shaped by practical considerations. In addition to being bound to the parsimonious holdings of handwritten records, content was further shaped by the easy-to-use form of the tool's final presentation. Trying "to minimize the error of the people doing the scoring" turned into "a big consideration when we developed a scorecard"⁹³ recalled one senior executive. Doing addition *in situ* was possible, but spur-of-the-moment multiplication proved to be somewhat problematic. What is more, the team soon also discovered that in a manual environment,

⁹² The entire paragraph has had to be restated from the published chapter to indicate that the scorecard was qualifying cases (configurations of people and firms) as discussed in Chapter 3 and not just the qualities of people, which is an anachronism and is not entirely accurate even in the case of today's FICO scores.

⁹³ Interview A by author with retired Fair Isaac employee, a first generation analyst and senior executive, June 22, 2004.

‘the fewer attributes you had [in the model] the easier to score’⁹⁴. It was only when the number of questions remained manageable—ten to twelve was ideal—that the points associated with each response could be reliably summed by hand. The key consideration in design, therefore, was neither statistical nor technical sophistication. It was that “the form of the model had to be simple enough that somebody could just ask a question look up something write down a single number write down the question look up something write down another number at the end of which, draw a line and add it up”⁹⁵. For the tool to work in the manual setting, statistical complexity had to yield along several dimensions to the material demands of the existing business environment.

Credit scoring changed the working routine for the clerk, but because the choice of data exploited the familiar encounter with a credit agent or application form the final system did not look or feel substantially different from what the consumer was used to experiencing. It is noteworthy that score calculation did not obviate an encounter with the consumer so much as it exploited it. As the *New York Times* explained when reporting on the novel use of scorecards at American Investment Company, “A prospective borrower is asked the familiar questions about his age, marital status, whether he owns or rents a home, how long he has been on the present job, whether he has a telephone, and the like”⁹⁶. In one basic version of the tool the user made reference to a permanent laminated copy of the table. They recopied the appropriate point values and performed the addition on a separate sheet of paper. In another version of the tool, stacks of disposable tables were printed up and the calculations were done directly on a fresh page for each applicant. The kinds of

⁹⁴ Ibid.

⁹⁵ Interview B by author with former Fair Isaac employee, a career analyst and current industry entrepreneur, Sept. 9, 2005.

⁹⁶ Kraus, "Scoring System Begun on Credit."

things that counted in a scorecard were transparent, because the applicant clearly knew what questions they were being asked to respond to, although to preserve the efficacy of the system and prevent gaming by consumers who might be tempted to change their replies, users were advised not to advertise the exact point values associated with each of the possible answers.

If the table has been the main calculative aid for some 4500 years of human history⁹⁷, then it should come as no surprise that the original Fair Isaac scorecard is also an enduring technical form. When pressed as to whether rudimentary manual scoring system continued to be relevant today, a senior credit scoring analyst with a major financial institution that started his career at Fair Isaac enthusiastically responded, “Absolutely. They were scoring by hand in ‘85. They were scoring by hand in 1990! And I bet there are some still scoring by hand in some other countries”⁹⁸. From humble beginnings, the scorecard has been passed down and informally diffused across the globe through generations of specialized credit scoring practitioners that have been trained at Fair Isaac and then gone on to work in the financial industry⁹⁹. What is more, despite the loss of two of its key features through digitalization¹⁰⁰—the physical card and the stringent limitations on credit file and application

⁹⁷ Martin Campbell-Kelly et al., eds., *The History of Mathematical Tables* (Oxford: Oxford University Press, 2003), p. 1.

⁹⁸ Interview C by author with former Fair Isaac employee, a career analyst and product innovator, Jan. 31, 2007.

⁹⁹ The process of developing scorecards was not protected as intellectual property and many aspects of the Fair Isaac approach have become, through informal transmission, standard in the credit scoring industry. What was protected were specific technical solutions to problems that would arise in the process of scoring that might affect the weights (point values) associated with each factor. This is like saying that the hamburger is a cultural dish but the version with the square patty or the special sauce might belong to a particular restaurant or brand.

¹⁰⁰ There are moments in digital scoring where the scores have also disappeared. For example, software can be hardwired to carry out score-based policies such that the only output a retail agent using computer relationship management (CRM) software might see is a final decision to offer a product, accept or reject an application, or seek additional information with regard to a client. For an ethnographic study of the use

data, numerous internal and taken-for-granted features of scorecard algorithms continue to be inherited from the original Fair Isaac methods of design and production. “[I]t is kind of ironic isn’t it”, marveled a active credit scoring innovator and intellectual legatee of Fair Isaac, “that the most sophisticated credit decisions these days are easily made based on a model form that started from a small finance company in the South”¹⁰¹.

of CRM in Hungarian retail banks see Zsuzsanna Vargha, "Technologies of Persuasion: Personal Selling and the Production of Markets in Consumer Finance" (Columbia University, 2009).

¹⁰¹ Interview B by author with former Fair Isaac employee, a career analyst and current industry entrepreneur, Sept. 9, 2005.

CHARACTERISTIC	ATTRIBUTES				
Years on Job	1 yr – 4.5 yrs 30	Less than 1 yr 35	4.5 to 12.4 38	12.5 or more Retired 52	
Finance Company	Any 0	None Listed 22			
Department Store	None listed 10	One 15	Two 23	Two or more 26	
Years at Address	Less than 3.5 Not Ans. 30	3.5 – 7.49 38	7.5 or more 42		
Bank Account	No Bank 10	Savings Only 20	Check Only 28	Check and Save 34	
Total Income	Less than \$600 30	\$600-699 42	\$700-1199 47	\$1200 or more Not Ans. 59	
Worst Bureau Rating	None 16	No Rating 5	One derog -13	Two or more -40	
No. Inquiries (6 mo.)	None or One 10	No Record 7	Two -2	Three -4	Four or more -10

Figure 1. 'The Example Bank – Scorecard'

This example scorecard has been reproduced from a newsletter called *Viewpoints*, distributed by Fair Isaac from 1977 onwards. Its purpose was to communicate information on best practices to scorecard customers in lay terms. The point-values are representative of actual results, although the table is probably a composite rather than a faithful presentation of a single empirical case. Sample scorecards were frequently used as teaching tools in the newsletter, but it is unclear whether the visual presentation of these tables is similar to the scorecards that were being employed by clerks in day-to-day retail transactions. The term 'department store' refers to retail lines of credit. The last two rows ask data from credit bureau reports. *Source: Viewpoints*, volume I: issue 2, Winter 1977, p 3

The process of scorecard manufacture (ca. 1960-1980)

At the core of this chapter is the claim that it is meaningless to treat the rise of consumer risk management as a spontaneous event of intellectual discovery. Some readers may be puzzled by the emphasis on acts of physical labor at the expense of statistical formulas in this account. Indeed, formulas, rules and theorems are one obvious way of capturing what it means to do risk calculation. But these are not the only languages through which to communicate how statistics have been put to use to evaluate consumer credit risk. To think about score calculation in terms of commercial manufacture is to focus on the daily activities that were carried out at the company which brought the first credit scoring tools into being, and to animate the movements of people and paper¹⁰². Captured here are the deliberate but ephemeral gestures and the repetitive organizational routines that support innovation, but are distilled out of esoteric formulas and are seldom if ever admitted into the formal records of scientific and technological achievement¹⁰³. The purpose of recording these movements is to show that risk management takes place from within a material setting and must connect and compress activities taking place in disparate times and locations.

¹⁰² The production process in the manual setting reduces paper into other forms of paper: credit files and ledger cards become microfiche images which are reprinted in San Rafael. Data are transferred to data sheets by coders, and then punched into IBM-cards. When the cards are run through the computer the analysis is spit out on long rolls of paper. The final algorithm, a concentration of all the paper that came before it, is presented to credit managers as a cardboard scorecard. In an engaging review of the literature that takes paperwork as an objet of investigation, historian of paperwork Ben Kafka notes that “The new social history that dominated Anglo-American historical studies in the 1960s and 1970s discovered all sorts of interesting and important things by looking *through* paper work, but seldom paused to look *at* it”. Ben Kafka, "Paperwork: The State of the Discipline," *Book History* 12 (2009): p. 341, emphasis in original. Bruno Latour has also used paper as a methodological trace in his work on France's *Conseil d'Etat*. Bruno Latour, *The Making of Law: An Ethnography of the Conseil D'etat* (Cambridge: Polity, 2010).

¹⁰³ For an account of how science is turned into written text through the selection of modalities see Bruno Latour, "Give Me a Laboratory and I Will Raise the World," in *Science Observed*, ed. Karin Knorr-Cetina and Michael Mulkay (Beverly Hills: Sage, 1983). See also Knorr Cetina, *The Manufacture of Knowledge*.

Collecting samples from credit offices

As late as the mid-1970s digital information infrastructures did not routinely exist in financial institutions. In technical terms, the ‘performance [of a loan] was on ledger cards as opposed to on an automated accounts receivable’¹⁰⁴. What this means in practice is that Fair Isaac worked with paper records. “A big part of projects was actually getting the data into the model. You know, 80% of the task was that a lot of what was coming [was] on paper and had to go through data processing and so on”¹⁰⁵. When a scorecard contract was signed, a team would be sent out to collect data for statistical analysis. Their job was to bring it back and concentrate it in a single location, the center of calculation¹⁰⁶, the place where analytic activity was concentrated—just north of San Francisco, in the city of San Rafael (Marin County). Just as grain, livestock and timber once poured into Chicago from rural areas through waterways and railroads, to be processed and shipped back out again, boxes full of raw credit data poured into San Rafael by parcel post from remote parts of the country to be analysed, mulched and returned to customers as finished scorecards¹⁰⁷. The Fair Isaac building was a research center, but it was simultaneously a factory floor¹⁰⁸.

¹⁰⁴ Interview D by author with a career Fair Isaac employee, a first generation analyst and senior executive, Sept 9, 2006.

¹⁰⁵ Interview E by author with a retired Fair Isaac employee, a first generation analyst and senior executive, Sept 5, 2004.

¹⁰⁶ Bruno Latour, "Centers of Calculation," in *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge MA: Harvard University Press, 1987).

¹⁰⁷ William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton & Company, 1992). As Cronon has shown, the city and the rural have been inextricably connected through industrialisation by the continuous traffic of raw materials and produced goods passing back and forth between them.

¹⁰⁸ This statement reflects the argument being made in Bowker, *Science on the Run: Information Management and Industrial Geophysics at Schlumberger, 1920-1940*. Bowker's point is to show that “that industrial science and technology is consequent on and reflective of a new way of working, that its true filiation is not with the mythology of great scientists but with the might of the industrial revolution” (14).

The key scientific and organizational figures in the process of producing a Fair Isaac scorecard were called ‘analysts’. Once a contract was made with a finance company (the main type of scorecard customer along with mail order outfits and some retail firms), the primary task of the analyst was to figure out how best to constitute a sample of cases on the ground which could be used to build a predictive statistical model. Scientists and project managers all-in-one, analysts were accorded by far the most prestige in the hierarchy of production. This was not only because of esoteric textbook knowledge achieved through higher education—early analysts were required to have or nearly have attained a Ph.D. in either engineering or operations research—but also because they were responsible for numerous strategic decisions that would affect how first order sampling was to be done¹⁰⁹. A practical and cost effective means of case selection was achieved by an imperfect method of cluster sampling, usually by selecting a few offices deemed representative of the overall operations of the finance firm through close consultation with its managers.

Since the goal was to statistically differentiate the past performance of both ‘good’ (consumers that had repaid consistently and in full) and ‘bad’ borrowers (consumers that had a record of disrupted repayments or of failing to repay in full), analysts selected consumer files which had a lengthy enough history from which to extract two ‘snapshots’ of data. These snapshots were used to establish a statistical relationship between characteristics assessed at the moment of application (first snapshot) and an outcome of default or repayment some time later (second snapshot). Data had to come from closed (and not current) credit accounts, so drawing a statistically adequate sample required digging deep into storage spaces to assemble defunct files from lists generated in co-operation with the

¹⁰⁹ There are several prominent female analysts and executives in Fair Isaac history but they do not appear until the 1980s.

scorecard customer. One of the old-guard described it this way: “[I]n those days, every shopping center had a loan office, and you’d go in and get an installment loan [...]. They kept everything on little cards, all handwritten”¹¹⁰. To access these files, analysts visited suburban strip malls to locate and copy ledger cards as well as application forms where conserved. Where there was no archival record, there could be no empirical analysis.

In July, 1974, Larry Rosenberger made his very first such sampling trip as a ‘kid out of school’ to fulfill a contract with Spiegel’s, the Chicago based mail-order firm. He packed his bags and followed fellow analyst John Woldrich, so that he could be taught everything he needed to know. The road trip “lasted a total of 10 days and covered Swissvale, PA, a suburb of Pittsburgh, Ironton, KY, Anderson, IN, Maumee, OH, Willowick OH”, and, as an internal Fair Isaac history records with what could be read as a hint of Californian snobbery, “several other bright spots in the heartland”. Somewhere along the way, one of the microfiche cameras broke down. Woldrich, the senior member of the team set out in the rental car to find a repair shop some 50 miles away leaving a baffled Rosenberger behind with barely any experience working the machine. Before he left, Woldrich reminded his pupil “that all he had to do was to be sure to adjust the exposure for the different colors of the ledger cards and everything would be OK.” His words were hardly reassuring. “I went to school 19 years,” Rosenberger thought ruefully to himself when left alone to contemplate his future in credit scoring, “to be able to take pictures of ledger cards”¹¹¹.

This particular story was often repeated at Fair Isaac not only because it was somewhat typical, but because Rosenberger would go on to succeed Bill Fair as chief

¹¹⁰ Interview ‘E’ by author with a retired Fair Isaac employee, a career analyst and senior executive, Sept 5, 2004.

¹¹¹ Sawyer, ed., *A Brief History of Fair Isaac*.

executive officer, while Woldrich would become an executive vice president and eventually, chief operating officer. What was striking in conversations with this first generation of analysts who eventually became the Fair Isaac executive in the 1990s, is that the most vivid part of early scorecard projects was sample collection, with little or no mention of the sanitized intellectual work usually associated with statistical analysis. Far from the idealized image of the ivory tower, doing scientific work at Fair Isaac involved manual participation. No one, not even a freshly graduated star PhD student of Robert Oliver coming out of Berkeley's IEOR (Industrial Engineering and Operations Research) program, could escape the mundane task of hauling boxes of data out of dusty storage rooms, some of which were being sequestered in some 'pretty unsavory places'. Recalling his trips to finance offices, another retired senior vice president noted that "At that time some of them were located in the worst parts of cities. [...] It could be, not intimidating, but certainly not the most pleasant thing, it's not the most glamorous thing to do, [...] driving around to these strip malls and storefronts"¹¹².

To strain matters more in the field, the aid offered by the finance company's local staff was often less than forthcoming. Clerks and office workers often had little regard for the disruptive intrusion of an alien scientific activity. "Some of the people who worked there might have a high school education. [...] These people don't particularly want to help you, right? They have their other jobs to do there and things like that"¹¹³. In a small technology firm with a handful of employees, run with the intimacy of a family business, when something had to get done everyone was expected to do their part. In the early years it

¹¹² Interview F by author with a retired Fair Isaac employee, a first generation analyst and senior executive, Aug. 8, 2006.

¹¹³ Ibid.

was not uncommon for spouses to travel with Fair Isaac analysts (and in at least one case a teenaged son), to provide companionship through long, hot, and dusty days on the road. Unsalariated spouses assisted in the grunt work that kept the company going. Incidents of accidentally destroyed records, water logged files, inaccessible or misplaced archives, and boxes shelved just out of reach, not to mention the occasional necktie caught in rolling microfiche feeders, all added to the challenge of assembling a workable sample.

The scorecard business grew slowly, but contract by contract, firm by firm, it did grow. Eventually, when the process was ironed out into a semi-skilled task, the sample collection trips would also be carried out by non-scientific Fair Isaac personnel. “So, can you imagine’ explained one former female employee, ‘going around to all these locations and shoving paper [a machine] bigger than a printer”¹¹⁴. “It was hard work,’ contributed another, ‘Once we hit the ground there was no joy. You would go in and you would go into the customer’s files and in many cases, you would have to sometimes pull ‘em out of there if they didn’t already have them arranged for you”. Underscoring the repetitiveness of the task she continued, “you would just keep passing the document through. Booorrring. Un-staple, then re-staple. Then, bloody hands”¹¹⁵. Once located, selected files continued to be photographed page-by-page, and by hand in the field. Thick undeveloped rolls of film were then sent back to California in metal canisters by post. “That was a real scary thing” about sampling, recalled a senior executive with a mischievous grin, “because you didn’t really know whether you had a good sample until you got it back”¹¹⁶.

¹¹⁴ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

¹¹⁵ *Ibid.*

¹¹⁶ Interview F by author with a retired Fair Isaac employee, a first generation analyst and senior executive, Aug. 8, 2006.

Hiring housewives to process data

Manual activity and moment-to-moment problem solving continued in scorecard manufacture well after the field work had been completed. When the film collected over a week finally arrived at head office in San Rafael it was developed and printed on long rolls of paper that had to be torn by hand and re-stapled to resemble the original credit files. The samples were precious and potentially information-rich materials, but in their raw state they were not as yet useful for statistical analysis. To make them into useable data the documents underwent a multi-stage process through which they were gradually converted into a crisp, clean and uniform database. Once reassembled, the culled credit documents had to be coded into a mechanically readable form. At first, Fair Isaac's six, full-time office staff were asked to do the initial stages of this work which they managed to squeeze in between their regular administrative duties. By the late-1960s, however, after a large contract was signed with the Chicago retailer Montgomery Ward, a full time arrangement for coding was clearly needed.

Fair Isaac hired a young woman named Carol Veris to manage the situation because at first, there was "neither the space, budget, nor consistency of workload to make hiring permanent coders possible"¹¹⁷. To solve the problem in a way that would control costs Veris resorted to an age old solution in tradition manufacture called domestic production or 'putting-out'.¹¹⁸ That is, she placed an ad in the newspaper and contracted the work out on a piece rate basis to local Marin county housewives willing to work but on a flexible schedule,

¹¹⁷ Fair Isaac & Company Incorporated, "History of Fair, Isaac and Co.," p. 6.

¹¹⁸ Alfred Chandler has described how before the 1840s 'Entrepreneurs distributed work for processing in the homes or neighboring families' (Alfred D Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge MA: Belknap Press, 1977), p. 51.). Along with hiring specialized apprentices and journeymen, and acquiring simple machinery, the domestic production system was one of the three ways early manufacture could be expanded. Although it never reached the level of development that it did in England, Chandler notes that in the US domestic production was frequently used for producing shoes and boots.

many of whom had husbands employed at the Hamilton Field Air Force Base in Novato. Under the homecoding arrangement, when a scorecard contract was signed by Fair Isaac, any number of women from a roster of about two hundred might be offered work preparing data. The women would come into the office and pick up a batch of applications along with special pre-printed data sheets designed by the project analyst in co-operation with the head of coding. The quality of the final product depended in large part on the ability of the coders to perform their task reliably, which would require a highly organized form of distributed collective action.

In combination with the sampling strategy performed by analysts, the meticulous work of the homecoders was the backbone of the scorecard, since it was their job to interpret the writing on the ledger cards and convert it into the standardized numerical codes demanded by the analytic process. Veris developed the basic theory and rules for coding and those who succeeded her in the position of head of coding were mandated to instruct the coders on what they were doing. One woman remembered that “[w]e went to these classes and they gave us these printouts. There was lots that we had to look at.” The head of coding was also responsible for preparing extensive reference books. “Oh yes,” confirmed another woman when asked whether they received any ongoing guidance. “We had big binders. We went page by page. So we had to read and code for each project”¹¹⁹. Candidates were subject to serious training to absorb a considerable range and content of codes. “There were occupation codes. Housewife was HH. Fireman, Policeman” rattled off one coder.

¹¹⁹ Group interview H by author with former Fair Isaac homecoders and other female employees, Aug. 21 2006.

“Then there would be groups. For how many years did they live [at an address] you would just put the year”¹²⁰.

The purpose of this first stage of data processing was to pull, reduce and standardize data points from the mass of paper that had been sampled. After the initial training, a common data sheet distributed to the women indicating which pieces of data were deemed relevant to the project at hand was the basic material aid in coordinating action. Equipped with a pen and stack of forms, each woman would do this transfer work independently, filling the nooks and crannies of her personal schedule at home. “You know”, explained one woman “we’d just sit there and do it on these sheets of paper. They all had the heading of what you were supposed to put, where”¹²¹. Another level of coordination involved organizing the women into working groups of five. Four unit members did the initial coding while one was assigned as a ‘checker’ to review for accuracy behind the others. From kitchen tables and parked cars, between loads of laundry and shuttling children to school, this diligent labor force scoured personal finance files one after the next. This is how coding work became visible part of the Marin County community. One woman amusedly recalled that “you’d go certain places... I was by the campfire and could see somebody doing this and I walked over and I said, well you have got to be working for Fair Isaac!”¹²²

If analysts were quick to point to the unexpectedly manual aspect of their jobs, for their part, coders soon revealed the intellect and judgment required of their labor. Former coders drew attention to conditions that were equally true for both parties: “It was a lot of

¹²⁰ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

¹²¹ Group interview H by author with former Fair Isaac homecoders and other female employees, Aug. 21 2006.

¹²² Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

work. We had to make a lot of decisions because of the different rules.” Looking back on the process what these women emphasize is that in practice, selecting codes that corresponded with raw credit files involved its own form of tacit decision making that was far from obvious. Former coders make it clear that “[t]here was some interpretation on all of this. You couldn’t just copy it. That was the hard part, coding it. [...] They didn’t just say he’s been three times thirty days late in nice English”¹²³. Since there was no standard format for record keeping in the credit industry, different customers, offices (or even credit officers) could keep their files in idiosyncratic ways. For example, “[w]e had to read these logs of payments and every company didn’t do the same thing, and we’d get so confused”¹²⁴. Not everyone could function under these constantly shifting conditions. The women I spoke to emphasized that a person who ‘just couldn’t get it’ was not kept on for very long.

Coding was beset by its own set of seemingly trivial but enormously hampering problems which not only slowed data processing but also threatened scorecard quality. A coder explained that “The [customer] wouldn’t let go of the originals. They were afraid that if something happened they would be liable”. So in addition to illegible writing and unusual responses, homecoders often did battle with substandard copies. Mining copies, the primary material for the production of light and mobile credit data, was a burden that was borne heavily by the coders. Even the slightest inconsistencies were not tolerated. As Bill Fair noted, “We knew we had to be attentive to correctness but we had very little idea of the sensitivity of the results to error”¹²⁵. To overcome routine challenges, Fair Isaac coders developed their own organizational hierarchy, sub-routines, forms of problem solving

¹²³ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

¹²⁴ Ibid.

¹²⁵ Fair, "Inform History (Unfinished Memo)." 1991

expertise, policies and rules of thumb. So although coding might be considered a mundane task because of its overtly repetitive appearance, upon closer inspection it is clear that the work demanded constant learning and could not simply be offloaded onto the unskilled.

Coding required skills but it could not be contracted to an occupational group considered to be skilled. This is because, in addition to technical coordination, there is another component of coding that is equally as important—the economic element. Coding depended on the willingness of all of these women to do the work of data capture at a cost that was not prohibitive to the overall endeavor. At a piece rate of seven cents per credit file, ranging up to twenty depending on the amount of data to be gleaned (checkers only made two cents per application) the goal was to complete at least ten applications an hour. A first paycheck of \$17.50 cents was certainly something to be proud of. “The only way you’d earn money [was] to be very fast. Otherwise you didn’t get very much”¹²⁶. Even though they were not officially required to memorize the codes, in fact, the women admitted “you did sort of have to memorize it if you were going to make any time at all, if you were going to get through one of these applications”¹²⁷. The use of home labor to reduce salaries and human memory to informally maximize production, as well as the presumption that coding remained unskilled even as women workers became highly experienced workers are only two examples of the situated ways in which the cost of mechanization was absorbed and controlled by Fair Isaac.

The second stage of data production was keypunching in which the assigned codes were transferred from paper forms onto 80-column, machine readable punch cards. The key

¹²⁶ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

¹²⁷ Group interview H by author with former Fair Isaac homecoders and other female employees, Aug. 21 2006.

punching machine was “like a typewriter, you put your IBM cards in—they’re about five by seven—and you have to sort them. If we punched a certain digit that would mean [occupation]: housewife”¹²⁸. Once again, some women keyed while others checked behind for errors. Getting to and through these application files was a time consuming process that absorbed the bulk of the production period. Bill Fair himself would find fit to record years later that “Data entry was demanding and tedious in the extreme. [...] Getting a deck of cards ready for a run was a matter of weeks of work counting the time it took to encode it before keypunching could begin”¹²⁹. This two step process continued until April 1975, by which time Fair Isaac acquired technology that permitted codes to be directly into computer terminals and saved in an electronic format. It was at this moment that data entry became an internal unit. The homecoding function was replaced by a permanently staffed, and with few exceptions all female, Cathode Ray Tube (CRT) Department¹³⁰.

The women for the CRT Department were handpicked according to new and stringent performance requirements, and only those with the skills to work the machines could ‘make it’ in the transition from home to office. By machine “[y]ou had to deal with the same type of information but at a certain degree of speeds. Any type of typing information certainly helped you. Because otherwise the keyboard was like Greek, I would think.” To increase the pace of processing the organizational structure of coding was reworked. A new department called ‘sample control’ was established “that would go through all the

¹²⁸ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24 2006.

¹²⁹ Fair, "Inform History (Unfinished Memo)." 1991 #489 In addition to the cards containing the sample data, programming cards which held the program the analyst designed, also had to be punched and fed into the computer.

¹³⁰ Women employees played a central role in preparing the programming cards, and as time went on a woman took charge of managing the iterative data analysis runs. Later, when transfer technology changed and cards of data became magnetic tapes, the position of tape librarian was filled by a woman as well.

documents and try to find the ones that were readable and those that were not, and then bundle them into groups of 50"¹³¹. And since "[y]ou couldn't be on the machines and try to interpret information all day", three shifts of four hour duration were created: 7-11am, 1-5pm, and the self-styled 'ladies of the night' who worked from 5-10pm¹³². Remuneration was made hourly rather than per piece. No one can remember the precise rate, but it was somewhere in the ballpark of \$2.50 to \$3.50 per hour. Raises came in increments of five cents, and eventually a health care package was provided for anyone working at least half time.

Women's labor has only recently been included into accounts of science and technology.¹³³ As the turn towards the study of scientific practice has made clear, if the

¹³¹ Group interview G by author with former Fair Isaac homecoders who became career employees, Aug. 24, 2006.

¹³² Ibid.

¹³³ As historian of science Steve Shapin has remarked, because histories of science have tended to focus on its marvelous effects rather than on the details of scientific production, the role of technicians as scientific actors has generally been neglected. Steven Shapin, "The Invisible Technician," *American Scientist* lxxvii (1989). Following on this insight, several case studies have sought to restore the vital role of women, who are often not considered scientists, to accounts of scientific and technological change. See for example Monica J. Casper and Adele E. Clarke, "Making the Pap Smear into the 'Right Tool' for the Job: Cervical Cancer Screening in the USA, Circa 1940-95," *Social Studies of Science* 28, no. 2 (1998), and Naomi Oreskes, "Objectivity or Heroism? On the Invisibility of Women in Science," *Osiris* 11 (1996). The female clerk has long been associated with office work. Sharon Hartman Strom, *Beyond the Typewriter: Gender, Class, and the Origins of Modern American Office Work, 1900-1930* (Urbana: University of Illinois Press, 1992). So, just as they have in science, women have also played an important historical role in the rise of information management. There are telling photographs that capture the prominence of women in raising early information infrastructures. Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*, p. 24. This is confirmed in the banking sector where the role of women in the adoption of new information technologies has frequently been noted. See Bonin, "From Prehistory to the History of Computers in Banking: Mechanization of Data Processing and Accounting Methods in French Banks, Circa 1930-1950.", Juan Pablo Pardo-Guerra, "The Automated House: The Digitalization of the London Stock Exchange, 1955-1990," in *Technological Innovation in Retail Finance, International Historical Perspectives*, ed. Bernardo Bátiz-Lazo, J. Carles Maixé-Altés, and Paul Thomes, *Routledge International Studies in Business History* (New York: Routledge, 2010). See also Bernardo Bátiz-Lazo and Peter Wardley, "Banking on Change: Information Systems and Technologies in U.K. High Street Banking, 1919-1969," *Financial History Review* 14, no. 2 (2007). That the importance of women's labor might easily be overlooked in the history of computing, as it was in the history of science, may not be entirely surprising given the very tendency of information infrastructures to become mundane and to sink into the background. Susan Leigh Star, "The Ethnography of Infrastructure," *American Behavioral Scientist* 43 (1999).

extension of science and technology into the everyday is to be explained, something more has supported it than the cognitive genius emanating from a few great men. In the rise of distributed systems, practical considerations of execution matter. This has proved particularly true for the routine operation of data driven systems and calculative infrastructures where scores of working women - the first 'calculators' - have consistently played an important role¹³⁴. The production of scorecard technology and its spread into consumer finance is no exception. Fair Isaac records report that on December 23rd, 1977, at precisely 10:47 am Fair Isaac's spirited data-entry unit officially celebrated the processing of their millionth credit application to the sound of a ringing bell¹³⁵. The event was carefully staged by upper management, who, in recognition of this milestone, provided commemorative paper weights and cake for all. Until well into the 1990s this is how the information infrastructures for credit scoring systems were built up—upon the movement of pencils over paper, and millions of tiny decisions, revisions and keystrokes.

Fair Isaac's corner on computing and analysis

When Fair and Isaac set up shop as operations research consultants a computer was still a relatively inaccessible thing. In order to offer computing assistance they rented time

¹³⁴ For a historical reference to how women were organized in a factory-like arrangement, serving as human calculators in the manufacture of logarithmic tables, see Lorraine Daston, "Enlightenment Calculations," *Critical Inquiry* 21 (1994). For a more recent account of women carrying out ballistic calculations in WWII, see Jennifer S. Light, "When Computers Were Women," *Technology and Culture* 40, no. 3 (1999).

¹³⁵ *Viewpoints*, volume II: issue 1, Fall/Winter 1977. *Viewpoints*, the major historical reference for tracing Fair Isaac's activities, was a quarterly newsletter initiated by yet another prominent woman at Fair Isaac, Mary Pellegrino, who ran the series for 20 years. This unpretentious publication written in accessible, non-technical language diffused best-practices to customers covering a range of topics from management strategies to regulation. The series continues to be published today but has been converted into a vehicle for marketing and brand promotion. Information on the IBM-1130 is available at this online IBM archive.

on machines available around San Francisco (their initial work was tailored for the IBM-650), for example, at Standard Oil of California, during off-peak hours. It was the late-1960s by the time Fair Isaac was able to lease a machine for itself. The model, an IBM-1130, was a low-budget desk-sized system with direct access program storage expressly “designed for on-the-job problem solving by engineers, scientists and business people”¹³⁶. When the stack of punch codes prepared by the coders was complete, it was carried to the computer room where it met a second deck of programming cards that held the instructions written by the analyst for the parameters that were to be extracted from the dataset. When the two carefully prepared decks of cards were finally joined the process of producing statistics would begin. But with one machine for everyone, computing time continued to be a limited resource. While one card run was proceeding the other analysts had to wait, working on weekends and overnight in order to gain access to the machine.

Fair Isaac’s original business model was fundamentally dependent upon the company’s ability to sequester computer-assisted statistical analysis away from data producers (lenders) as well as data accumulators (such as the credit bureaus) an arrangement that was at first permitted by the initial scarcity of computers¹³⁷. So even though computing

http://www-03.ibm.com/ibm/history/exhibits/1130/1130_4513PH03.html.

¹³⁶ Although I have only mentioned one transition here, Fair Isaac would bear the cost of adopting new computing systems numerous times (including one transition to a UNIVAC 1108). Instead of consulting externally on computer usage, the business model of scoring had them exercising sophisticated computing expertise internally, to port, update and maintain their proprietary program called INFORM.

¹³⁷ Over the years, the process of scorecard manufacture would change as the consumer finance industry’s command of information technology and business machines evolved. For example, the Fair Isaac coders were eventually replaced by reels of magnetic tapes loaded with data coded elsewhere. Many of these tapes were sent from the second-party information processors charged with handling the wealth of data that would be produced by the flow of credit card transactions whizzing through, for example, Visa’s electronic payment system. Martha Poon, "Historicizing Consumer Credit Risk Calculation, the Fair Isaac Process of Commercial Scorecard Manufacture, 1957-C.1980," in *Technological Innovation in Retail Finance, International Historical Perspectives*, ed. Bernardo Bátiz-Lazo, J. Carles Maixé-Altés, and Paul Thomes, *Routledge International Studies in Business History* (New York: Routledge, 2010). Data would also be transferred to Fair Isaac on reels of tape from the newly digitized credit bureaus which aggregated credit

machines did not come easily to this small company, their major resource was that they had ideas and the know-how to use them. Their pioneering move was to not only exploit this knowledge, but to also find a way to transfer computer-assisted calculations to financial operations that did not as yet have any computing capabilities of their own. A boundary object *par excellence*, the original scorecard was a technology product that transferred technical analysis to the user in a non-digitized format¹³⁸. It was by looping a manual environment back onto itself, having passed it through Fair Isaac's computing—and not by transitioning financial institutions to a digital environment—that consumer credit origination was first reconfigured and refined by risk assessment. The tangible endpoint of Fair Isaac labor was not 'analysis' the set of activities that is most readily associated with statistical expertise and computing. Sampling and data processing were at the core of the product and so was the printed card.

It is important to note that the basic feature of the scorecard and its production process were a specific response to a distributed organizational arrangement¹³⁹. That is, the instrument was painstakingly designed to meet a particular economy of computerization in which data keeping was not digitized and computing capacity were as yet a scarce resource.

data on consumers from multiple lenders and public sources. (It is this arrangement – a marriage of bureau data with Fair Isaac analysis – that produces FICO scores.) What is noteworthy, however, is that even as the transition towards routine electronic data capture has obviated the need to manually access paper records and the rise of information infrastructure the need to physically transport it at all, the separation of risk calculating capacity (at Fair Isaac) from data management (at the lender or data processor) is a structural feature that has, in many regards, been conserved.

¹³⁸ Leigh Star's concept of the 'boundary objects' describes a cybernetic solution to a social worlds problematic. It is a device with an informatic component that solves the problem of coordinating action without requiring groups to come to cognitive agreement. That is, it produces action without necessarily conveying a message. As the original paper on gathering specimens for taxonomy suggests, boundary objects are especially important when a project depends on garnering cooperation between expert and non-expert groups. Susan Leigh Star and James Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39," *Social Studies of Science* 19, no. 3 (1989).

¹³⁹ For an ethnographic account of how calculation happens in distributed organizational arrangements see Edwin Hutchins, *Cognition in the Wild* (Cambridge MA: MIT Press, 1995).

Although statistical credit scoring would dramatically transform what was happening in manual underwriting, the existence of statistical scoring was not completely alien from a paper-based setting¹⁴⁰. This is not to say that a method for assessing default probability could not have been innovated at a later period from within an electronic environment, but it is to suggest that under different circumstances its statistical structure, pattern of circulation and information content would most certainly have been worked out differently. To give one perhaps surprising example, even though computers calculate scores in full, the practice of limiting the number of factors underlying each score to ten to twelve at Fair Isaac has been conserved¹⁴¹. Where complexity is needed it is added not by increasing the number of factors, but by multiplying the number of scorecards in use¹⁴². Thus, key features

¹⁴⁰ Mary Poovey has written extensively about the historical processes that lead to the separation of narrative forms of knowledge from more privileged numerical representations of facts. The description in this chapter of the transition from written records, capable of capturing more complex narratives, to quantitative information, can be read as an ethnographic response (that is, an account of the achievement of an equivalent separation in financial practice) to what Poovey has observed by examining literary genres. Mary Poovey, *A History of the Modern Fact, Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago Press, 1998).

¹⁴¹ Inside each credit bureau, generic FICO® scores are calculated off of multiple scorecards that divide the population into ten sub-segments. For example, people under the age of 30 will have their score calculated off a common scorecard. Former Fair Isaac analysts told me that the nine other segmentations are a proprietary secret known by only a handful of people, who are contractually bound not to reveal what they are. This underlying structure to the credit scoring system is based on judgments made by Fair Isaac's analytic staff, which, because they are judgments about how to fit complex data to outcome the algorithms model, cannot be replicated or reverse engineered. My point here is that the ten to twelve factor scorecard model is an old Fair Isaac convention which originated in a manual environment. It is retained today because it limits the number of 'adverse action' codes the industry has to work with to respond to the Fair Credit Reporting Act (FCRA), which require creditors to offer consumers four reasons why they have been turned down for credit.

¹⁴² At first this was done by designing different scorecards for different loan products or for geographical areas (concerns about redlining ended the latter practice (see Chapter 4)). Generic FICO adds complexity by segregating the population into ten separate scorecards within each algorithm. The segregation of these scorecards, not the factors within them is a large element of what FICO wants to keep secret. It is a structure that is conserved even when the weighting of the factors, or the factors themselves are periodically modified to recalibrate the models to population changes. This means that not everyone is being calculated from the same factors even though all scores are issued on the trademarked 300-850 scale. It is important to recognize that statements about the composition of FICO to the public, places limits on score redevelopment because it means that these percentages must remain fixed going forward.

inherited from the manual environment continue to structure the design of the contemporary system.

Conclusion—Industrial processes and the information age

In a world flattened by digital infrastructures it can seem as though information travels at light speeds and that risk assessment is being carried out effortlessly. Sophisticated electronic environments make it difficult to discern the reorganization involved in raising and operating calculative systems. This is because the sources that produce digital traces are proliferating while the equipment that interconnects disparate locations is increasingly hidden. The sheer space that early computing machines once occupied, sometimes taking up entire buildings, has given historians a striking entry point into animating the important organizational work that has supported the transfer of computers into sectors such as banking¹⁴³. Giving a history to risk calculation, which is generally thought of as a function black-boxed inside of these machines, has proved enormously more difficult. As computing historian James Cortada has emphatically argued, however, ‘the most important story about computing is its applications, not its technological evolution’¹⁴⁴. He means that computers and stockpiles of electronic signals have absolutely no relevance until they are adapted to perform certain tasks.

FICO’s visibility to the public helps them keep their market dominance, but it also poses technical challenges. These dynamics are to be discussed in the longer project.

¹⁴³ For two histories of bank computers see Bonin, "From Prehistory to the History of Computers in Banking: Mechanization of Data Processing and Accounting Methods in French Banks, Circa 1930-1950.", Ian Martin, "Britain's First Computer Center for Banking: What Did This Building Do?," in *Technological Innovation in Retail Finance, International Historical Perspectives*, ed. Bernardo Bátiz-Lazo, J. Carles Maixé-Altés, and Paul Thomes, *Routledge International Studies in Business History* (New York: Routledge, 2010).

¹⁴⁴ James W. Cortada, *The Digital Hand: How Computers Changed the Work of American Financial, Telecommunications, Media, and Entertainment Industries*, II vols., vol. II (New York: Oxford University Press, 2006), p. xi.

This chapter has sought to demonstrate that despite all appearances, the rise of intellectual goods such as calculated risk information is not the result of any spontaneous or necessary shift brought on by the advent of digital infrastructures. Tracing the development of the Fair Isaac scorecard respects the fact that risk assessment can have a history separate from but analogous to the history of business machines. This treatment of risk computation in historical perspective extends a research objective that has been laid out by business historian JoAnne Yates. Yates shows that the mechanical period did not suddenly give way to the information age, but rather gave rise to it. As she has convincingly argued, the operating environments of the established industries that would integrate business computing in the post-war period have to be taken into account as structuring forces that have profoundly influenced the emergence of our information-oriented era¹⁴⁵. If the content of computation is historically situated, then the historian's purpose is to trace the points of connection where organizational and industrial context have been woven into technical content as information innovations have gotten progressively adapted into routine action¹⁴⁶.

The insight that there is a material confluence between the industrial past and the digital present has profound consequences for how we pursue histories of information. First and foremost it suggests that the uptake of new functions for information, such as risk management, cannot be treated in general terms as encompassing all businesses. These

¹⁴⁵ In this regard the story of credit scoring resembles Yates' account of how insurance companies adopted pre-computerized information-processing technology at the turn of the century. To understand the move towards digitalization in the insurance industry Yates has methodically traced several instantiations of information management systems beginning with mechanical tabulating equipment. What her study shows is that specific organizational arrangements influence the design of technologies every bit as much as technologies influence organizations. Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*, 1

¹⁴⁶ Michel Callon and John Law, "On the Construction of Sociotechnical Networks: Content and Context Revisited," in *Knowledge and Society: Studies in the Sociology of Science Past and Present*, ed. Lowell Hargens, Robert Alun Jones, and Andrew Pickering (Greenwich, CT: JAI Press, 1989).

functions must always be carefully narrated on an industry-by-industry basis. The details of Fair Isaac's production process confirm this, since the initial configuration of the scorecard was clearly developed by entrepreneurs laboring within a specific moment in consumer finance history. Perhaps more importantly, this description does more than simply indicate that the industrial past makes a difference to the design of risk calculation. It also pinpoints industrial process—namely commercial manufacturing and product engineering—as the very mechanism that has generated the shift in consumer finance towards risk-based operations. FICO scores are related to the Fair Isaac scorecard just as the iPod is related to the Apple 1, or the Ford Focus is to the Model T.

Product manufacture allows us to place US consumer credit information within a distinct material lineage. Thus, the chapter lays the groundwork for tracing the unique and trajectory of one risk calculus as it has been developed by Fair Isaac for the consumer credit industry. The scorecard is a commercial product that is made by a more or less stabilized process of production. But the device will only get applied in practice if it attracts a buyer who is willing to make use of it. As such, the scorecard is the material terrain where disputes about how credit scoring should function will be negotiated. So although Fair Isaac's basic internal organization to assemble scorecards would remain quite similar for several decades, the company would be repeatedly compelled to modify the features of the technology it was making in order to overcome social, political, and commercial challenges to the implementation of statistical techniques into everyday business practice.

Chapter 2 explores the scorecard's reception in the field of consumer credit. It examines why so few lenders were interested in the technology, and explores one important redesign of the scorecard to make it more appealing to prospective users.

Chapter 2

Shifting the Costs of Credit Production

Ordinarily the business man does not concern himself with the blueprint games and scores of the scientists.

M. R. Neifeld¹⁴⁷

When Fair Isaac arrived on the scene in the late 1950s, consumer finance was already a well established industry. As an outside provider of novel technological solutions and newcomers in an occupied land, early Fair Isaac could not barrel its way into the world of consumer credit and declare the authority of their science; its employees could not demand that credit managers submit to the intrusive activities involved in setting up a scorecard. Nor could it force disruptive organizational changes on lenders by requiring them to take up the meticulous data keeping routines necessary to support robust statistics. And so, even though the years of expertise would accumulate rapidly under Fair Isaac's feet, the uptake of math and statistics into credit origination was painfully slow. In the words of Larry Rosenberger,

¹⁴⁷ The Consumer Credit Symposium (1951). "What We Don't Know About Consumer Credit". M. R. Neifeld, vice-president of Beneficial Management Corporation, p. 7.

the company's former CEO, the company's founders "struggled over a period of time, to convince the industry that using math and numbers and whatnot, made any sense whatsoever, and was in fact a serious way to assess risk and consumer credit"¹⁴⁸. What operations researchers quickly discovered is that experienced 'credit men' - the old guard of the consumer credit business - were deeply entrenched in the traditional problems and practices of underwriting loans.

It would take over twenty years for scoring to be seen as integral to the business of consumer credit. As Rosenberger puts it, "That's a long time for one set of founders and one company to pound away at something to try to get it established"¹⁴⁹. Speaking in retrospect, eyewitnesses to this period of the company's history recall the 1960s and 70s as a time of tremendous perseverance. For this reason, they frequently refer to the early days in evangelistic metaphor, as the 'missionary' or 'proselytizing' period. However, the most senior Fair Isaac analysts also speak with unshakable certainty that the resistance from the credit industry was destined to fall away. Once the indisputable qualities of their technology were demonstrated and understood, nothing could have stood in its way. The company's longstanding internal description of credit scoring—as a more efficient way of deciding consumer credit outcomes—is cited time and again as the ultimate reason for the technology's widespread adoption. The general sentiment is that two decades was "a long time for one set of founders and one company to pound away at something to try to get it established. But we finally did, simply because it worked"¹⁵⁰.

At Fair Isaac, the technology's entire biography can be concentrated in two simple and emphatic words—*it worked*. This chapter begins to examine what it means to say that

¹⁴⁸ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22 2004.

¹⁴⁹ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22 2004.

¹⁵⁰ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22 2004.

credit scoring worked. There is, of course, a technical explanation for how the scorecard functions which Fair Isaac would have already been armed with when they went out into the field. If, however, we are posing the question of how a technical account is carried out of the imaginary, and we position ourselves in a past moment when the adoption of novelty has not been realized, then it is tautological to claim that superior efficacy is the cause of a technology's success; for efficacy cannot exist until it has had an opportunity to be proven in practice. For the technical setup being proposed by Fair Isaac to be taken up by users, the company had to infiltrate the world of the finance industry and convince them to welcome a foreign instrument as their own. This would involve adapting the prototype to increase its acceptance, it would require making and remaking the scorecard so that it *would* work¹⁵¹. In what follows, I will begin to trace how Fair Isaac managed to insert their technology into the inner workings of the credit world, and I will situate the scorecard within the industry's existing problem and internal struggles.

When the operations researchers met with credit professionals, two distinct versions of the credit problem collided. On one side, there was a conviction that the process of selecting borrowers should be fine-tuned to control *default rates*; on the other, there was a long standing industry preoccupation with streamlining *operating costs*. In the middle was an expensive little device, the scorecard, whose survival hinged on its ability to resolve both sets of concerns. Retracing this tension is not easy, since, apart from a few internal memos written by Bill Fair years afterwards, there is little documentation that conserves the encounter between a young Fair Isaac and the post-War establishment of consumer finance. I have drawn upon industry journals and trade history to fill out this picture. What these

¹⁵¹ The process of getting technologies and technical systems to work in practice is a major theme of science studies. For one example see Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay."

documents plainly show is that the problem credit managers recognized was that they had to reduce the revenue eroding expenses distributed throughout the life of a loan. The problem the scorecard solved was entirely different—it improved decision making at the moment of loan application. In the struggle to sell the scorecard, Fair Isaac seems to have prevailed. But before it could do so it would have transform the scorecard into a solution to the empirical problem that consumer financiers were grappling with, and not only the one Fair Isaac staked out on the industry’s behalf.

The policy origins of American consumer finance

A detour into the nature of the consumer finance is in order if we are to understand the profound disconnection between Fair Isaac and the credit industry. The roots of consumer finance can be traced back to the beginning of the 20th C, when a type of licensed corporation was established for the sole purpose of lending money to a growing class of urban wage earners. These institutions were known as the finance companies¹⁵². The

¹⁵² For an engaging version of the rise of consumer finance in the U.S. that focuses on the changing moral dynamics of credit see Lendol G. Calder, *Financing the American Dream: A Cultural History of Consumer Credit* (Princeton: Princeton University Press, 1999). His Chapter 3 is especially instructive on the history of finance companies. Retail credit (buying-on-time) in which a retailer would accept payment for goods in fixed installments, constitutes a second origin point of consumer finance. What distinguishes retail credit from the finance companies is that it does not involve handing over cash. Fair Isaac’s first customers included retailers, but my account favors the finance companies because the only stake in their transactions is money. Retail credit is usually marked as the ancestor of the credit card since the card format was first used by department stores. But this history focuses on aesthetic qualities (the card) while ignoring their far more important, financial feature (the credit). See David Evans and Richard Schmalensee, *Paying with Plastic: The Digital Revolution in Buying and Borrowing* (Cambridge, MA: MIT Press, 1999). It is noteworthy that neither retail credit nor small loan lending were originally sources of profit. Extended to non-durables, retail credit was initially a form of merchandizing designed to make goods more attractive, while small loans from finance companies, as this chapter discusses, were initially considered a social service for the working poor. (One of the functions of finance companies was to consolidate retail loans.) In historical perspective contemporary credit cards are an astounding

standard narrative about this turn-of-the-century period is as follows: the movement of labor from farms to industrial cities created a class of wage dependent workers who could no longer rely on the support of extended social networks in periods when employment was interrupted. Savings were scarce for these people because, as observers remarked, “a very large proportion of the families of laboring men in the city spend their entire income on what appear to be the bare necessities of life”¹⁵³. The transition to the city increased the need for goods and the overall cost of living while intensifying status competition and eroding incentives towards thrift¹⁵⁴. That licensed lenders were created to deal with wage labor’s problem of securing emergency cash was reflected in the first professional name of their trade association— ‘industrial lenders’. Historian of credit Lendol Calder notes that “For moralists, the name was intended to suggest that the emergency loans needed by workers were not the result of individual folly but a consequence of the industrial system”¹⁵⁵.

Life in the city was so precarious that in an instant, workers and their dependents could be thrust into a situation where they needed to borrow money in order to make ends meet. Long standing interest rate caps fell by the wayside as loan sharks scrambled to devise ingenious ways to circumvent traditional usury laws and exploit the need. A classic method called ‘salary buying’ was documented in a landmark 1908 study by a Columbia graduate student, Clarence Wassam¹⁵⁶. To buy a salary was to offer money in exchange for future

phenomenon because they encompass both the social function (of finance companies) and the consumption function (of retail credit) while generating huge profits.

¹⁵³ Clarence W. Wassam, "Salary Loan Business in New York City" (Columbia University, 1908), p. 19.

¹⁵⁴ Rolf Nugent, *Consumer Credit and Economic Stability* (New York: Russell Sage Foundation, 1939).

¹⁵⁵ Calder, *Financing the American Dream: A Cultural History of Consumer Credit*, p. 142. The name was changed to ‘personal finance companies’ in 1929, moving the emphasis away from credit for workers and towards credit for consumers (p. 148).

¹⁵⁶ Clarence Wassam was a research fellow at the New York School of Philanthropy and graduate student at the department of Political Science at Columbia University. The salary buying study was his PhD dissertation.

claim on some portion of a worker's wages, before these had actually been paid. A 1903 letter to the *Montreal Star* by a Canadian salary buyer defended the practice. He argued that "if a man wants to sell a week's or a month's future wages we buy the same, just as we would so much growing crop of wheat or apples on the trees, or any other commodity, for future use"¹⁵⁷. As Wassam explained it since "the transaction is one of purchase and sale there can be no claim of usury". Employees would hand over portions of their wage in periodic installments that ultimately amounted to much more than the amount the buyer had originally given them. Wassam's data showed that the effective annual interest rates in salary buying frequently exceeded 968 per cent.¹⁵⁸ What is more, since the practice was frowned upon as a sign of poor character workers faced the constant threat of being exposed to their employer and of being dismissed in shame.

The combat against loan sharking attracted the attention of scientifically minded, progressive social reformers. Wassam, and colleague Arthur Ham (author of a report on chattel loans) would place the issue high on the agenda of the Russell Sage Foundation¹⁵⁹ and would steer Olivia Sage's influential philanthropic efforts to remedy the problem. According to Wassam and Ham's studies the distressing cumulative effect of aggressive money lending was to "lessen efficiency, increase crime, endanger the home, [and] enrich one class of

¹⁵⁷ Wassam, "Salary Loan Business in New York City", p. 74.

¹⁵⁸ In Wassam's example \$34 was borrowed. It was paid back in installments of \$2.65 a week over 20 weeks. The total amount paid was \$53, \$19 of which was in excess of the original amount. While the interval (weekly) interest rate was only 4%, the annual interest rate was a whopping 968%. Calculating interest in annual percentage rates (APR) became a way of making the cost of different loan configurations comparable. The argument for this standard is argued in Hillel Black, *Buy Now, Pay Later* (New York: William Morrow and Company, 1961), p. 87-95.

¹⁵⁹ The Russell Sage Foundation was founded by Olivia Sage with 10 million dollars of the inheritance she received upon the death of her financier husband, Russell Sage. Involving his estate in credit reform is perhaps ironic given that in 1869, the year he married her, he was reportedly taken to court for being the leader of a usury gang.

people at the expense of another”¹⁶⁰. On the one hand, the Russell Sage reformers bypassed arguments that challenged the insufficiency of wages or weak job security. On the other, they defied traditional wisdom descending from the Victorian era that decried borrowing of any sort. Instead, they argued that for “steady reliable and hard pressed men in need of temporary assistance”¹⁶¹, “judicious borrowing is frequently an absolute necessity”¹⁶². As Wassam explained, it was “The presence of a very definite economic need” in combination with “the absence of legislative protection to any organization which would legitimately fill such a need”¹⁶³ that was driving unscrupulous business methods. Ham would later recall that the crux of their position was “the recognition of the small-loan business, not as a parasitic growth but as a necessary element in our financial system”¹⁶⁴.

A legal historian commenting on the history of the case in the 1940s noted that “Prior to 1884 the law paid no special attention to *small* loans. Usury statutes provided maximum legal rates on all loans, large or small”¹⁶⁵. Small loans were legally recognized as a separate category of lending at the end of the nineteenth century, but this was only so that legislators could try to stamp them out by banning objectionable lending practices such as salary buying. Following a series of miscellaneous legislative attempts that failed to extinguish the loan sharks the Russell Sage reformers concluded that “usury, like

¹⁶⁰ Wassam, "Salary Loan Business in New York City", p. 86.

¹⁶¹ Roswell C. McCrea in the preface to Arthur H. Ham, *The Chattel Loan Business* (New York: Russell Sage Foundation, 1909), p. 7.

¹⁶² Wassam, "Salary Loan Business in New York City", p. 1.

¹⁶³ *Ibid.*, p. 12.

¹⁶⁴ Arthur H. Ham, "The Trend and Progress of the Movement to Improve Small Loan Conditions" (paper presented at the Seventh Annual Convention of the American Industrial Lenders' Association, Chicago, 1921), p. 6.

¹⁶⁵ George G. Bogert, "The Future of Small Loan Legislation," *The University of Chicago Law Review* 12, no. 1 (1944): p. 1., emphasis in original

profiteering, is readily denounced but not so easily defined or prevented”¹⁶⁶. Experience was suggesting that “it would be futile to attempt to eradicate oppressive features by restrictive or repressive legislation”¹⁶⁷. Indeed, it seemed as though “any attempt to keep loan companies within bounds merely by adding to the list of restrictive measures under which they may operate, simply results in higher charges and more irresponsible practices”¹⁶⁸. As a first line of action the foundation began to foster access to small loans under conditions they considered fair. They supported a number of limited dividend remedial associations funded by charitable donations to compete directly with the sharks by offering loans on more reasonable terms¹⁶⁹.

The radical contribution of the Russell Sage reformers was to promote borrowing as a legitimate part of social life. To argue that small loans needed to be legally accommodated instead of repressed they reframed the question of what might constitute just lending practices into a pragmatic cost calculation¹⁷⁰. Their most lasting efforts were sunk into “determining what kinds of legislation would be effective in controlling commercial companies and allowing them to do business legitimately instead of driving them under

¹⁶⁶ Arthur H. Ham, *Small Loan Legislation, Progress and Improvement, Address Delivered before the Seventh Annual Convention of the American Industrial Lenders' Association September 23, 1921* (New York: Russell Sage Foundation, 1922), p. 2.

¹⁶⁷ Roswell C. McCrea in the preface to Ham, *The Chattel Loan Business*, p. 7.

¹⁶⁸ Roswell C. McCrea in the preface to *Ibid.*, p. 8.

¹⁶⁹ The Russell Sage Foundation would be accused by money lenders of seeking a profitable way to invest its endowment. They contributed funds to only one such organization in New York. Ham, *Small Loan Legislation, Progress and Improvement*, 2.

¹⁷⁰ The Morris Plan (1910), devised by Arthur J. Morris in Norfolk, Virginia at Fidelity Savings and Trust Company, was another option put forth to solve the small loan debacle legally but without changing the law. Under the plan (which had several other components) borrowers were given a loan at the bank rate of interest, but they were simultaneously sold a type of certificate on installment terms. When they had paid for the certificate, which was priced higher than the amount of the loan, they earned the privilege of paying back the loan. When the transaction was complete the effective rate of interest was in the range of 19%. For full details see Louis N. Robinson, "The Morris Plan," *The American Economic Review* 21, no. 2 (1931).

cover or exterminating them”¹⁷¹. In this logic, the justification of a lender’s earnings would depend on “whether the rates charged by the different loan companies are necessary in order to secure a fair return upon the investment or whether the necessity of the borrower has been exploited in securing an exorbitant charge”¹⁷². Studies found that many of the charges and fees exacted by lenders were arbitrary, imposed only because they could bully borrowers into paying. But these investigations also concluded that a profitable business at the strict bank rate of 6 per cent was totally impossible. As Ham would report, “The interest on a \$50 loan at 6 per cent per annum for six months would be \$1.50”. At the bank interest rates, a business could never fund “an office with its attendant expenses for bookkeeping, cashier, stenographer, and maintenance as well as the usual losses and necessary fees to attorneys”¹⁷³.

It was social scientists and reformers, not economists who would advocate terms for consumer finance. As of 1910, Ham became involved in drafting legislation that would establish small loan lending “as a legitimate and necessary factor in our economy by dissociating itself from exploiting practices”¹⁷⁴. Drawing together a coalition of “formerly implacable enemies”¹⁷⁵—the American Association of Small Loan Brokers, and the National Federation of Remedial Loan Associations—he drafted the Uniform Small Loan Law in 1916. Designed to attract ‘reputable capital’ to the business of financing workers, the original proposal placed constraints on the price of credit, but only after taking the cost of small loan origination into account. It permitted loans of less than \$300, a flat interest rate

¹⁷¹ John Mark Glenn, Lilian Brandt, and Frank Emerson Andrews, *Russell Sage Foundation, 1907-1946*, 2 vols., vol. 1 (New York: Russell Sage Foundation, 1947), p. 142.

¹⁷² Wassam, "Salary Loan Business in New York City", p. 29.

¹⁷³ Ham, *The Chattel Loan Business*, p. 15.

¹⁷⁴ Glenn, Brandt, and Andrews, *Russell Sage Foundation, 1907-1946*, p. 151.

¹⁷⁵ Calder, *Financing the American Dream: A Cultural History of Consumer Credit*, p. 134.

of 3½% per month¹⁷⁶, while prohibiting all fees and additional charges. The proposed law “vindicated the belief that neither a laissez faire policy nor coercive measures will cure the evil of usury; that the remedy lies in the creation of something that will facilitate credit and increase money in circulation as well as the means and sources by and from which it can be obtained”¹⁷⁷. The elevated interest rate acknowledged the particularities of running a small loan operation, which, unlike a bank, did not have access to inexpensive funds in the form of deposits. It also acknowledged that these lenders faced higher bureaucratic burden of keeping track of numerous small accounts.

The proposal was politically tenuous. Although it had been relatively easy to “expose illegality and immorality in the loan shark’s activities”, the reformers soon found out that it was much “more difficult to convince the public and legislators of the necessity for permitting higher charges than were legal for ordinary business loans”¹⁷⁸. Caught on all sides, “the new bill encountered strenuous opposition from the general public which considered the rate of interest too liberal, and from lenders who considered it too low and thought the law too drastic in other respects”¹⁷⁹. The Uniform Small Loan Law was redrafted several times over the next two decades, and had to be ratified state by state. But the model remained the centerpiece of consumer credit regulation until the onset of WWII. Ham noted that despite strong opposition and after much lobbying, “social and civic agencies eventually came to our assistance and newspapers rallied to the cause”¹⁸⁰. Versions

¹⁷⁶ 3½% per month is 42% APR.

¹⁷⁷ Glenn, Brandt, and Andrews, *Russell Sage Foundation, 1907-1946*, p. 144.

¹⁷⁸ Ibid.

¹⁷⁹ Ham, *Small Loan Legislation, Progress and Improvement*, p. 7.

¹⁸⁰ Ibid.

of the law were implemented in 34 states between 1909 and 1941¹⁸¹, laying the foundation for a new arrangement of lending that drew the remedial associations and commercial small loan lenders together into a single category to be known as the finance companies.¹⁸² These regulated agencies drowned the loan sharks out of business¹⁸³.

In 1930, Evans Clark, the director of the Twentieth Century Fund, would make the following observation: "Strange as it may seem this great expansion of mass finance facilities has not been carried out by the banks themselves, but by a fresh crop of organizations of a new order of being: from corner, one-man offices and mutual associations doing business in the hundreds to nation-wide chain concerns doing business in the millions"¹⁸⁴. What had begun as a conscientious effort by philanthropically-minded, social scientific entrepreneurs to balance the tension between private profit making and public purpose flourished into a full fledged consumer lending industry. Fair Isaac's success in selling scorecards would depend on its ability to tap into the peculiar challenges this fleet of operations faced.

To catch a glimpse of what the mechanics of the finance business were like and to give a voice to these old-fashioned consumer financiers I have relied primarily upon the 1942-1960 proceedings of a trade conference called the Consumer Credit Symposium, a year by year record of the industry's concerns. At these events, firsthand accounts of operating

¹⁸¹ Elisabeth Andersen, "Experts, Ideas, and Policy Change: The Russell Sage Foundation and Small Loan Reform, 1909-1941," *Theory and Society* 37 (2008).

¹⁸² There are two types of finance companies in the U.S. that should not be confounded. First, there are the ones being discussed here which were started to loan small amounts of credit. The other kind began life as an adjunct to large manufacturers. Their purpose was to facilitate the sale of expensive consumer durables. An example of the latter is General Motors Acceptance Corporation (GMAC), the financial subsidiary of General Motors (GM).

¹⁸³ For a favorable review of the effects of the laws in Kentucky where they were enacted in 1934 see B. J. Lenihan, "Progress in Consumer Credit in Kentucky," *Law and Contemporary Problems, The Loan Shark Problem Today* 19, no. 1 (1954).

¹⁸⁴ Evans Clark, *Financing the Consumer* (New York: Harper & Brothers Publishers, 1930), p. 8. The Twentieth Century Fund was a foundation started by Edward A. Filene to put his wealth to public purpose. It was renamed The Century Foundation in 1999 and bills itself as a non-profit liberal think tank.

methods were passed on to members of the trade by experienced credit managers who shared their successes, vented their frustrations and aired their political views.¹⁸⁵ These documents tell us that the mid-century credit world that Fair Isaac would have encountered was drastically different than the one the company has participated in creating.

How narrow profit margins were eroded by operating costs

Both strict and unconventional, the small loan laws permitted a heavily regulated consumer credit industry to emerge by laying down strict terms under which lenders and borrowers could engage. They loosened the minimal interest rates dictated by traditional usury laws, but kept caps firmly in place. The terms were designed to create revenue that would accommodate “the higher costs in extending credit in small pieces, requiring monthly servicing” and the cost of setting up “the proper reserves for losses”¹⁸⁶. The reformers’ rationale was that “The amount of dollar income per deal must be increased enough to pay

¹⁸⁵ Methodological footnote: The Consumer Credit Symposium was an annual trade conference held between 1942 and 1971. The annual volumes run about 150 pages each, and contain 20-25 texts of presentations given by representatives of small and large finance companies, bankers, regulators and the occasional academic. Advice was dispensed on everything from how to construct the contents of credit files using the least number of forms, to the most effective arrangement of the front office space. Some of the papers are original to the conference, by many are reproduced from addresses given at other meetings or published in trade magazines. This suggests that the purpose of the conference was to regroup the most important industry statements of the year. Collections: I have relied on the volumes available at the Regenstein Library, University of Chicago. Between 1942-1960 the collection was missing the years 1943, 1944 and 1952. Referencing convention: I have provided references the individual conference papers in the footnotes only, giving the first page number of the paper within the conference publication. To demonstrate the representativeness of these data, the speaker’s name, title, organization and state are indicated.

¹⁸⁶ The Consumer Credit Symposium (1950). “Your Consumer Credit Department – Gold Mine or Rat-Hole?” Edward H. Roden, Vice-President, Passaic-Clifton National Bank and Trust Company. Passaic, New Jersey, p. 34. Andersen, "Experts, Ideas, and Policy Change: The Russell Sage Foundation and Small Loan Reform, 1909-1941."

the expenses of acquisition and servicing and still leave a surplus as profit”¹⁸⁷. To create transparency in the margin lenders would be able to take in the designers of the law barred all hidden charges. What is more, to make the full extent of the charges immediately legible to the borrower they “eliminated [...] the normal and accepted charges connected with the loan of money in installments, and they lumped these charges into a package with the interest.”¹⁸⁸ The plan was that the elevated interest rate would attract business capital into the field, but in the long run it “counted on competition among licensed lenders to reduce rates of interest whenever feasible”¹⁸⁹.

The promise of relatively higher gross returns was deceptively attractive. Lenders flocked into the business only to discover that the statutory interest rate ranging from 1½% to 3½% per month on unpaid balances was still restrictively low. As the Chairman of the Board of the General Finance Company hastened to remind his audience, “Consumer credit is obviously the most costly type of credit with which you have to deal, because in this department you are ‘selling potatoes by the peck’ instead of ‘by the carload’”. He exhorted his listeners to “Get that distinction!”¹⁹⁰ One solution was to drum up more volume by lowering interest rates, but given the low ceilings on loan size this was only an effective strategy for making profit if internal expenses were tightly controlled. As one small finance company president ruefully reported “after doubling our size, we have nowhere near the

¹⁸⁷ The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois, p. 17.

¹⁸⁸ The Consumer Credit Symposium (1951). “Management’s responsibility – To customers, to employees, and to the public”. A summary of addresses delivered before Nebraska Association of Small Loan Companies. (Reproduced from *Time Sales Financing*, published by the American Finance Conference, Chicago, Illinois). Arthur H. Werner, Regional public relations director, Beneficial Management Corporation. Newark, New Jersey, p. 127.

¹⁸⁹ Glenn, Brandt, and Andrews, *Russell Sage Foundation, 1907-1946*, p. 345.

¹⁹⁰ The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois, p. 17 (underlining in original).

relative net profit to show for our efforts”. “There may be more glory in a big operation” he wistfully conceded, “but I am presuming that most of us are interested primarily in profit.”

¹⁹¹ Clyde William Phelps, an economist of consumer credit offered this crisp diagnosis: “Since a consumer finance company is limited by law and by competition as to the percentage rate on loan balances it can charge, it must, in order in order to operate successfully, be able to control its ratios of operating costs and total costs to loan balances”¹⁹².

Experienced credit operators were confident that entrants into the field—which by the 1940s included depository banks¹⁹³—were overestimating their ability to make the business work. As the director of Consumer Credit Studies at Household Finance Corporation made clear, “The cost of handling, and the rate of charge on a business loan—usually repaid after a significant lapse of time, in a single payment—cannot realistically be compared with the cost of handling consumer credit.”¹⁹⁴ A common problem was that upper management in banks used dealing with larger business loans was too easily seduced by gross yields. “The uninitiated, including some bank officials” declared one bank vice-president from Boston, Massachusetts, “think that the charges on consumer credit notes are high, and they compare these charges with the interest rates on commercial loans.” What a

¹⁹¹ The Consumer Credit Symposium (1955). “The Smaller Finance Company and its Advantages”. Clyde C. Fowler, President, Sterling Discount Corporation. Atlanta, Georgia, p. 109.

¹⁹² Clyde William Phelps, “Consumer Finance Charges: I,” *The Journal of Marketing* 16, no. 4 (1952): p. 407.

¹⁹³ Banks gave out small personal loans, not finance credit under the small loan laws. But where banks had traditionally resisted lending for non-productive purposes, it was the appearance of viability in the small loan sector that created the impetus to shift resources into consumer lending. As this chapter discusses, lending to consumers required operating capacities that were distinct from commercial credit. To acquire these capacities banks have often bought over finance companies. (This is particularly visible in France where every major bank is now partnered with a finance company subsidiary.) Information based lending strategies based on credit scoring change all of this as they provided a platform through which new (mostly credit card) operations can enter directly into the business.

¹⁹⁴ The Consumer Credit Symposium (1959). “What Business Teachers Should Know About Consumer Credit”. Dr. Ernest A. Dauer, Director of Consumer Credit Studies, Household Finance Corporation. Chicago, Illinois, p. 102.

small loan lender had to recognize was that “The gross yield of 9% to 11% is before costs, and the cost of handling installment loans is much greater than is commonly realized”.¹⁹⁵ Another bank vice-president, this time from New Jersey, exhorted his colleagues to not overlook “that total costs, including addition to the loss reserves, range from 50% to 70% of gross income”¹⁹⁶. “Remember this,” summarized the Chairman of General Finance Company, “Do not look at the loss ratio alone, or at the high gross income, but rather look at the net profit or loss produced on the funds employed in the operation”.¹⁹⁷

Money poured out of small loan operations and into the hands of borrowers, but not all transactions brought in a meaningful return. At least part of the problem was that as time passed, the statutory interest rate and loan amounts stayed fixed while inflation eroded profit margins and intensified competition. The bank vice-president from New Jersey pointed out that the “rates for most classifications of installment lending are approximately the same as they were in 1939, but costs have mounted steadily since that time”¹⁹⁸. Professor Phelps agreed, noting that “increased wages and office rents, increased prices for supplies, and the general upward movement of other costs have tended since the end of the war to offset the economies achieved in operating procedure”¹⁹⁹. A consultant from Georgetown, Connecticut told a story about a consumer credit department he had worked with where the

¹⁹⁵ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

¹⁹⁶ The Consumer Credit Symposium (1950). “Your Consumer Credit Department – Gold Mine or Rat-Hole?” Edward H. Roden, Vice-President, Passaic-Clifton National Bank and Trust Company. Passaic, New Jersey, p. 34.

¹⁹⁷ The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois. 17 (underlining in original)

¹⁹⁸ The Consumer Credit Symposium (1950). “Your Consumer Credit Department – Gold Mine or Rat-Hole?” Edward H. Roden, Vice-President, Passaic-Clifton National Bank and Trust Company. Passaic, New Jersey, p. 34.

¹⁹⁹ The Consumer Credit Symposium (1951). “Where are Consumer Credit Costs Headed?” Dr. Clyde Williams Phelps, Professor of Economics, University of Southern California, p. 39.

expenses had recently jumped a dramatic 100 per cent. “That means” he explained, “that that particular bank is pressing against its permissive ceiling for rates so hard it isn’t funny.”²⁰⁰ “What are you going to do about it?” he asked his audience rhetorically, gesturing at how infeasible it was to persuade state policy makers to lift the caps any further. “Ask for higher rates? That’s one solution, or else get after your costs.”²⁰¹

State governments had laid out permissible terms for small loan lending under the guidance of the Russell Sage reformers, but they had not provided operating instruction for how to run a profitable business within the strict framework of the law. Like all small business lending remained a craft endeavor involving skills that were worked out, on the ground, through trial and error. Learning through experience led to variations in business strategies and operating structures. Given the idiosyncrasies within operations there was “a lot of play, a lot of area [...] open to controversial discussion”²⁰². This complicated the establishment of cost standards for the industry. An industry statistician warned that when it came to comparing profit between firms there were “differences in operating practices, rates, ceilings, etc. that make comparisons even within fields quite difficult to interpret”²⁰³. This bank vice-president from Cleveland agreed, reporting that his bank had “tried on several occasions to analyze our operating costs to establish a minimum schedule but, to the best of my ability, we have not found it to coincide too well with the figures that have been quoted

²⁰⁰ The Consumer Credit Symposium (1953). “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²⁰¹ The Consumer Credit Symposium (1953). “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²⁰² The Consumer Credit Symposium (1953). “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²⁰³ The Consumer Credit Symposium (1955). “Factors Affecting Profits in Consumer Lending”. Preston J. Heiman. Statistician, Beneficial Management Corporation. Newark, New Jersey, p. 128. For example, higher ceilings in Ohio (\$1,000) meant that the expense ratio was lower there than in New York (\$500) because more dollars could be lent and therefore more return made, for identical cost per account.

by other banks”²⁰⁴. Commenting on incommensurability of the figures the Chairman ominously predicted that “If you do not accurately know your costs of handling consumer credit you may, without realizing it, have a very stable drain on the total net income of your institution”²⁰⁵.

The number of costs to keep track of was dizzying. A first category was called a ‘per item cost’, which encompassed “the cost that runs along whether you write a five dollar loan or a five thousand dollar loan”.²⁰⁶ Simply acquiring a loan involved “the labor, stationary, and other expenses involved in putting a loan on the books [...]: Interviewing; investigating; approving the application; making out the note; preparing ledger cards, file cards, and other records; making out the check; and posting the records.”²⁰⁷ Closing out the loan involved “the costs involved in withdrawing the paid note for the portfolio; cancelling it and returning it to the borrower with a ‘thank you’ letter; closing out loan records and transferring them from active to closed files”²⁰⁸. A second category of cost varied according to the loan size and the length of its term. This included the cost of receiving and handling each periodic installment payment, the bookkeeper’s time, and a proportionate part of the cost of collecting delinquent installments.²⁰⁹ There were also the per dollar costs such as the rate at

²⁰⁴ The Consumer Credit Symposium (1955). “Lending Operations and Audit Methods”. R. Geisinger, Vice-President, The National City Bank, Cleveland, Ohio, p. 58.

²⁰⁵ The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois, p. 17.

²⁰⁶ The Consumer Credit Symposium (1953) “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²⁰⁷ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²⁰⁸ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²⁰⁹ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

which funds were being borrowed from banks (the cost of procuring money to lend) and the cost of life insurance.²¹⁰ And finally there was the allocation of a share of overhead costs “which include collections, accounting, advertising and promotion expense”²¹¹.

The combination of these numerous types of costs made precise calculation extremely tedious. An assistant vice-president at National City Bank of New York admitted that that “in many loans of the consumer type you have to admit that you cannot tell when looking at any one loan that you may not have an ultimate loss on it.”²¹² According to experts at conferences, even those who thought they were keeping count were probably tending to underestimate expenses. The statistician recited a list of frequently overlooked factors: “But how many allocate cost of space utilized by the consumer credit department? How many allocate the cost of the bookkeeping function which is normally carried out by the general bookkeeping department of the bank? How many allocate such items as advertising, telephone, postage, depreciation, legal expenses, money costs and taxes?”²¹³ The vice-president from Boston concurred, rattling off his own list of hidden costs, including “directors’ fees; general accounting, auditing, and other indirect services; and the undistributable portions of senior officers’ salaries and expenses”.²¹⁴ “The point is”, said the

²¹⁰ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²¹¹ The Consumer Credit Symposium (1948). “The Business of Consumer Credit”. W. A. Spaugh, Assistant Treasurer, American Security and Trust Company. Washington D.C., p. 113.

²¹² The Consumer Credit Symposium (1950) “Will You Get Your Money Back”. Fred H. Diefenbacher, Ass’t Vice-President, National City Bank of New York, New York City, p. 129.

²¹³ The Consumer Credit Symposium (1955). “Factors Affecting Profits in Consumer Lending”. Preston J. Heiman. Statistician, Beneficial Management Corporation. Newark, New Jersey, p. 128.

²¹⁴ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

industry statistician, summarizing the central concern of mid-century consumer financiers, “Failure to allocate all applicable expenditure to a consumer credit operation can be fatal!”²¹⁵

A smattering of independently produced figures revealed just how tight the margins were. The figures were startling. “As near as we can determine” reported the Cleveland vice-president “our break-even point on a loan is \$5.50, which means that if we are to make any money, we must have a charge of about \$7.50 or more. It has been our practice in the past to have a minimum charge of \$7.50 on any loan and to try to discourage loans of under \$100.”²¹⁶ Once break-even points were determined a portfolio could be analyzed for operational losses. If 80% of loans were for 12 months and were less than \$400, and if \$424 was the break-even point, it became quickly “apparent that a substantial portion of the portfolio is unprofitable at a flat 5% discount rate.”²¹⁷ In the case of “direct personal loans of \$250 or less, for 12 months”, the frank assessment of another bank vice-president from Passaic, New Jersey was that it was impossible to “cover the costs involved, and the banks of the State continue to make this type of loan only as a public service”.²¹⁸ The General Finance Company found that “In the ten months of 1947, expenses were 8.14%, or it cost \$8.14 to acquire service and liquidate every \$100 of credit”²¹⁹. So although at the beginning

²¹⁵ The Consumer Credit Symposium (1955). “Factors Affecting Profits in Consumer Lending”. Preston J. Heiman. Statistician, Beneficial Management Corporation. Newark, New Jersey. 128 (emphasis in original)

²¹⁶ The Consumer Credit Symposium (1955). “Lending Operations and Audit Methods”. R. Geisinger, Vice-President, The National City Bank, Cleveland, Ohio, p. 58.

²¹⁷ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²¹⁸ The Consumer Credit Symposium (1950). “Your Consumer Credit Department – Gold Mine or Rat-Hole?” Edward H. Roden, Vice-President, Passaic-Clifton National Bank and Trust Company. Passaic, New Jersey, p. 34.

²¹⁹ The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois, p. 17.

of the 20th century consumer credit was flowing legally throughout the US, it was potentially a loosing proposition.

The cost of producing quality credit

Cost accounting only began in the 1920s and by mid-century was still a relatively new managerial practice²²⁰. In 1956, then, it could still be said that “Effective cost analysis is a relatively new management tool in the consumer credit field”²²¹. According to the Georgetown consultant, the question of acquiring knowledge of costs was urgent. “How many of you do have a blow-by-blow description of every operation in your bank?” he demanded. “Well, I won’t ask that question, it might prove embarrassing.” The key to control, he insisted, was to be properly informed so a lender could say with confidence (to legislators, among others), “Look, friend, this is the bedrock. I can’t process this loan without doing this and this and this and this and this. I’ve got other expenses, too. But that’s my bedrock of expense – I’ve got to earn at least that much.” “You will find”, he reassured his listeners, that “by making such a careful, detailed examination of your operations, that you are going to be able to cut costs.” “I have yet to find a case”, he

²²⁰ Christopher McKenna has argued that the origins of management consulting are in cost accounting and not, as it is often claimed, in scientific management (Taylorism). Cost accountants, who had ties to engineering, wanted to count the cost of credit (interest paid to borrow liquid capital) as a production cost. Traditional accountants refused on the grounds that this would violate the principle that calculations of ‘profit’ should be kept separate from the question of efficiency in manufacturing. McKenna, *The World’s Newest Profession: Management Consulting in the Twentieth Century*.

²²¹ The Consumer Credit Symposium (1956). “Analyzing and Controlling Consumer Loan Costs”. Gilbert W. Urban, Member of the Comptroller’s Staff, First National Bank of Minneapolis. Minneapolis, Minnesota, p. 126.

asserted, “where I haven’t been able to show economies of operation by eliminating procedures, by combining other procedures, doing this, doing that.”²²²

To calculate costs, managers needed to generate information about which parts of the operation were incurring potentially unnecessary expenses. Scientific studies provided a number of approaches for assessing the situation. The vice-president from Boston advocated that “Cost studies, methods surveys, work-measurement programs, and comprehension of key statistics (such as number of loans per employee) with other consumer credit agencies are all tools the must be used to control costs.”²²³ The results showed that the greatest contributor to the net cost of a loan was the fixed cost of originating and maintaining loan files. Following Taylorism, management science studies attempts to pinpoint waste by focusing on the movement of the clerks. The Georgetown consultant noted that “in the consumer credit business, [...] you can set up time standards for, I would say, about sixty to seventy percent of the operations which go through your bank every day [...] because the tasks are so repetitive”²²⁴. In addition to timing the girl typing a four-line address (the studies suggested a good standard was 16 seconds²²⁵) or improving “the lighting of the working area, to reduce errors”²²⁶, managers were also encouraged to simplify records and routine bookkeeping methods.

²²² The Consumer Credit Symposium (1953) “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²²³ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²²⁴ The Consumer Credit Symposium (1953) “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²²⁵ The Consumer Credit Symposium (1953) “Consumer Credit Costs”. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

²²⁶ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

That expenses were being incurred at each and every point in the bureaucratic process meant that there was no single target where the issue of reducing costs might be solved. Sectioning the process was one way to introduce key managerial control points. Lending departments were, for the most part, sectionalized such that “in the normal course of work flow, the activities of one section are automatically checked by another [...] so that no one section handles a given transaction from beginning to end”²²⁷. With some variations, work in small loan lending would typically be distributed over four basic sections: credit policy, investigations and originations, discount division (posting repayments received) and collections (follow up on delinquencies). The most common form of small loan, where a number of repayments were made at regular intervals (installments), lent itself nicely to this highly structured division of labor. When it came to reducing overall losses, no section was above board. Lenders were advised that, “Constant supervision and review are required, particularly in a growing operation”²²⁸. Any point where an extraneous action was taken could be subject to improvement depending on the power of observation and creativity of managers.

After fixed costs, there was a second great contributor to operating expenses: collections, the pursuit of cases that had failed to repay. Loans that were not repaid on schedule or in full were of obvious concern to small loan lenders. Bad debt fell into two categories: cases of ‘default’, an unscheduled nonpayment event which required costly intervention to pursue collect; and cases of ‘charge off’ where collection efforts were

²²⁷ The Consumer Credit Symposium (1957). “Division of Responsibilities in Installment Loan Operation Helps Automatic Audit, Cuts Costs”. William K. Linzner, Vice-President, The Gramatan National Bank and Trust Company, Bronxville, New York., p. 85.

²²⁸ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

abandoned altogether and the outstanding debt was written off as a loss. Finance companies were encouraged to become aware that “Bad-debt losses should also be recognized as a cost, and provision should be made for a loss factor as part of the per-dollar-of-loan costs”²²⁹. In response to the question ‘Will you get your money back?’ an assistant vice-president at National City Bank of New York emphatically replied that “you will get your money back minus this stipulated ‘expense of loss’”. He advised that the best way to deal with such losses as an expense was to plan for them to happen by lumping them in with the costs of origination and collections: “You have to lay out your program based upon experience and the law of averages that credit loss will be “x” percent of the aggregate of the loans you make”. “That ‘x’ percent in this particular business”, he emphasized, “is just as much operating cost as your other items of salary (by far the largest expense), rent, stationery, telephone, etc.”²³⁰

On the books, income was primarily governed by the rate of interest being charged, the method of levying charges and the mode of accounting, but it was also sustained by efforts to collect when payments went awry. As an old adage among installment lenders went, “You can finance only that which you can collect”²³¹. The point was reiterated by an attorney working for a firm that represented small loan companies. “It is nice to be busy,” he said, “but unless loans can not only be made but also collected, our business is a

²²⁹ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²³⁰ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York, p. 129.

²³¹ The Consumer Credit Symposium (1951). “Basic Operating Problems of Installment Sales”. C. Ray Cook, Assistant Vice-President, Marshall & Ilsley Bank. Milwaukee, Wisconsin, p. 44.

failure.”²³² One Chicago bank with \$18,500,000 in outstanding consumer debt with a little over \$5,000,000 in installment debt reported having 15 employees to service these loans, 3 of which were full-time collections men.²³³ Lending adequate support to collections was not seen as exceptional in the small loan business. This vice-president at Bank of America stated the situation most succinctly. As he observed, “We can not have a broad, flexible credit policy without a firm collection program. I don’t mean ‘hard boiled’ – just diligent and firm”. “We bankers don’t MAKE bad loans”, he concluded, “we just let them get that way”²³⁴. Having the resources to actively pursue payments was an integral part of sustaining acceptable rates of return. The relationship was direct— increasing returns meant increasing collections efforts²³⁵.

Collections were labor intensive because they were handled on a case by case basis. The practice involved skill because “the circumstances surrounding the delinquencies are seldom the same, and there, again the alert collection man must exercise the judgment gained through experience and decide whether to play along with the situation or to apply the firm

²³² Consumer Credit Symposium (1948). “Let’s Bring Collections Up to Date”. Joseph E. Newton, Newton, Wilhelm and Kenny, Attorneys for Local Loan Company, p. 25.

²³³ Consumer Credit Symposium (1955). “Collections Problems – Repossessions”. Howard M. Nuss, Assistant Cashier, South East National Bank of Chicago. Chicago, Illinois, p. 20.

²³⁴ The Consumer Credit Symposium (1946). “Basic Principles of Consumer Finance”. R. A. Peterson, Vice-President Bank of America. San Francisco, California, p. 85 (emphasis in original).

²³⁵ Low risk = high cost. Microcredit is an excellent example of this relationship. Interest rates were originally set high at Grameen Bank to support the labor of managing numerous tiny loans. If risk is related to rates of default then the poorest Bangladeshi women are low risk. That these people can repay their loans shows that under the right conditions, conditions which are more or less expensive to set up, anyone can be a ‘creditworthy’. As an economist Yunus conflates the social position with risk in his descriptions. Muhammad Yunus, *Banker to the Poor, Micro-Lending and the Battle against World Poverty* (New York: Public Affairs, 1999). But he has come out in strong critique of international banks that would incorrectly see microlending as a subprime (high risk) and therefore high return endeavor, instead of recognizing that high rates of interest are meant to offset operating costs of producing prime credit. This is the tension at the heart of risk based lending. It is becoming a sophisticated version of ‘the poor pay more’.

hand.”²³⁶ It is noteworthy that among legitimate operations in the post-war period, many of the more extreme collections tactics had been rejected. The Director of Supervision at Household remarked that “some of the collection tools used so effectively back over the years are not a little bit in distaste and do not lend themselves to the dignity of man.”²³⁷ Tactfulness had become important. “To get your money back” advised the assistant vice-president of National City Bank, “it is necessary to exercise commonsense and sound judgment and treat most debtors as through you knew all along it was their intention to repay their loans”. “If he is impressed with the attitude that in his difficulty the bank wants to help him preserve his credit standing and cooperate with him just as much as it did when he was granted the loan [...]”, he continued, “you will find that he will strain a point to keep any bargain he makes for the repayment of his debt.”²³⁸

The impetus to work closely with clients was old hat in commercial banking. But it was from the moral mandate of the charitable loan associations that the finance companies inherited their tolerance of clients in distress. In the move from philanthropy to business, the profit seekers inherited attitudes from the non-profits they were replacing. In a pamphlet designed for the Century of Progress World’s Fair of 1933, Household reported having “loaned to each of 300,000 families an average of \$187, mostly for paying overdue bills and for meeting emergencies beyond current income or cash resources”²³⁹. Billed as a ‘public service’, Household argued that through this kind of refinancing and assisted

²³⁶ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York., p. 129.

²³⁷ The Consumer Credit Symposium (1955). “Collections – Yesterday, Today and Tomorrow”. K. J. May, Director of Supervision, Household Finance Corporation, p. 14.

²³⁸ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York, p. 129.

²³⁹ Household Finance Company, "Financing the American Family: 100 Years of Progress in Family Finance," in *Century of Progress World's Fair* (Chicago, Illinois: Household Finance Company, 1933), p. 12. Courtesy of the Hagley Museum and Library Collection

restructuring of monthly payments, “family morale and health are preserved, purchasing power is stabilized, and good will maintained”²⁴⁰. The point that achieving a successful outcome required support throughout the course of a loan was not lost even as the industry became increasingly profit-oriented. Finance companies recognized that if they dealt with constant disruption, it was not necessarily due to a screening error on their part. Since no one could escape the vicissitudes of life, even people who were worthy of receiving credit were not immune from credit troubles.

The value of a person—a major component of their creditworthiness—was a fixed quality. Unlike behavior, circumstance, or economic conditions it did not change. Therefore a person who granted credit under terms the lender had deemed suitable in the first place was likely deserving of forbearance. This explains why the industry could be remarkably accepting of what was sometimes benignly referred to as ‘past due paper’. “If you are in this business”, commented a bank vice-president from Chicago, “you must reconcile yourself to past due paper – you have it in your commercial loan department just as you always have some overdrafts. Remember, your installment credit department is dealing with a broad cross-section of individuals among whom will always be sickness, death, adversity, loss of employment, just plain carelessness, and a small amount of crookedness.”

²⁴¹ Understood as a byproduct of the ordinary ups and downs of life, the occurrence of irregular or overdue repayments became a natural part of the credit business. This Chicago bank-vice president’s attitude towards such events was as patient as it was practical. “You and I cannot make over human beings” he said, “even if they do happen to be our

²⁴⁰ Ibid., p. 14. Courtesy of the Hagley Museum and Library Collection

²⁴¹ Consumer Credit Symposium (1958) “Installment Lending – A personal Business”. J.F. Keely, Vice-President Lake Shore National Bank, Chicago Illinois, p. 57.

customers; so we have to take them as they are, since human beings are the only customers available.”²⁴²

A conviction of the fundamental goodness of creditworthy people implied that lenders should be generous with borrowers who came up short. The National City Bank of New York’s slogan was “You can’t lose money on an honest man with a job”. “We like to take the viewpoint that every borrower is honest,” noted one of their assistant vice-presidents, “which we have found, in general, to be the case. Given the ability to repay his debt, you will never lose a dime”²⁴³. “The past,” agreed another bank vice-president from Salt Lake City, Utah, “has demonstrated to us that the average American is reliable, trustworthy and dependable.”²⁴⁴ When problems in a case arose, lenders were encouraged to assume that “There are numerous good reasons. There are a lot of reasons beyond his control.” In this spirit, this assistant cashier reminded lenders that “that man is our bread-and-butter. Without him, we wouldn’t even have a job. So give him every break that you can. [...] sit down with him, analyze his income and his fixed expenses”²⁴⁵. National City Bank’s assistant vice-president concurred, noting the mutual obligation of the borrower to create feasible conditions for the borrower. “There is nothing more certain to result in a recurring default,” he acknowledged “than to demand that a debtor live up to some

²⁴² Consumer Credit Symposium (1958) “Installment Lending – A personal Business”. J.F. Keely, Vice-President Lake Shore National Bank, Chicago Illinois, p. 57.

²⁴³ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York. 129 (underlining in original) National City Bank of New York became CitiBank.

²⁴⁴ Consumer Credit Symposium (1955). “Direct Loans”. F. J. Cowan, Assistant Vice-President, Manager, Consumer Credit Department, Walker Bank & Trust Co, Salt Lake City, Utah, p. 28.

²⁴⁵ Consumer Credit Symposium (1955). “Collections Problems – Repossessions”. Howard M. Nuss, Assistant Cashier, South East National Bank of Chicago. Chicago, Illinois, p. 20.

unreasonable term of repayment under which you insist that he pay more than he is humanly able to pay”²⁴⁶.

Lenders were acutely aware that consistent repayment behavior was not independent of their attentive efforts to ensure collection throughout the life of the loan; high quality had to be produced. Shepherding borrowers was considered part and parcel of the production mechanism behind a profitable consumer finance business, and therefore the expenditures devoted to collections were considered just as necessary as fixed bureaucratic costs. Collections activities were so central to lending that what was happening in the collections department was diagnostic of a firm’s overall performance. As this bank vice-president from Cleveland explained “when you take poor credits, even though they are secured, what actually happens is that you built up your collections activity and the cost of handling the loan is much greater than you anticipated”²⁴⁷. In a reverse reading, if the work in collections was too slow, some credit managers interpreted this to mean that the firm was being too stringent, and was missing out on potential revenue generating opportunities. That the rate of return could be monitored through collections activities shows that revenue was not only passively accrued; the most aggressive lenders actively worked for it.

The results were unmistakable. Historic default rates were reported to have remained just over 2% of outstanding balances at National City Bank, even during the depression years, and ultimate loss ratios were recorded at a mere 28/100 of 1% and 46/100 of 1% during 1928-29 consecutively. The all-time low in direct bad debt losses was recorded

²⁴⁶ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York, p. 129.

²⁴⁷ The Consumer Credit Symposium (1955). “Lending Operations and Audit Methods”. R. Geisinger, Vice-President, The National City Bank, Cleveland, Ohio, p. 58.

in 1934 at 36/1000 of 1%, which amounted to \$9,321 out of \$26,201,627.²⁴⁸ By the end of 1953, the losses incurred at National City Bank of New York were still only 30/100 of 1% of average outstanding loan balances²⁴⁹; and in 1955, a bank president from Peoria Illinois recorded his losses as a mere 1/16 or 1/17 of 1% in regular times²⁵⁰. The insignificance of default is further indicated by the minimizing form of its expression. It was measured neither in terms of its bureaucratic cost in dollars, nor was it tracked by the number of individual accounts involved. Rather default rates were lumped together in such a way that they became but a tiny percent of the overall volume²⁵¹. Financiers considered it essential “that the so-called ‘loss expense’ [...] continue to appear as a respectable figure”²⁵². In an industry that turned moral attitudes towards credit upside down, being able to show that people were repaying faithfully was important to maintaining a public image of rectitude.

These figures tell us a lot about Fair Isaac’s experience. In isolation, the ultimate weight of bad debt as a source of operating losses was strikingly low. At National City Bank, experience in the business clearly showed “that credit loss is a minor element, compared with operating costs, in passing out small amounts of money to a large number of people”²⁵³. Under these conditions, there would have been little incentive to implement a technology

²⁴⁸ The Consumer Credit Symposium (1957). “Bread and Butter Business – Personal Loans”. J. Andrew Painter, Vice-President, The First National City Bank of New York, New York City, p. 116.

²⁴⁹ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

²⁵⁰ The Consumer Credit Symposium (1955). “Merchandizing Installment Credit To The Public”. Fred M. Blossom, President, The Central National Bank and Trust Company of Peoria. Peoria, Illinois, p. 123.

²⁵¹ Bad debt was reported to reach 6 -17% of gross revenue an expression that makes it appear much more significant than as a percent of outstanding loan volumes. See The Consumer Credit Symposium (1948). “Costs of Handling Consumer Credit”. Owen L. Coon, Chairman of the Board, General Finance Corporation. Chicago, Illinois, p. 17.

²⁵² The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York., p. 135.

²⁵³ The Consumer Credit Symposium (1950). “Will You Get Your Money Back”. Fred H. Diefenbacher, Assistant Vice-President, National City Bank of New York, New York, p. 129.

that through statistical analysis concentrated on reducing bad debt by weeding out cases prone to default. Yet—and here we return to our central story—this is precisely what the scorecard purported to do! In the language of Fair Isaac, the device used consumer information to statistically discriminate between ‘goods’ and ‘bads’ based on some definition of an undesirable ‘default’ event. Presented as a semi-automatic tool for screening credit applications, the tool promised to distinguish quickly between categories of accounts that would be closed out in an orderly fashion from those that would lead to some kind of disruptive and costly occurrence. But reducing a residual event that occurred in small minority of negative cases did nothing to lessen the overall cost burden of producing successful cases which was the art, the practice, and the burden of lending.

The titillating hook of the 1961 *New York Times* article reporting on the first Fair Isaac scorecard project at the American Investment Company was: “Can a deadbeat be recognized before he is granted a loan?”²⁵⁴ The reporter indicated that the question had ‘intrigued lenders for generations’, but was only now receiving scientific attention. The question was interesting, but it was not the lenders’ main concern. Even if practitioners considered excluding deadbeats a part of their business, improved screening would not have been considered an obviously meaningful priority as an independent target for overall cost control. Since the empirical evidence showed that inherently unreliable debtors in the system were exceedingly rare, credit professionals could consider their traditional methods

²⁵⁴ Kraus, "Scoring System Begun on Credit." Lawrence M. Curtis, the president of American Investment is cited in the article as saying that the company’s losses in charge-offs (an amount of credit a creditor as deemed it can not collect) “amounted to only slightly less than the concern’s net profit of \$7,130,576”. This figure is presumably much higher than that expressed by default losses because default can mean one missed payment (one installment payment of a loan) where as charge-offs write down the remaining balance of the loan. American Investment’s average loans outstanding was reported as \$203.0 million in 1959. Cottle and Mickelwait, "Composite Earnings Performance of the Major Consumer Finance Companies." Their net profit was therefore about 2.85% of average loans outstanding.

for rooting these people out as perfectly sound. Default rates were largely a result - to put it polemically - of inexperience in the credit business and inadequate control over production. The question of loan quality, then, was a question of maintaining commitments, not of prediction. What lenders desperately wanted to control was not the loss of inevitably bad debt, which was minimal, but the cost of managing the process of producing good outcomes, which was enormous.

Offsetting the cost of the scorecard

Odds prediction of default was, at best, an oblique contribution to the problem of controlling operating costs. What is more, once the price of acquiring a scorecard was entered into the balance sheet, the technology itself was guaranteed to shoot expenses through the roof. Operations researchers have long recognized that the cost reductions achieved by their solutions could be, as one textbook noted, “insignificant compared with the cost of developing the model”. “In fact”, the passage continued, “the model produced results only slightly better than would have been achieved by using a series of simple decision rules derived from existing practice”²⁵⁵. A variation of this observation has recently been made again by Emanuel Derman a physicist turned financial engineer at Goldman Sachs reflecting upon his career as a first generation ‘quant’. Derman notes that there is rarely a clear cut connection between the introduction of statistical models and enhanced profit, even in high finance. More often than not quantification contributes value through “the discipline it imposes, the operational errors it disallows and the intuition that traders

²⁵⁵ Norbert Lloyd Enrick, *Management Operations Research* (New York: Holt, Rinehart and Winston, 1965), p. 33. The author of the textbook is commenting here on a specific project.

gain from being able to experiment with a model”. “The truth” Derman soberly reinforces, “is that models are rarely an unambiguous source of profits”²⁵⁶.

In designing the technology, Fair Isaac’s priority was certainly to produce a user friendly piece of scientific equipment that was statistically sound; but for the technology to be transmitted into business practice, an equally crucial feature was that it be affordable. Just as their clients struggled to stop up leaks in their internal operations, Fair Isaac would also have to master operational control at every stage of its own production process. One of their central mandates as technology developers was to absorb and minimize the expenses involved in the costly conversion of heterogeneous paper records into standardized datasets. For example, when it came to making microfiche images of credit records “The cost of film, developing, and printing ran about \$0.05 per page. Thus, a data sampler spent his/her day making ‘nickel decisions’, one after another after another”²⁵⁷. An imperative to reduced production costs was equally at play in the decision to treating coding labor as unskilled (remunerated at lower rates of compensation), as well in efforts to reduce the number of keystrokes needed to perform each coding operation. The base price of a scorecard is reported to have been approximately \$32,000 in 1976²⁵⁸.

The price of a scorecard encapsulated the costs associated with the process of developing a scoring system (see Chapter 1), and it remunerated the vendor for the exercise of their own internal cost cutting expertise. A comparison of the price of a scorecard with the operating figures of a small consumer finance operation, however, does much to suggest that despite Fair Isaac’s passion for efficiency, the upfront cost of a scoring system would

²⁵⁶ Emanuel Derman, *My Life as a Quant* (Hoboken: John Wiley & Sons, 2004), p. 169.

²⁵⁷ Robert Sanderson, personal email communication, June 2, 2004.

²⁵⁸ This figure was reported in interviews. Sales figures taken from a 1990 sales manual for Fair Isaac’s custom application scorecard renamed ACCRUE90, show that at that time the first scorecard was \$44,000 with a diminishing scale for each subsequent scorecard.

have made them prohibitively expensive for all but the largest of lending firms. A quick glance at some figures are instructive: In a 1948 article in *Bank News*, a small town bank reported that two full time employees making 776 loans a year, of an average size of \$439, at a 6% interest rate would produce an annual income of \$20,439²⁵⁹. Allowing for \$13,602 in expenses, the author estimated that this would leave a net profit of only \$6,819 per year. If “the answer to ‘What is profit?’ is income less expenses,”²⁶⁰ purchasing the technology would have been an immediate drain on surplus earnings. Alternatively, if accounted for as a contribution to the ‘cost per item’, scoring would have added significantly to the per loan cost of production. Throughout the years, the question of price would remain a point of tension between Fair Isaac and its customer base. “That has been a curse of Fair Isaac all along” reflected a Fair Isaac salesperson, speaking from his experience in the 1980s. “We were expensive for what we did”²⁶¹.

And the sticker price did not absorb the full range of costs associated with credit scoring. Another key expense would be incurred internally by the lender in accumulating the raw data necessary for Fair Isaac to perform their analysis. Record keeping consumed employee time, paper products and storage space. This is why a major recommendation for streamlining expenses was to minimize data retention. A list of do’s and don’ts from a bank vice-president hailing from Peoria, Illinois advised lenders as follows: “**Do** Keep adequate records but keep them as simple as possible / **Don’t** Maintain a single form or record that is

²⁵⁹ The Consumer Credit Symposium (1948). “The Business of Consumer Credit”. W. A. Spaugh, Assistant Treasurer, American Security and Trust Company. Washington D.C., p. 113.

²⁶⁰ The Consumer Credit Symposium (1955). “Factors Affecting Profits in Consumer Lending”. Preston J. Heiman. Statistician, Beneficial Management Corporation. Newark, New Jersey, p. 128.

²⁶¹ Interview K by author with former Fair Isaac manager in Europe, December 19, 2005.

found to be unnecessary”²⁶². Another bank vice-president hailing from Chicago, Illinois noted that “Necessary records, to be sure – monthly yearly records on volume of loans, outstandings, income, charge-offs recoveries – and others necessary for your particular operation” were to be retained—“but keep them as simplified as possible”²⁶³. The organizational demands of scoring were, therefore, strikingly at odds with the imperative to reduce operational costs. As a senior Fair Isaac analyst frankly explained it, the lenders “weren’t thinking, frequently, of keeping historical information for the purposes of some bozo who wanted to build a scorecard. That wasn’t their goal”²⁶⁴.

The strength of Fair Isaac’s statistical analysis depended on the firm’s access to a source of records of real accounts whose unplumbed secrets could be explored. Empirically derived data delimited the range of factors that were candidates for the algorithms. The technology company had to convince its customers that the burden of building up these data reserves would produce a return in the long run, even if the advantage of doing so was not readily apparent. The enduring conflict was that “we always wanted them to keep more information, and they wanted to keep less”. “We would say, look if you would just add a few more little fields here... We can really help you out if you would keep just a little bit more information”²⁶⁵. Such requests were met by skepticism on the part of experienced credit managers. The industry’s reluctance to increase data collection is perhaps summarized best by this bank vice-president from Chicago. As he wryly noted: “It may be of some interest to know, what percentage is left-handed, and how many attend church on Sunday. But I submit

²⁶² Consumer Credit Symposium (1948). ““Servicing” of Installment Loans”. Virgil E. Samples, Vice-President, Commercial National Bank of Peoria. Peoria, Illinois, p. 30.

²⁶³ Consumer Credit Symposium (1958). “Installment Lending – A Personal Business”. J.F. Keely, Vice-President Lake Shore National Bank. Chicago Illinois, p. 57.

²⁶⁴ Interview I by author with senior Fair Isaac analyst and product innovator, September 28, 2006.

²⁶⁵ Ibid.

that such information is of doubtful benefit in the approval of loan applications or when one of your automobile customers skips to California”²⁶⁶.

If a tool for controlling default had a cost-saving function, it remained implied and indirect. “The staff at FICO knew they had a tool that would produce significantly saving to their customers” records a 1977 corporate history, “but the general attitude of the credit industry was negative.”²⁶⁷ Since lending firms could barely get a hold of their own idiosyncratic cost figures, the added value of the scorecard could not initially be expressed in terms of controlling costs. That is, since the product vendor had not recourse to internal cost figures, and could not assess these without engaging in independent cost studies, they could not provide any direct dollar estimates for how much the scorecard might save any particular firm in terms of operating expenses. According to one career analyst who went on to run his own scoring consultancy, during the five years he worked at Fair Isaac, he never once saw any discussion of the benefits of the scorecard in terms of dollar figures. Instead, the advantage of statistical analysis was always described in ‘numbers of cases’. The assumption was that if they were to “get 10 % reduction in the number of bad cases that would be 10% reduction in the amount of bad debt, and whatever that turns into, in profits”²⁶⁸. Fair Isaac’s own inability to calculate revenue or profit increases of scorecard reinforces the difficulties of cost accounting in consumer credit.

In an environment with a heightened sensitivity to cost control, a pressing question for a prospective buyer would certainly have been whether the price of the system would

²⁶⁶Consumer Credit Symposium (1958). “Installment Lending – A Personal Business”. J.F. Keely, Vice-President Lake Shore National Bank. Chicago Illinois, p. 57.

²⁶⁷ Fair Isaac & Company Incorporated, "History of Fair, Isaac and Co.."

²⁶⁸ Gerard Scallan, former Fair Isaac analyst and founder of ScorePlus. Personal communication at the Credit Research Center, Credit Scoring and Credit Control X conference in Edinburgh, Scotland, August 29, 2007.

eventually be counterbalanced by the savings it produced; and if so, how long it would take for this to occur. Since bad debt losses were relatively low (especially in small communities with equally small finance operators) default reduction was much too weak a justification for the scorecard. To merchandise the device Fair Isaac would have to change their rhetorical strategy and come up with an arsenal of other arguments that could demonstrate more definitively how the tool's performance could, at the very least, offset its own cost. The intriguing solution they came up with was to modify the design of their product. Here's how the scorecard was reworked: They created scoring tables so that the first factors that counted were drawn solely from the credit application forms. The user would "look at the 'application score' and stop there and get what was called the 'subtotal score'"²⁶⁹. If the subtotal score "was very high in theory they would approve you, and if it were very low they would decline and if it were in the middle they would go and get a credit bureau report".²⁷⁰ In short, Fair Isaac had redesigned the scorecard in such a way that in at least some cases, a conclusion could be reached using only data attained directly from the applicant while eschewing the need to purchase a credit report.

The scorecard had always relied on two basic types of data in lender's files. As this career employee and former executive explained, "there was application data and there was credit bureau data". "We had credit report and we would code that data", he continued, "We did that for years". But the idea in the cost-modified scorecard was that "if you didn't get enough plus points on the bureau to get above the cut off, so you already know it's a

²⁶⁹ Interview E by author with a retired Fair Isaac employee, a first generation analyst and senior executive, September 5, 2005

²⁷⁰ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22, 2004

turn down, so why even bother”²⁷¹. With this kind of scoring table “part of our sell was that we could make better decisions for you and we could also save you money on buying a credit report. And credit operations relied a lot on credit reports, so it was a big deal”.²⁷² Fair Isaac argued that, at the extremes, a credit decision could be made without further resorting to credit bureau reports since the additional information would not change the decision to reject or accept the application. Because bureau reports were priced at \$1.25 per unit²⁷³ their cost could be clearly apprehended and juxtaposed against the price of the scorecard. The rhetorical pitch was as follows: “Do you want to get as much predictive power from the application as you can so that you may not even have to buy a bureau [report]?” The appeal was obvious because “The bureaus were expensive back then”²⁷⁴.

The cost-based argument was that by cutting back on expensive credit reports, money would be saved that could gradually offset the cost of the scoring system. In this arrangement, the cost of scoring would be borne not by cutting into the user’s revenues, but by redirecting resources away from the credit bureaus. The implication is intriguing: the scorecard was rendered attractive, not by proving its superior capability in identifying future defaulters, but rather by its ability to recycle a known operating expense by drawing away funds earmarked for bureau reports. Operating costs were neither clarified nor cut, so much as they were shifted. Rather than rendering elusive distributed costs more visible or reducing

²⁷¹ Interview E by author with a retired Fair Isaac employee, a first generation analyst and senior executive, September 5, 2005

²⁷² Interview E by author with a retired Fair Isaac employee, a first generation analyst and senior executive. September 5, 2005

²⁷³ Figures from Gary G. Chandler and David C. Ewert, "Cost and Value of Credit Bureau Reports" (paper presented at the Proceedings of the Eastern Finance Association, 1975). Reported by Noel Capon in his testimony. Credit Card Redlining. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs, U.S. Senate, 96th Congress. June 4 and 5 1979, p. 156.

²⁷⁴ Interview J by author with former Fair Isaac analyst and product innovator, September 12, 2006

hard to reach leaks in operating expenses, the tool simply displaced an already calculable expense to its own advantage. This observation overturns accounts that might be tempted to place a quest for rationality or the natural interest of financial firms in risk metrics at the forefront of a causal explanation for credit scoring's success. To the contrary, scorecards were not immediately attractive to consumer credit firms for a number of reasons, not least of which was that, like numerous other technologies²⁷⁵, they started out being unfeasibly expensive because the material infrastructures to absorb the weight of calculation did not yet exist.

Redesigning the technology so that a benefit could be concretely grasped in terms of immediate cost effectiveness is as much a part of what made the technology 'work' as its functionality in expressing default as a probabilistic risk. The laws that brought the finance industry into being hardwired the question of cost into the business. Under these conditions cost was in and of itself a technical requirement that superseded the novelty of mechanized application screening. It is worth noting that this early maneuvering around bureau reports sets the stage for some dramatic tension later in the biography of the scorecard during the creation of today's FICO scores. The executives in charge of negotiating the contracts with the bureaus that created the Fair Isaac version of 'credit bureau scores' recalled that the earlier sales strategy had "kind of put us at odds with the bureaus because they wanted to sell as many credit reports as they can". The cost effectiveness of scoring at the expense of the credit reports meant that "we actually, got kind of confrontational with the bureaus, which made it hard to get deals with them later on"²⁷⁶. In the 1980s, Fair Isaac would have to

²⁷⁵ Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*.

Levinson engagingly recounts the difficulties in setting up the standards that support container shipping.

²⁷⁶ Fair Isaac & Company Incorporated, "History of Fair, Isaac and Co.."

partner with the very organizations they had managed to make into adversaries on the road to establishing the viability of their technology.

Conclusion—The move from cost to risk in consumer credit

In the post-War period, convincing a firm to sink capital into an expensive tool like the scorecard would indeed have been a hard sell. Where revenue reducing leaks were known to be distributed throughout the process of loan management like water out of sieve, the narrowly targeted approach of the scorecard would have been fundamentally incompatible with the industry's preoccupation with reducing overall operating expenses. So despite great technical skill Fair, Isaac & Company began life as an underdog. This is perhaps because the Fair Isaac calculation of 'default risk' was somewhat academic. The assessment of default probabilities was a sophisticated exercise in statistical problem solving, but it was not one that was expressly designed to achieve any of the objectives business people were directly concerned about such as assessing costs, cutting costs or increase revenue and profits. Reducing relative default rates would certainly aid competitiveness and increase returns—in theory. But, given the way the credit world was actually configured, it was difficult to imagine how this could be accomplished by inserting a high priced instrument at the point of screening, instead of by strengthening collections efforts or increasing efficiencies at multiple points down the line. Scorecards might increase screening speed, but this would only create a bottleneck if the operation was able to efficiently accommodate the accounts downstream.

A return to the history of consumer credit is a reminder of just how foreign the notion of probabilistic default risk assessment once was to credit management. From the vantage point of the mid-century consumer credit industry, it is perhaps no surprise that “Throughout the 1960s, the credibility accorded to the whole notion [of credit scoring] was close to zero and [Fair Isaac’s] customer list grew slowly”. “Lending is probably the world’s second oldest profession” reflected Rosenberger “and had been done judgmentally for centuries. And so here were these two guys saying we can help you do this better and as you can imagine there was a fair bit of skepticism about whether that was true or not”²⁷⁷. The burden of evidence was always on Fair Isaac, because, as he points out, “Well, people were back then, I mean there were MBA’s around, don’t get me wrong, but aside from accounting, business didn’t have that much of a quantitative edge to it”²⁷⁸. A naturally occurring interest among consumer financiers in controlling default risk, therefore, cannot explain how Fair Isaac eventually came to ‘break through’. What matters are the qualities of the technology, and the specific ways in which it was adapted to the situation of the industry.

The history of consumer credit is a history of the progressive institutionalization of forms of control over the exchange of money for the purposes of consumption. Tightly fixed interest rates originally set by social reformers in the earlier part of the century sought to reconcile the tension between exploitation through usury and the social utility of credit. The laws dictated that to be profitable, the costs of loan production had to remain within the revenue generating restrictions set by the small loan laws. Thus, the profit making capability in consumer finance would come from minimizing operating expenses. Calculating and controlling operating costs proved slippery, however, because of variability in operational

²⁷⁷ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22, 2004.

²⁷⁸ Interview by author with Larry Rosenberger, former CEO of Fair Isaac, June 22, 2004.

design, because expenses were distributed over the entire process of loan production, from securing the funds to lend, to pursuing collections. When Fair Isaac encountered the credit industry, there was a movement to seek new information so that costs could be better managed; there was also a parallel and contrary impulse to reduce information storage in order to control costs. As clever as it was to mechanize one point in the operating process, in this environment, the scorecard, itself a significant expense, could not become widely attractive until its own contribution to cost control was made explicit.

The cost accounting problem in the consumer credit industry could not be bypassed because it was as much a moral and a social imperative as it was a question of business management. If lenders had been made entitled to profit from small loan lending through the laws, this was only because of the social purpose these loans arguably served. The justification for interest rates (and penalty charges, when these were permitted) that exceeded the traditional rates of usury was that “a finance company is a service institution, and that finance company charges are charges for services rendered”²⁷⁹. In some cases, lenders were simply expected to absorb losses. Even though “Too many loss-leaders in the consumer credit business produce a lot of volume, but no profit” members of the industry conceded that these must, nonetheless be made “as a matter of good business and good social policy”²⁸⁰. The bottom line was that the limits on profit were accepted as part of the equity of the consumer-lender relationship. “I want to emphasize,” came the forthright statement from the vice-president from Boston, “that I do not advocate that you should always cover

²⁷⁹ The Consumer Credit Symposium (1956). “Finance Charges – Pre-Payments and Rebates – Collections and Repossessions”. *Times Sales Financing*, p. 116.

²⁸⁰ The Consumer Credit Symposium (1955). “Factors Affecting Profits in Consumer Lending”. Preston J. Heiman. Statistician, Beneficial Management Corporation. Newark, New Jersey, p. 128.

costs, regardless of what they are. Your costs may be too high because you are operating inefficiently. It is not fair to expect the public to pay for this inefficiency.”²⁸¹

This significant historical observation is that before consumer credit was a problem of ‘managing risk’ it was primarily a problem of ‘controlling costs’. At the origins of the consumer credit industry, it was the cost of operations and not the credit standing of the borrower or any prior projection of loan outcome that justified the price of credit. The fair price of credit was not tied to the level of creditworthiness of the person, nor was not related to any notion of risk, assessed in advance; rather, it was tied to the time and expense involved in managing the loan. *Interest remunerated the basic cost of loan production.* The founding principles of the consumer credit industry are, therefore, radically different than the ones upon which they run today. In the original configuration of consumer lending, raising interest rates and levying fees were not sanctioned methods for generating profits. As scoring technology overcame the industry’s initial resistance, it would provide economic rationale—risk-mediated lending—with a foothold from which to erode the relationship between public purpose and private profit in credit cobbled together at the turn of the century.

The introduction of ‘default risk’ through the scorecard would participate in providing a fundamentally new justification for generating revenue by giving credit to consumers. Chapter 3 explores the mechanics of the scorecard as a tool built by operations researchers. It finds that the probability of defaulting predicted by early credit scoring technology varied from lender to lender, and was intimately related to each firm’s operating practices. ‘Default risk’ was originally a function of industrial credit policy.

²⁸¹ The Consumer Credit Symposium (1955). “Controlling Costs an Internal Operations”. Harold E. Randall, Vice-President and Comptroller. The First National Bank of Boston. Boston, Massachusetts, p. 144.

Chapter 3

Custom Models for Credit Executives

Credit is an opinion generated by circumstances and varying with those circumstances. The state of credit at any particular time is a matter of fact only to be ascertained like other matters of fact; it can only be known by trial and inquiry.

*Walter Bagehot*²⁸²

Fair Isaac presented its application scorecard to the finance industry as a simple and straightforward substitution of method. When the device was inserted into the lending process it appeared to replace a preexisting organizational function served by manual underwriters or credit committees, with a mechanical device. Yet, although the initial assessment of the borrower had always been an important moment of credit production, applicant screening had never stood alone as the definitive moment in constituting the quality of a loan. As this chapter explains, ‘risk’ is not simply a new way of making business decisions. Risk assessment technologies such as the scorecard have introduced to business a

²⁸² Walter Bagehot, *Lombard Street, a Description of the Money Market* (New York: Scribner, Armstrong & Company, 1877).

fundamentally new form of operational control through information. In practice, however, the old and the new forms of control were at first closely related. What the scorecard purports to do for the credit process (provide *executive control* through a prediction of future outcomes) was enmeshed in the processes through which credit relationships, in those days, were actually made to work (*operating control* to achieve the desired future outcome).

If taken in isolation, the problem-framing and problem-solving approaches that defined credit scoring (probabilistic prediction) will clash in significant ways with the existing organization of mid-century loan production (case processing). As we saw in Chapter 2, the initial agreement to grant a loan was actively supported by an iterative process of making the loan good; that is, once a loan was granted, numerous actions needed to be taken throughout its duration to enact the initial expectation that it would be repaid. In treating credit quality as though it could be predicted upfront using only data contained in the application form, then, the content of scoring models both relied upon, but upended, the temporally and organizationally distributed attention to maintaining loan commitments (such as collections mechanisms) that served as the strong arm of the established regime of credit control. When viewed through the lens of operations research, the key to improving credit production was to enhance executive decision-making by upper-level managers.

Fair Isaac isolated and elevated application selection into a moment that could be subjected to direct managerial oversight, and profoundly re-configured where and how control should be exercised over consumer credit production. Nevertheless, despite presenting a radically different theory of credit control, in actual practice, scorecards could not and did not make their predictions in a void. Strictly speaking, scorecards automated the replication of successful decisions that had been made within the specific operating

environment of a firm; that is, they modeled data to select for cases that would be successful in the future, but only if treated with the same continuous operational control that had been exercised on borrowers in the past. Despite the radical break in methodology brought on by the use of statistics, the technology's predictive power was profoundly contiguous with the situated mechanisms of credit production that preceded it.

This chapter begins to examine what credit scoring introduced into the development of consumer finance and refines the claim that scores are a form of prediction. It describes how empirically driven statistical analysis was intertwined with the entrenched practices of loan underwriting and loan management within the consumer credit industry to create the first custom application scorecards. The structure and organization of consumer finance, an industry populated by small businesses each with their own idiosyncratic operating policies, as well as their own often disaggregated and inconsistent record keeping, shaped the business of scorecard production. That being said, it is important to recognize that algorithms were not models of operations as three dimensional systems²⁸³, but were models of the outcomes or effects produced by these operating systems. Since a scorecard was essentially a mathematical model of past outcomes captured within in a discrete body of data, a scoring algorithm and the scores it produced could only be considered relevant to a specific lender's business experience.

One scorecard did not fit all. Variations in the achievements of operational control meant that scoring models were not transferable between enterprises. This was a boon to Fair Isaac, which retained a strong proprietary hold over the transfer of their technology. By

²⁸³ Scoring algorithms were models of data, not the properties of operations. By a model of an operation I mean, for example, a schema that attempts to capture the structure of an operation such as a flow chart. Similarly in genomics, linking phenotypes to genomic sequences is a kind of model that relates an outcome to patterns in data (nucleotide sequence), but is not a model that says anything about what goes on in the body to express that phenotype.

the same token, however, despite the company's best efforts, application scorecard production could never be rendered fully routine. The significance of the analytics it provided was always firm specific and so was the information emitted by a scorecard. The convergence of scientific methodologists for hire with a credit industry rife with firm-specific production practices meant that risk management technology had to be made contract-by-contract, firm-by-firm. Unlike the credit scoring system we know today, the original scoring business only provided scorecards that were customized to match the uniqueness of finance companies as organizational forms.

This historical observation that scorecards were custom products disrupts the claim that the purpose of credit scoring science is to predict how humans will act; it displaces distracting questions about the adequacy of statistics for qualifying the complexity of human behavior. What the custom business shows is that the original purpose of scoring was to capture how credit relationships were produced through interactions between borrowers and the credit policies of financial institutions. Credit scoring was originally an intra-firm statistic for communicating credit quality (a property of credit arrangements), not creditworthiness (a property of individuals). So instead of asking whether credit scoring is an appropriate way to represent and manage people, this chapter strives to sets up an alternative question: in light of the history of the technology itself: how has scoring become a representation of an individualized risk that is treated as though it is somehow independent from the interventions and activities of financial institutions?

Operations research seeks to improve executive control

Operations research (OR) began as a military endeavor to deploy scientific research as a means of refining executive decision-making in wartime situations. According to historian of economics, Philip Mirowski, who has traced the intertwining of the economics profession with military inspired sciences in the post-war period, “Operations research languishes as the unloved orphan of the history of science”²⁸⁴. In surveying some of the achievements of OR, Mirowski notes that is difficult to define with any precision what OR practitioners sought to do because “Few if any conceptual unifying threads ran through the individual calculations and exercises”²⁸⁵. He suggests, therefore, that instead of seeking to pin down a scientific content, the field can be better understood by its function— to carry out the ‘boundary work’ of embedding interdisciplinary teams of civilian scientists in various places within the war machine. The distinct relationship OR had with its military patrons is, perhaps, one of its defining characteristics. They saw their role as providing military commanders with scientific direction “while balancing this delicate combination of engagement and aloofness from the chain of command”²⁸⁶. Operations researchers were paid by the military but they did not consider themselves to be military personnel.

During the post-war period, as physicists and military personnel flooded into the newly created suburbs²⁸⁷, OR was recast as a set of techniques that might be used more

²⁸⁴ Philip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science* (Cambridge: Cambridge University Press, 2002), p. 177.

²⁸⁵ *Ibid.*, p. 181.

²⁸⁶ *Ibid.*, p. 182.

²⁸⁷ For a discussion of the relationship of suburbanization to American post-war physics see David Kaiser, "The Postwar Suburbanization of American Physics," *American Quarterly* 56, no. 4 (2004). Kaiser is interested in both the literal (where physicists lived) and symbolic (about the exit of physicists from universities and into industrial laboratories) dimensions of suburbanization.

generally in the civilian world.²⁸⁸ In the first US textbook on OR published in 1951, Philip Morse and George Kimball stated that OR techniques could be used to enhance the control of executives in any field, be they “the commanding general of a military force, the vice-president in charge of operations in an industry, or the director of some governmental activity”²⁸⁹. More specifically, as William Horvath at the Office of the Chief of Naval Operations described the field, OR “provides the administrator or executive department with a quantitative basis for decisions” in any situation where there was a choice between alternative plans. As early as 1948, Horvath was arguing that OR techniques could “be used equally well for the study and improvement of other operations such as manufacturing, distribution, communication, transportation, farming and, in fact, the operation of any large organization which performs some repetitive process that can be expressed in quantitative terms”²⁹⁰. By 1950, “OR began to be taken seriously by American industry”²⁹¹. A 1953 piece in the Harvard Business Review echoed Horvath’s position, promoting operations research for management as a way “to single out the critical issues which require executive appraisal and analysis”, and to provide “factual bases to support and guide executive judgment”²⁹².

²⁸⁸ Most illustrious practitioner of operations research is, perhaps, Robert McNamara. McNamara was the president of Ford Motor Company prior to becoming Secretary of Defense under the Kennedy administration, and ended his career at the World Bank. This work is emblematic of the influence of OR in the industrial, military and financial sectors. His memoirs are recorded in Errol Morris’ Oscar winning documentary, the *Fog of War* (2004). In a vivid example of his penchant for empirically supported thinking, McNamara recalls having participated in experiments in which he threw wrapped skulls down the stairwell of a Cornell dormitory as a way of brainstorming vehicle safety.

²⁸⁹ Philip M. Morse and George E. Kimball, *Methods of Operations Research*, 1st revised ed. (New York: John Wiley & Sons, Inc, 1951).

²⁹⁰ William J Horvath, "Operations Research - a Scientific Basis for Executive Decisions," *The American Statistician* 2, no. 5 (1948): p. 6.

²⁹¹ Russell L. Ackoff and Patrick Rivett, *A Manager's Guide to Operations Research* (New York: John Wiley & Sons, 1963), p. 9.

²⁹² Cyril C. Herrmann and John F. Magee, ""Operations Research" For Management," *Harvard Business Review* July-Aug (1953): p. 100.

Mid-century credit executives wielded their influence by setting the terms of credit policy. The *Credit Management Handbook* (1965), a general handbook for credit managers of all stripes (not only consumer credit) stated that “Any company that sells on credit has a credit policy, at least in the sense that individual credit decisions follow some pattern consistent with that company’s over-all aims and policies”²⁹³. The handbook noted, however, that “In American business today credit policy is commonly informal and unwritten”. This is perhaps because, as the following description from the 1950s suggests, policy was a complex entity that consisted of an executives statement and its execution by staff: “The abstract phase is that group of intangible factors that are used in the make-up of a sound Credit Policy. The concrete part is the Credit Policy itself.... the final decision....the fixed course of action decided upon”²⁹⁴. Policy positions could circulate informally in small firms, but policy transmission posed a serious threat to the smooth continuity of operations: “Many banks” noted this vice-president from Scranton, Pennsylvania, speaking at the Consumer Credit Symposium, “have been faced with a sudden death or critical illness or incident involving their loan officer and discovered that all of the

²⁹³ Credit Research Foundation, *Credit Management Handbook*, ed. National Association of Credit Management, 2nd ed. (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 40. The Credit Research Foundation was the education and research affiliate of the National Association of Credit Management. The handbook was designed for all types of credit departments, but mainly addressed those that mediated exchanges between small manufacturers, suppliers and retailers. The pressures recorded here were common to many types of credit operations, and not just consumer credit. The generality of this description mitigates the over-determining argument that competitive pressure was the driving force behind the innovation of credit scoring. If that were the case, quantified risk management systems would have been developed for all credit markets, and not as this research shows quite early in consumer credit, following the industry specific efforts of Fair Isaac.

²⁹⁴ The Consumer Credit Symposium (1954). “Credit Policies”. E. H. Stotesbery, treasurer, Federal Discount Corporation, Dubuque, Iowa. 68 (underlining in original).

credit information was in the 'head' of the stricken person. That places the bank in an unenviable and awkward position in failing to have this information in writing"²⁹⁵.

As a credit operation grew, formulating explicit policies became necessary in order to command the complex hierarchies that separated the executive from line personnel. The *Credit Management Handbook* suggested that executives needed to create "an atmosphere which encourages subordinates to think in terms of policy: to be aware of the effect of their individual credit decisions upon total department and company operations"²⁹⁶. "One of the general principles to be followed in delegating authority and in establishing procedures" it noted, "is to include as many situations as possible in a routine which can be administered by lower-level personnel". As a more complex division of labor developed in consumer finance, the idea was that solid policies would free "credit men who are more highly qualified by training and experience to deal with more complicated situations"²⁹⁷. Moreover, when it came to managing consumer credit, it was thought to be "impossible on the face of things to make a very exhaustive investigation comparable to those made in connection with large commercial credit lines". On these grounds, this bank vice-president from Charleston, West Virginia, recommended that underwriting policies be reduced to a set of standards which

²⁹⁵ The Consumer Credit Symposium (1957). "Policies for the Small Loan Department". Richard G. Kreis, Vice-President, The First National Bank of Scranton, Pennsylvania. 5 Contemporary accounts claim that credit expertise became scarce under the wartime draft, and that it was the absence of qualified loan officers that created the impetus for firms to turn towards systems for guiding non-experts in executing credit decisions. The evidence I have reviewed suggests that had the credit industry been left to their own devices, the nature of these systems would almost certainly have been rule-based, rather than statistically-based. The importation of statistics by sources outside the credit industry is a pattern repeated in the mortgage industry (see Poon, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance.").

²⁹⁶ Credit Research Foundation, *Credit Management Handbook*.

²⁹⁷ *Ibid.*, p. 8.

might “be applied quickly, inexpensively, and at the same time with a high degree of accuracy”²⁹⁸.

Amongst themselves consumer financiers circulated a handful of general principles for ensuring the performance of consumer loans independent of local operating conditions. For example, the president of the National Retail Association advised that “The degree to which the Credit Department should go in turning down accounts should depend to some extent upon the gross income margin involved in the goods being sold. If this income margin is low, a strict credit policy is likely to prevail because credit losses must be kept low”²⁹⁹. With regards to capacity, he recommended a rule of thumb, though not a hard and fast one, “to the effect that when an individual would undertake monthly payments in excess of 25% of his monthly income, a second look should be taken at the application, because a commitment in excess of that percentage figure might result in a chronic delinquency”³⁰⁰. “When it comes to credit terms” came a more exacting recommendation for a finance company vice-president from Chicago, Illinois, “you’ve got to follow the doctor’s prescription. That means sound terms that have been proved by forty year’s experience – in today’s market at least one-third down and no more than 24 months to pay for that car”³⁰¹.

Despite their reassuring simplicity, rigid specifications such as these were rapidly losing their effectiveness. By mid-century, increased competition was forcing lenders to push through conservative limits and to stretch loan dimensions in daring ways with as yet unproven results. The credit industry readily conceded that “It would be somewhat difficult

²⁹⁸ The Consumer Credit Symposium (1953). “Actuarial aspects of consumer credit”. Joseph A. Turner, VP, The Kanawha Valley Bank, Charleston, West Virginia, p. 41.

²⁹⁹ Proceedings of the National Consumer Credit Conference. (1951). “Evaluating the Risk”, Clarence E. Wolfinger, President of the National Retail Credit Association, p. 109.

³⁰⁰ Ibid.

³⁰¹ The Consumer Credit Symposium (1955). “Dealers and their Finance Connections”. Paul H. Brown, Vice-President, General Finance Corporation, Chicago Illinois, p. 100.

to set a standard for, or even discuss in too much detail, collection or loss ratios which should result, due to the variances in credit and collection policies”³⁰². A credit manager was expected to “set his own standards based upon the degree of leniency in credit and collection controls”³⁰³. Yet, as commonly remarked upon, “all too generally there is a gap between top management of the bank and management of the instalment loan portfolio”³⁰⁴. This was especially true in banks where consumer credit, when it was taken on, was considered a secondary activity. Because “the individual transactions are too small to warrant the personal attention of the bank managers [...] what management really sees is the sum total of transactions over a given period of time.”³⁰⁵ To command businesses, banking executives, who were increasingly removed from ground operations needed to trace the effectiveness of their stated positions and flexibly readjust in due course.

The problem with policy as a method of organizational communication was that even when it was clearly written down, it could never be transmitted unambiguously through the organizational line. In the form of words, policy only weakly met the definition of communication expressed by the oft quoted Shannon— “that of reproducing at one point, either exactly or approximately, a message selected at another point”³⁰⁶. The *Credit Management Handbook* pointed out that crisp statements could be effective at narrowing the

³⁰² Proceedings of the Eleventh Annual National Consumer Credit Conference. (1959). “Revolving Credit Plans in Retailing”. E. L. Burland, p. 77.

³⁰³ Ibid.

³⁰⁴ A Challenge to Management by J.P Dreibelbis, Senior Vice President, Bankers Trust Company, New York, New York in American Bankers Association. (1956). Proceedings of the National Instalment Credit Conference. *National Instalment Credit Conference*. St. Louis, Missouri: Instalment Credit Commission, American Bankers Association, p. xx.

³⁰⁵ A Challenge to Management by J.P Dreibelbis, Senior Vice President, Bankers Trust Company, New York, New York in American Bankers Association. (1956). Proceedings of the National Instalment Credit Conference. *National Instalment Credit Conference*. St. Louis, Missouri: Instalment Credit Commission, American Bankers Association, p. xx.

³⁰⁶ See Claude E. Shannon, "The Mathematical Theory of Communication," *Bell System Technical Journal* 27, no. July (1963).

range of decisions “for particular personnel, kinds of situations, or time periods”³⁰⁷. Policy statements could also be “constantly interpreted and applied to concrete situations, with the help of specific guides or procedures”³⁰⁸ that translated abstract edicts into concrete approaches to action, reproduced in several locations. Yet, even when accompanied by the most practical set of guidelines a policy could never fully eliminate the use of judgment and interpretation by the personnel executing the day-to-day activities of the firm. As the handbook acknowledged “policy serves as a guide in determining how to handle given kinds of problems, but it never offers a definitive solution”. What is more, “The fact that credit policy is explicitly stated does not preclude decisions which are contrary to the policy”³⁰⁹. So although policy was an instrument of coordination, disseminated into the hands of numerous loan officers it inevitably produced results that deviated from executive directives.

With its roots planted firmly within operations research, Fair Isaac supported a problem-solving approach that privileged and reinforced executive control over operations through improved communication. The scorecard was not conceived of as a labor-saving device to replace clerks. It was not a method of storing data like a filing cabinet, nor did it simply tabulate data like the original punch card systems. From its inception the scorecard was posed as a device for wresting control over the quality of the firm’s production process. Fair Isaac’s efforts might be counted as a modest wig of a contemporaneous movement to produce ‘management information systems’ described by historian of technology, Thomas Haigh. Haigh describes an altogether more ambitious group of self-styled ‘systems men’ who sought to redefine “the computer as a managerial tool for the creation of systems to deliver information to executives rather than as a technical device for the processing of

³⁰⁷ Credit Research Foundation, *Credit Management Handbook*, p. 41.

³⁰⁸ *Ibid.*, p. 40.

³⁰⁹ *Ibid.*, p. 41.

data”³¹⁰. The difference between systems men and operations researchers was in the scope of their ambition. Haigh points out that systems men “painted the specific tools developed by operations researchers (such as queuing theory, decision theory, and linear programming) as a useful but narrow specialization within the overall systems department”³¹¹. What is intriguing is that a more narrowly focused Fair Isaac has become for one industry what the systems movement ultimately failed to achieve for itself as a professional movement.

The paper laden environment that credit professionals were used to inhabiting was a world of widely distributed activities in which loan outcomes were managed on the ground through an indeterminate combination of loan terms (variable loan sizes, maturities, number of repayments...) and possible treatments (follow up, negotiation, readjustment...). In stark contrast, the introduction of the application scorecard specified, concentrated and fixed policy attention on a single moment—application screening. To accept a case or not, in this narrow reformulation of the credit problem as a clean binary choice³¹², credit production became amenable to the scientific intervention of operations research—the application of investigative methods for “the prediction and comparison of the values, effectiveness, and costs of a set of proposed alternative courses of action involving man-machine systems”³¹³. Since operations research sought “to estimate how likely it is that the next operations will

³¹⁰ Thomas Haigh, "Inventing Information Systems: The Systems Men and the Computer, 1950-1968," *The Business History Review* 75, no. 1 (2001): p. 29. The shift from data storage to data use that Haigh is pointing to may not be obvious unless one is familiar with the details of the history of computing. Systems men thought that “The computer's proper role had been transformed, rhetorically at least, from a simple clerk-replacing processor of data into a mighty information system sitting at the very heart of management, serving executives with vital intelligence about every aspect of their firm's past, present, and future” (16).

³¹¹ *Ibid.*: p. 27.

³¹² The classic case treating how to deal with Kamikaze attacks, illustrates operations research’s penchant for binary decision sets. The question to be answered was tightly framed as follows: “Should the ship under attack maneuver violently to avoid being hit, or keep straight in order to get better aim with its anti-aircraft guns?” Joseph F. McCloskey and Florence N. Trefethen, *Operations Research for Management* (Baltimore: The Johns Hopkins Press, 1954), p. 18.

³¹³ *Ibid.*, p. xxiii.

display characteristics similar to those analyzed”³¹⁴, its practitioners recognized that it was “the repetition of the operation, the event, the sale, which enables the operation to be reduced most readily via statistical techniques to quantitative form for analysis purposes”³¹⁵. To make the quality of credit hinging upon a single critical decision that was executed for each credit application, time and time again, was to fit credit into the kinds of problems Fair Isaac was suited to resolve. Repeated action was action that could be modeled.

Scorecards are custom models of past performance

By transforming stagnating paper into information, credit scoring reframed credit-making into a punctuated problem of decision-making in the here and now, rather than as a long-term project of relationship management predicated upon temporally distributed responses that could not be specified in advance. This is the cybernetic turn. “As the etymology of the term suggests,” writes historian of cybernetics, Orit Halpern, “cybernetics is a science of control or prediction of future action. In adjoining control with communication, it is an endeavor that hopes to tame these futures thru the sending of messages”³¹⁶. Halpern distills cybernetics into to three elements—the deferral of ontology,

³¹⁴ Morse and Kimball, *Methods of Operations Research*, p. 11.

³¹⁵ McCloskey and Trefethen, *Operations Research for Management*, p. 95.

³¹⁶Orit Halpern, "Interval: The End of Language? A Crisis of Speech?," in *The Eye of Time* (Durham: Duke University Press, Forthcoming). Halpern’s much needed forthcoming book *The Eye of Time* examines the internal logic of cybernetics to understand how it creates novel attitudes to temporality. My understanding of how cybernetics relates to credit scoring comes from having read this chapter of her manuscript which reads (to me) like a guidebook to the pure philosophy underpinning credit scoring which I have only be able to get glimpses of through my case materials. Halpern’s considerable intellectual challenge is to capture a discourse which itself rejects description as we think of it. In her words, “What the language of communication and control appears to suggest is an aspiration to displace older forms of representation, documentation, and memory. [...] This is a ‘language’ no longer given to translation, and also no longer beholden to literacy; a discourse that operates on all the senses and through action”. This suggests that

the rise of feedback, and the automation of the archive—all of which are built into the credit scoring apparatus. She argues that what marks cybernetics is “not the innovation of new mathematical or scientific principles” which were “often already invented in the late 19th and earlier 20th centuries”. Rather, in her reading what distinguishes it is “precisely the deferral of earlier modernist concerns”, that is, “the transformation in attitudes towards ontology and description”. Halpern’s overarching historical question belies the rise of information based financial systems such as FICO scoring in consumer credit: “What is at stake in such a movement” she asks, “where we being with an effort at documenting an external enemy, and end with the question of prediction and control?”

Fair Isaac, a commercial arm of OR, is the link between cybernetics as an imagined universe and the materiality of the consumer finance world. In this light, OR’s practical self-descriptions are deceptively modest: it claimed to be a science centered on improving executive action through the analysis of data³¹⁷. Its objective was, “by the analysis of past operations, to find means of improving the execution of future operations”³¹⁸. Like scientific management before it (which sought instead to improve efficiency among workers

Michel Callon uses the word ‘translation’ to refer to the way in which technical projects are made to adapt to material circumstances as they develop is quite strategic. Translation underpins the main argument of this dissertation, which is that on the ground cybernetically inspired projects become embroiled with the very forms of representation they seek to replace. This is how credit score gets built to ‘represent’ humans (to humans) even though the system itself rejects the question of fixed ontology (truth, nature, fact) that is at the center of the sciences that science studies is used to examining. The story of credit scoring is of a ghost (cybernetics) struggling to get into a machine.

³¹⁷ As part of the background research to this chapter I have carried out a systematic literature review through reference tracking of articles published in between 1948-2000 that record the discipline’s own purpose and history. I have also reviewed a number of early textbooks. It appears that as it entered the university OR struggled to name its disciplinary and pedagogical content. In the beginning, some writers attempted to classify types of substantive problems OR solved, but a preference to hold to the broadest but also the most impoverished definition of the practice, the common use of the scientific method in problem solving, seemed to overcome. It is noteworthy that as Fair Isaac evolved into a highly differentiated specialist in consumer credit analytics (an expertise that the company created itself) its roots in OR, while fondly remembered by the early generation of analysts, have become largely obscured. The company no longer refers to OR when it describes what it does, nor does it seem to pursue technical staff with a preference for training in OR.

³¹⁸ Morse and Kimball, *Methods of Operations Research*, p. 5.

in the production line³¹⁹) operations research would “not necessarily involve any great invention, nor the discovery of new or startling facts”. As Taylor himself had noted, a science of management involved “a certain combination of elements which have not existed in the past, namely old knowledge so collected, analyzed, grouped and classified into laws and rules”³²⁰. The claim of doing science depended on a profound respect for systematic empirical observation such that “The values of the basic action parameters” could be “derived from historical analysis of past actions or from designed operational experiments”. Fair Isaac’s direct inheritance from OR lies in this empirically driven problem solving approach which was constructed by drawing on an interdisciplinary kit of tools that are not specific to OR³²¹. The technical details of the solution it derived using these tools give flesh to ideas that are rooted in cybernetics.

In keeping with the principles of operations research, scorecards were maps of the choices that had been previously made by a lending operation made by statistically analyzing records of past performance. Insofar as an imprint of this past was captured by the kinds of information conserved in a lender’s administrative records, Fair Isaac’s claim was that these patterns could be assessed, and then used as a guide for future credit granting activity. As Larry Rosenberger recounted, “Basically we would tell our lender we are organizers of your past experience. If you’ve had experience, good and bad, with a bunch of folks we will organize that in a mathematical or statistical way to help you to use those decisions to make predictions going forward”. The basic assumption behind credit scoring was simply that

³¹⁹ Russell Ackoff noted that prior to the introduction of operations research into management, attempts at improving production, such as Taylorism, had tended to focus not on managerial control, but on actual efficiency of workers in the line. “Except for a few abortive attempts,” he pointed out, “science did not come to the aid of the *executive* function created by the segmentation of management”. Ackoff and Rivett, *A Manager's Guide to Operations Research*, p. 2.

³²⁰ Taylor quoted in McCloskey and Trefethen, *Operations Research for Management*, p. 82.

³²¹ *Ibid.*, p. xxiii.

“the future was more or less like the past”³²². In the reigning paradigm this made sense: if a firm had worked well with certain types of clients it would presumably work effectively with that type again—providing they could make the appropriate identification. Shifting the methodology by which this identification would be accomplished, the scoring analyst’s job was to define and assemble two samples representing positive and negative outcomes in the eyes of the lender. They would then dig into credit records to figure out which pieces of common information were lodged in these files, and carefully search for those which might help to statistically distinguishing one group from the other.

In the simplest terms, the scorecard was a model of past experience that reflected how policies had played out in interactions with borrowers within the daily practice of a finance operation. Scorecards were a tool of mechanically reproducing a set of screening decisions that had proved successful under the current operating conditions. What is more, Fair Isaac argued that a credit organization, assisted by way of statistics, might not only automate the replication of its previous choice set (made through a former method of screening), but might further refine and reduce losses by helping managers to avoid some types of cases while pursuing others. The company’s claim was that by better differentiating between desirable and undesirable outcomes at the level of the incoming population, credit scoring could improve the quality of a loan portfolio. In short, the scorecard was a tool for detecting the likeliness of a relational fit. That is, it distinguished groups of applications that corresponded to cases that had responded at statistically better rates to the internal style of a particular lending operation than others, and reinforced similar relationships as the business moved forward. As they say in the analytics industry, the modest ‘lift’ the scorecard offered

³²² Interview by author with Larry Rosenberger, June 22, 2004.

was relative to previous level of consistency in policy application and the evenness of the raw dataset.

The logic of scoring was that sifting through enough of the organization's data, if these were of a reasonable quality, would give rise to a set of factors that could be used to account for their portfolio's particular patterns of loan performance. The findings, translated into a gradated scale of numerical scores, could be used to better differentiate between cases in which loans had been repaid as hoped from those in which they had not. Since no single piece of data could, in isolation, differentiate perfectly between cases defined as 'good' and those defined as 'bad', scoring involved the application of specialized statistical techniques to systematically weigh and incorporate a number of pieces of information that in combination, were found to best draw the distinction between the two groups. Unlike underwriters whose expertise was founded on having sage opinions about the relevant criteria for borrower selection, the credit scoring analyst was not expected to come to the blackboard with a preconceived idea of which kinds of information did or did not belong in a scoring algorithm. Their task was to perform an 'empirical grapple'. Scoring analysts generated an array of factors, and then ran statistical tests to discover which combination of these best accounted for the performance of each sample of loans.

The factors in the final scoring algorithms and their associated point values changed from project-to-project. This is because as credit policies varied from operation-to-operation so did performance. Inspired by the accumulated wisdom of ground level credit men, the characteristic policies pursued by any given consumer finance firm were responsive to variations in communities, personalities, organizational histories and internal organizational environments. One advertising group did a study and found that having

“talked with these people about what their credit policy should be and its relation to advertising, sales, and the business as a whole; we found as many opinions as there were colors in Joseph’s coat. Instead of some unity of thought, there was the greatest difference of opinion.”³²³ Differences over how to best practices were the basis of competition in the credit industry, and credit professionals embraced customization as a necessity. “Whatever your system” said one bank vice-president from Chicago, Illinois—in this instance with reference to record management— “it should naturally be tailor-made for your regular bank, depending upon your location, size, volume, type of business whether direct, dealer, or both”³²⁴.

The stability of the scorecard as a commercial product was linked to Fair Isaac’s system of processing and analyzing credit records, as well as to the common final presentation of the card rather than to statistical content, which was unique to each device. If Fair Isaac’s objective was to standardize their own internal production process, they nonetheless had to remain sensitive to the local operating conditions of their customers. Given the deep variability in credit policies and, as a result, in the texture of credit operations, the scorecard would have to screen for the kinds of cases that most resembled the ones that a lender had already managed to work with effectively, given their particular style of loan construction, borrower selection, communication with clients, collection strategies, and so on. A labor intensive process, the analysis for each scoring tool would begin from scratch. It started with a fresh data collection, coding, cleaning and classing³²⁵

³²³ Proceedings of the National Consumer Credit Conference. (1953). The Role of Advertising in the Enlarged Utilization of Consumer Credit By Robert B. Barton, p. 94.

³²⁴ Consumer Credit Symposium (1958) Installment Lending – A personal Business. J.F. Keely, Vice-President Lake Shore National Bank, Chicago Illinois, p. 57.

³²⁵ Analysts went through a series of steps to segment variables into ‘fine classes’, but since these were often far too numerous to be useful, they then regrouped them into the ‘coarse classes’ that would

and was limited to how the application forms and files had been designed. Even if common factors repeated themselves in the algorithms, the score weights associated with these was specific to the firm from which each sample was drawn. To capture the uniqueness of an organization's practices and experiences the scorecard had to be custom-made. Every Fair Isaac product was the result of a genuine process of research and discovery.

Scorecards communicate and apply credit policies consistently

Fair Isaac's primary purpose was to improve executive decision-making. What they were trained to do was to "figure out what the decision is, get the decision out in front, put it on top of the table and sort of never let it go"³²⁶. The emphasis on making decisions should be recognized as a distinct endeavor from the attempt to build an expert system founded on any normative theory of how to make a sound credit decision. Analysts were not 'hypotheses confirmers', they were not supposed to say "*a priori*, here are the four things that I'm really after". As such, scorecard production was not constricted by the exigencies of finding an appropriate dataset on which to test the validity of a precise set of statements. Instead, theirs was 'a kitchen sink approach'. As Robert Heller a former member of the Fair Isaac board and a career economist explained it, providing they had access to a reasonably rich dataset from which to generate potential factors, the analyst would "throw hundreds and hundred of variables in [the sink] and basically let the machine grind out which ones of

constitute the options to appear on the scorecard. This kind of classification work and its political consequences (see also the footnote below on segmentation) has been extensively discussed in the science and technology literature, most notably by Geoffrey Bowker and Susan Leigh Star. Geoffrey Bowker, C and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences*, ed. Weibe Bijker, Bernard Carlson, and Trevor Pinch, *Inside Technology* (Cambridge MA: The MIT Press, 2000).

³²⁶ Interview by author with Larry Rosenberger, June 22, 2004.

those variables are the most significant”³²⁷. As an economist Heller chides Fair Isaac for not being more interested in causal modeling. Fair Isaac analysts, he insists should be understood as “practical guys who wanted to do practical things”. Their can-do attitude was “Ok, let’s estimate the probability that Ms. Poon will pay back her debt. You know, let’s do it! I can do it with the statistics at hand, so why build big theories? What works, works”³²⁸.

To Fair Isaac, sound empirical evidence was the only basis on which a decision should be made. They were, therefore, beholden to the information content gleaned from datasets, whatever those data might be. Scoring algorithms became heavily dependent upon and restricted to the most obvious source of organized data, the credit files that were made available by any particular lending operation. When addressing the dilemma of slim or non-existent records, operations research textbooks suggested that to get the ball rolling it was sometimes “necessary deliberately to design ‘small’ operations in order to obtain the necessary data”³²⁹. Likewise, when a small lender came to Fair Isaac wanting to launch a new loan portfolio “our response back then was, well you don’t have any past experience for us to organize, so when you go get some experience let us know and we’ll help you later”³³⁰. Sending the lender away forced them to “put in place some kind of an origination decision making process, however crude, however subjective, or whatever, and then later when they had experience we’d have to come in and try to unseed it or improve it”³³¹. Experts in statistical model building, but not in consumer credit, Fair Isaac had nothing to recommend

³²⁷ Interview by author with Robert Heller June 23, 2004. Dr. Heller was the President and CEO of VISA USA before becoming executive Vice President and a member of the Board of Directors at Fair Isaac. Prior to that he was a Member of the Board of Governor of the Federal Reserve Board.

³²⁸ Interview by author with Robert Heller June 23, 2004.

³²⁹ McCloskey and Trefethen, *Operations Research for Management*, p. xiii.

³³⁰ Interview by author with Robert Heller June 23, 2004.

³³¹ Interview by author with Robert Heller June 23, 2004.

unless they had access to materials representing actual past experiences. Then, and only then, could their project of statistical modeling move forward.

In providing a kind of organizational memory for what the previous policy had been, as well as a means for imposing incremental changes, scoring assisted in transmitting operating knowledge. The effect was smoother direction of internal operations. For example, scoring assisted managers to pursue growth, without haphazardly sacrificing credit quality. Mid-century observers chastised the finance industry for recklessly pursuing growth: “Some banks cut their rates to obtain volume, without knowing what effect this increased volume will have on the over-all profitability of their installment loan departments.”³³² With scores, as consumer finance executives loosened standards down the score scale, they could gauge the accompanying strain on collections by examining the changing odds. What is more, scoring preserved operational continuity. “How does the information about the various jobs in your consumer credit operation pass from person to person?” asked this mid-century credit consultant, “By word of mouth? By hearsay? That is not too good. Somebody might pass out of the picture, and then where are you with that key man gone?”³³³ Continuity would depend upon removing “credit policy from dependence on the knowledge and experience of one or a few individuals” and ensuring “consistency regardless of changes in department personnel”³³⁴.

To achieve executive control over production was to achieve the unity of action over an increasingly distributed and complex organization, with the purposeful ends of improving

³³² The Consumer Credit Symposium. (1954). Controlling Costs an Internal Operations. Harold E. Randall, Vice-President and Comptroller, The First National Bank of Boston, Boston, Massachusetts, p. 144.

³³³ The Consumer Credit Symposium (1953). Consumer Credit Costs. Otto Lorenz. Consultant, Georgetown, Connecticut, p. 59.

³³⁴ Credit Research Foundation, *Credit Management Handbook*, p. 44.

productive outcomes; in this case of scoring by managing default risk. In the practical day-to-day question of who to accept and who to decline, the defining advantage of application scoring was that it provided uniformity to decision-making at a single point in the organizational line. Rather than having a fleet of human underwriters working in different store-front locations interpreting new policy statements or responding to vague signals such as ‘Increase production!’ or ‘Decrease losses!’, the management of the operation had only to decide upon and issue a ‘cutoff score’, the numerical threshold along the linear scale of scores that marked the ratio of goods to bads the firm was willing to bear. To set the initial threshold on a new scorecard, Fair Isaac proposed two opening strategies. An operation could either maintain its current loan volume while decreasing the overall rate of default—that is, it could underwrite the same number of loans as before while using the refinement provided by scores to cut back on the number of cases needing collections; or it might increase production, taking on more loans while keeping the overall rates of default leading to collection interventions at the levels the operation was already comfortable handling.

Robert Oliver, a confidant of Bill Fair’s and a professor at Berkeley’s Industrial Engineering and Operations Research Department identifies linearity as an important innovation in credit scoring. In his estimation, “The innovation that [Fair Isaac] found was that in the construction of the scores that they were trying to sell, they reduced the enormous vector quantity toward a more scalable number”³³⁵. Fair Isaac accomplished this by selecting and then re-expressing the information content of credit applications as a set of arbitrary numerical categories that were arranged to represent linearly decreasing probabilities of default. The scorecard allowed loan officers to select or reject in terms of a

³³⁵ Interview by author with Professor Robert Oliver, September 22, 2006.

calculated probability, a gradated prediction of “the odds [...] that you’ll do something that is against the interest of the lender”³³⁶. In the Fair Isaac model, as scores increased, credit quality—defined in terms of probabilities of defaulting—also increased; or stated conversely, as the score went up probabilities of defaulting dropped. A signature feature of the Fair Isaac product was that it commonly imposed an interval scale on its scores: every 20 points doubled the odds. On a score scale in use in the 1970s, a score of 200-219 might have indicated an odds ratio of 10 (goods):1 (bad). Between 220-239 it would increase to 20:1, and in the highest score range, ≥ 280 , the odds might reach 160:1.

Credit scoring equipped the credit executive to exercise responsive quality control while acting at the level of the portfolio and at a distance from line operations. The prospective effect of scoring technology was to provide credit executives a sliding scale for controlling production levels. If lenders had once noted that “under varying economic conditions there can be substantial shifts in collection policy, like lifting the hand up and down on an inflated balloon”³³⁷, now, within any operating context, underwriting standards could be slackened or tightened at the frontend such that the fluctuations in credit quality would no longer be felt accumulating downstream. Scoring fulfilled the promises of operations research to ease the burden on executives’ time, while it simultaneously “intensified the potential of their decision-making role”³³⁸. Like other operations research initiatives what was at issue was “summing up of the facts bearing on the problem before a decision is made”. As such the scorecard was a device was designed to become a useful

³³⁶ Interview by author with Professor Robert Oliver, September 22, 2006.

³³⁷ Consumer Credit Symposium (1950) Will You Get Your Money Back. Fred H. Diefenbacher, Ass’t Vice-President, National City Bank of New York, N.Y., p 129.

³³⁸ Herrmann and Magee, ""Operations Research" For Management."

“part of the thinking process of the organization”³³⁹. With the flick of a switch, executives could slide up or down the score scale, moderating credit production in terms of credit quality, in response to changing conditions.

Application scorecards respect but externalize the specificities of credit operations

At the Consumer Credit Symposium in 1955, J. F. Cowan, an assistant vice-president at Walker Bank & Trust Co. in Salt Lake City, Utah and manager of the consumer credit department, argued that the practice of consumer lending was not an art but was indeed susceptible to scientific analysis.³⁴⁰ Cowan’s first point was that in addition to their earning power, a person’s character constituted an important form of collateral. But for repayment to occur, he also put forth two further observations: that the privilege of credit had to be extended long enough to match the earning power of the borrower; and that loans should be granted for constructive purposes. What is noteworthy is that in Cowan’s analysis, the analysis of a seasoned credit professional, the parameters that had to be considered scientifically to assess the goodness of a loan were not confined to qualities of the borrower. Other factors relating to what might be loosely referred to as the ‘loan type’ also mattered in the constitution of credit outcomes. This was reflected in economists’ early musings to formalize what constituted ‘credit quality’³⁴¹. A 1967 report by the National Bureau of

³³⁹ Morse and Kimball, *Methods of Operations Research*, p. 136. The scorecard provides a pivot point between Mary Douglas’ emphasis on categories and the way these categories are deployed in cybernetic systems. Mary Douglas, *How Institutions Think* (Syracuse: Syracuse University Press, 1986).

³⁴⁰ Consumer Credit Symposium (1955). “Direct Loans”. F. J. Cowan, Assistant Vice-President, Manager, Consumer Credit Department, Walker Bank & Trust Co, Salt Lake City, Utah, p. 28.

³⁴¹ Economists’ interest in consumer credit has always lagged behind its development in practice. The first serious study of consumer credit by an economist was R. A. Seligman’s two volume examination of

Economic Research to explore *The Quality of Consumer Instalment Credit* divided the concept of credit quality into two major categories: maturities and down payments, and loan terms and borrower characteristics. Lumping borrower characteristics in with loan terms made it clear that the qualities of people were to “constitute only one aspect of the concept of credit quality”³⁴²

Although the custom credit scoring models respected and retooled operational diversity, they also bracketed out numerous levels in the production of loan quality that were relevant to mid-century practitioners. A model is, by definition, a simplification of the real world conditions it seeks to capture. Models internalize some impressions of the empirical world in while leaving others outside. To lend or not to lend? In a first move, application scoring narrowed manager’s attention to the moment of credit origination. It isolated one point in the lending process and amplified it into *the* defining moment in the production of credit outcomes from the point of view of an executive decision-maker. The technology then resolved the problem of managing quality offering executives a parsimonious tool for exercising control before the credit relationship had even begun. What is more, and perhaps more significantly, application scoring not only focused credit managers on the point of borrower selection, but it also reduced consideration to data drawn from a form that represented the characteristics of only one party in the credit relationship. By relying solely on application data (and sometimes a credit report), the Fair Isaac scorecard put the

installment lending written in 1927. R. A. Seligman, *The Economics of Instalment Selling*, 2 vols., vol. 1 (Harper & Brothers, 1927). The Federal Reserve Board began to track the volume of consumer credit outstanding in January, 1943 and has reported monthly figures ever since. These data are available online at <http://www.federalreserve.gov/>.

³⁴² Geoffrey H. Moore and Philip A. Klein, *The Quality of Consumer Instalment Credit*, ed. National Bureau of Economic Research, *Studies in Consumer Installment Financing* (New York: Columbia University Press, 1967), p. 38-9.

assessment of the applicant at the center of risk management and credit control.³⁴³ Omitted from the formal content of the algorithm by design, was any consideration of other data that might reflect the qualities of the lending operation, the loan specifications, or the lender's downstream interventions to maintain the productivity of its portfolio.

What was ignored within the content of the custom application scorecard, however, was tightly re-included in the model's execution. That the original application scorecard was only valid within the limits of a specific firm, or even a specific loan product, meant that the content of the scorecard was not useful or complete unless the closeness of fit between the model and source of data being modeled was preserved. Even though the scoring algorithm did not contain information on operating practices or loan type in its formal content, the customized nature of the application scorecard fundamentally acknowledged that credit performance was embedded not in the person, but was produced within the fabric of operational control. What the custom application scorecard enforced was that if a group of borrowers passing through lender's policy machine had produced a positive outcome at an acceptable rate, then the equivalent result could be expected from similar people when run, *ceteris paribus*, through the same machinery. Far from reading the unplumbed depths of the human heart, in predicting who an organization would be able to work with effectively, inferential statistics were engaged to perform the altogether mundane task of mechanically replicating an empirically proven choice set within an essentially closed system, while eliminating some of the more disappointing cases.

Custom scoring algorithms did not identify desirable borrowers in any abstract sense, but were but only predictive of future outcomes when joined to the policy environment out

³⁴³ To fit scoring into the existing language of the credit industry, credit scoring was cast as a test of the 'creditworthiness' of the person (see Chapter 4), although Fair Isaac would vigorously defend against traditional interpretations of the word.

of which the model was constructed. In its choice of dataset Fair Isaac's scorecards introduced an important cleavage between the person (application data) and the financial organization (operating and policy data) in the assessment of credit quality. The model divided once seamless activities into a 'content' that was detached, isolated and acted upon³⁴⁴, and created, by exclusion, a 'context' of operating conditions that faded into the background. What is curious and of tremendous political importance is recognizing how and why Fair Isaac designed this segregation in a way that enacted a theory of credit that emphasized personal trustworthiness as the main source of risk, while defying experienced practitioner's more sophisticated knowledge of the organizational and interactional aspect of credit production³⁴⁵. Nonetheless, although custom scorecards introduced a schism into the lending situation it did not actually contravene the underlying unity of borrowers and lenders in the constitution of credit performance. Having created a calculated inside and a non-calculated outside to credit risk assessment, the implementation of custom scoring models

³⁴⁴Callon and Muniesa, "Economic Markets as Calculative and Calculated Collective Devices." I would be remiss not to point out that even after credit bureau scores created a credit risk function that was general to all lending operations, the probabilities that these scores represented had to be re-specified against the portfolios within each firm. Credit departments could also refine the meaning of bureau scores subsuming them into internal algorithms that supplemented the bureau level calculations with more detailed firm-level data. Yet, I would maintain that without the 'idea' that individual data could lead to a salient risk metric, an idea that was first materialized in Fair Isaac's application scorecard design, we might imagine a world in which it was meaningless, and therefore scientifically indefensible, to create a calculation of consumer credit quality that did not mix different levels of data on the firm, loan type and operating policies, from the outset. At present these data come into play, but they are mixed back into a purified calculus of consumer credit quality. The argument I'm developing is that the way Fair Isaac has organized and designed risk calculation around individual data has had specific structuring effects on U.S. consumer credit markets as its scoring products have become the industry's infrastructure.

³⁴⁵ I have found no evidence that Fair Isaac ever considered including operating or loan type data in the scores. Since I have no primary evidence from the 1950s it is unclear whether the founders of the company bear some of the responsibility for reintroducing a notion of the human into credit scoring even though they were using the techniques of the cyborg sciences which were developed to study sophisticated man-machine complexes. By the 1970s company descriptions of what the technology was assessing refer to 'behavior', which is an ambiguous term. To the lay person the word could be taken to refer to human behavior; to the cybernetician it would have referred to the outcome of the system.

that were bound to specific operating machineries reunited the choice of applicant (content) with the loan operation (context) to render the original whole.

In a sense, credit scoring was strongly conservative of existing operating forms and practices. At the same time, the introduction of statistical calculation which utilized data on people to predict organizationally bound results created a novel distinction that would drive profound modifications in the credit operations as consumer credit continued to develop through the century. Custom application scorecard acknowledged, but only passively, that people's credit performance did not occur outside of relationships with specific financial institutions. That is, the recognition that credit control was distributed between borrowers and lenders, (or even by loan product) was not carried internally within the scorecard, but was constituted by bringing it together with a complimentary but separate piece of production machinery. The distinctions introduced by Fair Isaac's calculations meant that the connection between the activities of people and those of financial institutions could be disentangled, like a separating a pair of matching socks. That we take for granted that 'consumer credit risk' is a property of individuals that can be presented through individualized bureau scores is a direct inheritance of Fair Isaac's peculiar scorecard design. That the actions of financial institutions were excluded from scorecard models created both the practical and conceptual conditions under which the firm's participation in producing consumer credit performance could be deemphasized, scaled-back, or even—as often happens to one sock—lost³⁴⁶.

³⁴⁶ As long as consumer finance firms are engaging in lending, their actions necessarily contribute to the production of credit quality. But modified by people-centered credit scores, the way in which mainstream lenders function is quite different today, than it was in mid-century consumer finance. The presumption that lending is about predictive control through executive decision-making has had dramatic performative effects on the evolution of the U.S. consumer credit markets. The quintessential case is the credit card markets, which, in building operations around semi-automated information based decision-making on the

Conclusion—Custom scorecards, customized risks

The fact that scorecards and the evidence of their effectiveness had to be produced firm-by-firm raises an important observation about the relational nature of the information constituted by the original application scorecard. An applicant's score, which appeared at the point of application and in the instant in which it was calculated, was the probability of default faced by a particular lending firm based on its specific history of past experiences. The details of this history depended on how internal credit policies and their execution in practice met with the peculiarities of different lives: a extended family that pooled income might budget a small loan better than a number of separate installment contracts; a person who received their salary at mid-month might manage one finance company's billing cycle better than another. Likewise, a finance company that kept contact through polite phone calls might induce different repayment responses than one that resorted to strongly worded form letters. Credit performance was thoroughly embedded in relationships and the relational strategies being pursued by all parties involved; it was played out in motion as the borrower, the lender's policies, and loan terms interacted over time. As a result, the credit risk estimated by scores for these operations was also fundamentally relational—it was produced within the specific context of a temporally extended encounter.

The nature of risk constituted by scorecards has been described in this chapter by situating scoring models in relation to the practices of mid-century consumer finance. As I have shown, the custom format of the first scorecards respected the fundamentally relational

backbone of bureau scores, have, as a core feature of the industry, profitably outsourced the collections function and dramatically reduced interpersonal and interactional contact with consumers. Controlling risk through odds-prediction has come to mean constantly refining how borrowers are categorized through calculation and data, rather than acting to change the outcome of default as the case unwinds. In the 1980s Fair Isaac would develop what it called champion-challenger races, experiments designed to test decision-making strategies on pools of test cases to determine which one was more effective.

nature of performance outcomes; the content of their algorithms, however, did not. To apply statistical methods to consumer credit screening as a means of making predictions, Fair Isaac treated future outcomes as the stable output of a closed productive system³⁴⁷. However, instead of modeling credit quality as a dynamic process crafted through the lifetime of the loan, the scorecard assumed that fairly static information about a person, available at the moment of application, could be used to differentiate between future outcomes. While the internal machineries of the firm continued to churn in the active day-to-day achievement of credit outcomes, scoring algorithms were gutted of these temporally distributed details. Focused narrowly on individual-level data, the models were built to bracket out and ignore the messy core of the credit relationship. In isolation, the content of the models treated repayment activity as though it that would unfold as if on auto-pilot and could be determined before it had begun, independently of the loan dimensions as well as the intermediate steps of loan production. As in game theory, application scoring statistically linked credit outcomes directly to starting states.³⁴⁸

³⁴⁷ Operations research was aware that all of their solutions required them to translate the subject's original concerns. Russell Ackoff, a pioneer in the field pointed out that in formulating a problem, "It is useful to distinguish between the [user's] problem and the research problem, even though they are closely related. The latter is a transformation of the former, primarily involving the definition of a scientific basis for selecting a course of action as a 'solution' " Ackoff, "The Development of Operations Research as a Science," p. 267.

³⁴⁸ In information based lending the lender becomes a decision-maker rather than a cost manager. While Fair Isaac assumed that reducing default increased revenues. It is noteworthy, however, that a credit scoring system could never be converted into direct cost savings because, as I demonstrated in Chapter 2, the industry did not have had a fine enough grasp on cost accounting carry out such calculations. Today, of course, revenue generation on credit cards is not synonymous with regular repayment or high credit scores, but instead with revolvers, people who hold a balance from month-to-month. A key analytic question is to unpack how the move from cost control to predictive control has become so astoundingly profitable, while abandoning interim micro-level control. Theories of neo-liberal self-governance (see the recent work by Marron, *Consumer Credit in the United States, a Sociological Perspective from the 19th Century to the Present.*) are certainly helpful in understanding the experience of living with credit under information based systems, but are certainly not sufficient to explain how these systems generate financial value. A recent series of podcasts from the Planet Money team on NPR treats this question with regards to mortgages. In March 2010 the Planet Money staff joined forces to purchase a \$1000 share of a 'toxic asset' in order to 'watch it die'. They recently reported that the asset is indeed dying, not because of foreclosure, but

The attentiveness to the relational nature of credit performance structured into Fair Isaac's custom business model is of great importance to the nature of the risk these early scorecards represented. That fact that credit quality was embedded in relationships meant that there could be no single assignation of a person's odds of performing in a desirable fashion. Probability estimate provided by scores would change depending on the credit policies and the responses these induced within the population against which an applicant's data was being compared. A credit score was a summary statistic with meaning inside the credit organization; it represented the odds that an individual posed within the context of that lender's operation; and it allowed firms to select the types of borrowers they had already worked with effectively, to produce loans of a satisfactory quality. Scores and the probabilities they presented, were multiple, ephemeral, and situated. In other words, risk adhered to the application, not to the applicant. Risk was not stabilized in the person nor did not travel around with them as today's FICO scores purport to do; rather, risk was highly situated, it was attached to the multiple models cropping up across the credit industry.

Fair Isaac engineering a transition toward computer-mediated risk-assessment by analyzing application level data but without every making any theoretical proposition that tied risk to individual action. Their analytic project was not undergirded by any model of business structures, nor was it influenced by a theory of credit performance. That is to say, it did not make any causal conjecturing as to why loans went into default. However, the design choice to create algorithms using only application data set up the conditions for credit risk to become embroiled into a familiar conversation about individuals as the technology was transferred into the realm of credit professionals. The debate has turned not around how

because of loan modifications and write downs. These findings highlight the tension between a) profitable consumer lending and b) the non-profitable consumer accommodation through credit which characterized consumer credit in the early part of the century.

credit quality was constituted—a substantive question that Fair Isaac as outsiders to the industry never contemplated—but around a red herring, the question of whether it is possible to predict human behavior (i.e. how probabilistic information relates to individual cases)³⁴⁹.

Human behavior is not the object of operations research as a science and assessing the qualities of people was never the objective of the scorecard. Individual creditworthiness was, however, at the center of regulatory debates in the 1970s to define equal credit opportunity. Chapter 4 explores how regulatory debates over what constituted fair credit clashed with the logic of statistical information. Fair Isaac and its scorecard were at the epicenter of these disputes in which a political project to ensure that individuals would be respected by lenders would be pit against the mechanics of predictive operating systems.

³⁴⁹ Throughout these controversies, the fundamentally relational statement of the nature of credit risk would be conserved on the ground so long as customization remained central to Fair Isaac's business model. A challenge to this way of doing business, and simultaneously, to the discontinuous, local nature of consumer credit risk calculation, would not occur until the early 1980s, following the appearance of a rival outfit and Fair Isaac's first true competitor in the market for credit analytics: Management Decision Systems (MDS). MDS would cut the first contract with the credit bureaus and push the business of credit scoring to the next level. As I will argue in future work the epistemic shift that segregates consumer credit risk from local operating practices and actualizes a full conversion to the notion of individual credit risk, is driven by a development in the credit scoring business that shift their emphasis fixed-income products (scorecards), to pay-per-use products (such as FICO bureau scores). Conceptual change in credit production, therefore, can be traced to innovation in the business model of the credit scoring industry.

Chapter 4

Statistically Discriminating Without Discrimination

to make a distinction: distinguish accurately...

to use discernment of good judgment...

to make a difference in treatment or favor on a class or categorical basis in disregard of individual merit.

*Definition of 'discriminate' from Webster's Third New International Dictionary*³⁵⁰

The first piece of US legislation to restrict institutions from considering certain categories of social membership when dealing with consumers was Title VIII of the 1968 Civil Rights Act, also known as the Fair Housing Act (FHA). A part of President Lyndon Johnson's vision of a 'Great Society', this legislation made it illegal to deny access to housing on the basis of race, religion, or national origin (sex was added in 1974, and families with handicapped children in 1988). Through the FHA, mortgages were the first type of credit to be subjected to a politically crafted definition of fair access. Similar restrictions would be put

³⁵⁰ Quoted in National Commission on Consumer Finance, *Consumer Credit in the United States* (Washington D.C.: U.S. Government, 1972), p. 151.

in place for consumer credit transactions, although it should be noted that the extension did not proceed in a straightforward or isomorphic manner from housing finance. Under the Equal Credit Opportunity Act (ECOA) signed by President Gerald Ford in 1974, it became illegal to consider the sex or marital status of credit applicants. Congress would, however, have to hold further hearings before the case was made to broaden the ECOA's coverage to encompass race, color, religion, national origin, and age, as well as the statuses of having received public assistance or having previously exercised one's rights under the 1968 Consumer Credit Protection Act.

Once the conversation about fair credit moved beyond the question of fairness in housing, the appropriateness of legislators' methods became a topic of debate. Major finance companies and credit cards operators were using credit scoring systems which raised the stakes of removing potentially relevant data from the purview of application screening. Scoring was not an issue in fair housing because the technology was not used in mortgage lending until the mid-1990s³⁵¹. When it came to the field of consumer finance, however, the mechanics of credit scoring would feature prominently in the attempt to identify and demarcate socially unacceptable consumer screening practices. Because statistical analysis depends upon discrete, well-honed and readily recognizable categories, an investment in Fair Isaac scorecards by a number of large and well-heeled firms intensified resistance to the proposed extension of this form of anti-discrimination legislation. Once scoring was adopted into use, federal action to ban the use of what were, by definition, entrenched and accessible ways of classifying people in the credit world ceased to be a purely political prerogative. The soundness of anti-discrimination initiatives became equally a scientific

³⁵¹ Poon, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance."

controversy that confronted the rules of empirical statistics. In the struggle to define fair consumer credit practices, the legal expression of political objectives would be pitted against a discourse of statistical objectivity.³⁵²

Much has been said and written to celebrate credit scoring as an unbiased aid to decision making. According to its staunchest proponents “what Fair Isaac scores really have done, is made credit totally color blind and age blind and whatever... It’s a non-discriminatory process”³⁵³. And yet, as the Congressional records show, it was Fair Isaac and its customers that crafted the most sophisticated and compelling argumentation resisting the prohibitions contained in the ECOA. Speaking before legislators, at first through the testimony of its most publicly visible customers and later in its own behalf, the company argued that this approach to public policy was diluting scientific objectivity to the detriment of political intent. In short, Fair Isaac propounded that the proposed regulatory measures introduced injustice into the credit process. They advocated that to execute truly objective decisions, (their) scientific expertise had to have immunity from policy interventions. The politicians involved in pursuing credit reform disagreed. While they would embrace the scientific nature of the scoring method with one hand, they would freely tamper with its autonomy with the other.

This chapter explores the constitution of a political principle of objectivity for consumer credit. In removing a selection of sensitive factors from all credit screening

³⁵² As Bruno Latour has already observed through his study of France’s *Conseil d’Etat*, there are strong differences between legal and scientific objectivity. Although each domain emphasizes “the virtues of a disinterested and unprejudiced approach, based on distance and precision, and in both domains participants speak esoteric languages and reason in carefully cultivated styles”, the specific manner in which they achieve these ends is quite different. Bruno Latour, "Chapter 3. Scientific Objects and Legal Objectivity," in *Law, Anthropology and the Constitution of the Social, Making Persons and Things*, ed. Alain Pottage and Martha Mundy (Cambridge: Cambridge University Press, 2004), p. 73.

³⁵³ Interview by author with Fair Isaac associate, June 22, 2004.

methods without exemption, Congress showed clear defiance for the idea of the necessary independence of scientific expertise. In the eyes of the law, statistically-based scoring systems were not deemed any more just—that is, any less prone to socially unacceptable forms of discrimination—than any other method of candidate selection. The curious implication is that credit scoring was not propelled forward as a tool of anti-discrimination because of a consensual acknowledgment of its superiority as a means of achieving fairness. Rather, I will show that the enactment of the ECOA enhanced the incentives to adopt credit scoring because this was the screening system best suited to demonstrating compliance with the law. Government restrictions that were an unnecessary, if not a damaging censure of the technology from the point of view of epistemology, were from a pragmatic angle its ultimate endorsement. This is how Fair Isaac lost the philosophical battle to define the principle of objectivity in consumer credit, but credit scoring technology won the regulatory war.

The National Commission on Consumer Finance (1972) endorses credit scoring

The issue of fair credit emerged from a convergence of the civil rights movement with the consumer protection movement³⁵⁴. The aspirations of the ECOA were as grounded in materiality as they were in lofty ideals. The Hon. Jeffrey M. Bucher, member of the Federal Reserve Board (FRB), would emphasize that “There is no room for discrimination in a society or a financial system such as ours. History teaches us that this

³⁵⁴ Lizbeth Cohen, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America* (New York: Vintage Books, 2004). According to Cohen (her Chapter 8) there are three waves of consumerism: the first occurs during the Progressive Era, the second under the New Deal, and the third, began in the 1960s as Congress took responsibility for protecting consumer interests.

Nation's social and economic growth was made possible by contributions from all segments of its diverse citizenry"³⁵⁵. The Board was in agreement that "such discrimination works to the disadvantage of applicants and creditors alike"³⁵⁶. The Hon. J. Stanley Pottinger from the Civil Rights Division of the Department of Justice reiterated the presumption that greater integration and inclusion coincided with economic benefit. "I would assume," he asserted, "that the national production of goods and services is constricted whenever commercial financing, a cornerstone of the economy, is either denied or offered under unreasonable condition to a segment of our population or business community"³⁵⁷.

The prelude to the ECOA was the 1972 release of a lengthy bipartisan report by the National Commission on Consumer Finance (NCCF). The NCCF was established under Title IV of The Consumer Credit Protection Act (1968) to study and appraise "the functioning and structure of the consumer finance industry"³⁵⁸. It is noteworthy that both the committee's analysis and Fair Isaac's started from the identical premise: that it was "obviously in the self-interest of credit grantors to distinguish accurately between good and bad credit risks—between those who will repay and those who will not—*prior* to granting credit". "If credit grantors could 'distinguish accurately' on a case-by-case basis," the document postulated, "they would be able to avoid wholesale discrimination on a class or

³⁵⁵ Credit Discrimination. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking and Currency. House of Representatives. 93rd Congress. June 20-21, 1974. Statement of Hon. Jeffrey M. Bucher, Member, Board of Governors, FRB, p. 30.

³⁵⁶ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs United States Senate. 94th Congress. July 15, 17, and 24, 1975. Letter from Jeffrey Bucher, Member of Board, to William Proxmire, p. 133.

³⁵⁷ Credit Discrimination. June 20-21, 1974. Statement of Hon. J. Stanley Pottinger, Assistant Attorney General, Civil Rights Division, Department of Justice, p. 34.

³⁵⁸ Consumer Credit Protection Act, May 20, 1968. Report no. 1397 House of Representatives 90th Congress 2nd Session.

categorical basis”³⁵⁹. Irresolvable uncertainties about individuals, however, were what created the need to assess applicants based on their identification with groups. Framed in these terms, the implicit epistemological argument was that credit granting was vulnerable to undesirable forms of discrimination because underwriters could mistakenly be relying on categories that had no bearing on proper repayment results.

Although the NCCF reviewed numerous reports of undesirable occurrences in credit granting, the document proposed that an antidote to the problem of erroneous information was already built into the markets. The efficiency argument was that “class discrimination based on class distinctions is minimized in a competitive market” because pressure from other firms “forces credit grantors to separate as accurately as possible consumers who are likely to pay from those who are likely to default”³⁶⁰. In this view, a strong profit motive was enough to “assure that credit grantors will try to make as much credit available as possible at ‘fair’ prices and that if one creditor’s ‘blind spot’ keeps him from extending credit to a creditworthy individual, another creditor will probably jump at the chance”³⁶¹. Such faith in the corrective effects of competition aligned with Nobel Prize winning economist Gary Becker’s 1957 statement on *The Economics of Discrimination*. There, discrimination is said to occur when individuals act with a willingness “to forfeit income in order to avoid certain transactions”³⁶². In lieu of prohibiting discriminatory action, then, the NCCF pressed “for measures to assure competition”³⁶³.

³⁵⁹ National Commission on Consumer Finance, *Consumer Credit in the United States*, p. 151. (emphasis in original)

³⁶⁰ Ibid., p. 152.

³⁶¹ Ibid., p. 2.

³⁶² Gary Becker, *The Economics of Discrimination*, 2nd ed., *Economic Research Studies* (Chicago: University of Chicago Press, 1971), p. 16.

³⁶³ National Commission on Consumer Finance, *Consumer Credit in the United States*, p. 152.

Bankers presented similar reasoning to legislators. As one bank vice-president would testify, “Discrimination which disqualifies a creditworthy borrower from obtaining what would be a sound bank loan means that the bank loses income it would otherwise have realized”³⁶⁴. The basic argument against an extension of the ECOA was that “Most of the abuses which this type of legislation is intended to correct are short-lived”³⁶⁵. The score-centric credit card companies that arose in the 1970s were among the most assertive proponents of competition’s inherent ability to assuage injustice. The Interbank Card Association held that “Creditors, as a group, are far more interested in making profitable extensions of credit than in ‘punishing’ applicants. Consequently, it seems unlikely that the practice which is sought to be prohibited will occur”³⁶⁶. During the ECOA amendment hearings Senator Joseph Biden asked John A. Dillon, executive vice-president of National BankAmericard (NBI), whether he had grasped the position correctly— “Just good business [to not be discriminatory], good public relations?” Mr. Dillon promptly replied, “That’s right”³⁶⁷.

In the pages of the NCCF report credit scoring was portrayed as a sound and established credit screening methodology. The document asserted that “statistically-based discrimination is as acceptable in extending consumer credit as it is in underwriting insurance”³⁶⁸. But what is more, credit scoring methods were promoted as the very vehicle

³⁶⁴ To Amend the Equal Credit Opportunity Act of 1974. Hearings before the Subcommittee on Banking, Currency and Housing, House of Representatives, 94th Congress. April 22-23, 1975. Statement of Homer L. Stewart, Jr. Senior Vice President Republic Bank of Dallas, p. 96.

³⁶⁵ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Forrest D. Jones executive vice president, Fidelity bank, Oklahoma City, on behalf of the American Bankers Association, p. 280.

³⁶⁶ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Interbank Card Association on S. 1927, p. 584.

³⁶⁷ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John A. Dillon, Executive VP National BankAmericard Inc., p. 375.

³⁶⁸ National Commission on Consumer Finance, *Consumer Credit in the United States*, p. x.

that would increase competition. As the chapter devoted to ‘Special Problems of Availability’ explained, the promise of statistics was that it could provide empirical proof of whether particular categories were relevant for predicting credit performance. Given the plethora of related and correlated factors that could eventually be considered objectionable, the NCCF argued that “Legislation cannot spell out how credit grantors should evaluate all of the factors reflecting a consumer’s credit standing”. Instead, “a credit grantor should be able to demonstrate a valid basis for his weighting of credit factors to show that his credit evaluation is not based purely on intuition, some ancient rule of thumb, or law long since repealed”³⁶⁹. The report suggested that would be “in the self-interest of each credit grantor to develop the ability to discriminate between potentially good and bad accounts by better training of personnel and by designing effective credit scoring systems”³⁷⁰.

Upon its release, the NCCF document engendered strong controversy. While commending its thoroughness, five of the six political appointees to the Commission found reason to append statements dissenting from key sections of the survey. As expressed by one, “a great many of our findings and recommendations are actually those of the staff rather than the Commission itself”³⁷¹. Chief among the critiques was that the professional staff’s academic training had led them to use econometrics to reach policy conclusions that were deemed wholly unfit for the real world³⁷². There was an overt disagreement between researchers (as academics) and legislators (as elected officials) over the mechanisms behind discrimination, and it is within the context of this rift that the report’s normalizing

³⁶⁹ Ibid., p. 155.

³⁷⁰ Ibid., p. 152. It is perhaps not coincidental that an internal Fair Isaac history records that “Not until about 1972 was there a noticeable shift to a more positive attitude toward scoring” Fair Isaac & Company Incorporated, “History of Fair, Isaac and Co..”

³⁷¹ National Commission on Consumer Finance, *Consumer Credit in the United States*, p. 242. Statement by Congressman Henry B. Gonzalez.

³⁷² Ibid., p. 255. Comments by Senator William Proxmire.

endorsement of credit scoring should be read. From an academic point of view the argument in favor of improving information assessment through technology was robust, and credit scoring was an obvious, available and rapidly developing solution to the problem of unjust credit exclusion. When thrown into the political fray, however, the strength of this reasoning was quickly dissolved.

Congressional concern over arbitrary action

Throughout the discussion of equal credit opportunity the government maintained that credit was as a privilege, not a right. Fair access did not mean credit for everyone; it meant consistent access for those who could meet any of the standards of creditworthiness that lenders independently set. Proponents of government intervention accepted the basic premise “that the situation can hardly be viewed as unwarranted discrimination if the creditor is unable to collect just debts”³⁷³. According to Senator William E. Brock the motivating concern was that if, for example, women “are qualified for credit, they should be able to obtain it”³⁷⁴. As Rep. Leonor K. Sullivan would enunciate in 1974, on behalf of the Subcommittee on Consumer Affairs of the House Committee on Banking and Currency, the purpose of the proposed legislation was “to strike at the existence of unfair credit selection practices victimizing millions of Americans because of their status as members of a particular group or category of people”. The ECOA’s combination of restrictions and punitive controls was designed “to remove arbitrary barriers to credit based not on the individual’s

³⁷³ To Amend the Equal Credit Opportunity Act of 1974. Mrs. Fenwick commenting on the National Commission on Consumer Finance, p. 58.

³⁷⁴ Enid Nemy, "Congress Passes Bill Banning Bias against Women on Credit," *New York Times*, October 11 1974.

creditworthiness but on factors such as race, color, religion, national origin, age, sex or marital status—factors which are usually extraneous to the person’s willingness or ability to fulfill his or her obligations to repay the credit extended”³⁷⁵.

The political objective of equal credit opportunity initiatives was to protect the individual by ensuring that credit was not being withheld based on an arbitrary decision, while respecting the autonomy of lenders to set their own credit policies³⁷⁶. The challenge before Congress outlined by Rep. Sullivan was “no longer one of whether discrimination in credit should be banned, but whether our bill as drafted meets the issue head on, without destroying the creditor’s right to make business judgments based on the individual applicant’s creditworthiness”³⁷⁷. As the hearings progressed the government’s position would be refined by two additional statements that specified the meaning of ‘arbitrary’. The first defined what credit evaluation *should* be based on— “Ability and willingness to pay are the only fair elements to determine creditworthiness”³⁷⁸; the second, what it *should not* be

³⁷⁵ Credit Discrimination. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking and Currency. House of Representatives. 93rd Congress. June 20-21, 1974. Opening statement by Mrs. Sullivan, p. 2. This chapter only discusses on one dimension of arbitrary action – the application of a generalized rule to eliminate a visibly distinct group of people during credit screening. A second aspect of arbitrariness that politicians were concerned about was that factors that did not bear an ‘understandable’ or ‘reasonable’ relationship to credit were being considered in the screening process. This was especially important because part of the ECOA requirements not discussed here, was that lenders should provide rejected applicants with reasons for why they had taken an ‘adverse action’.

³⁷⁶ The earliest proposals for the ECOA made reference to ‘invidious discrimination’ a term originally used with regards to race in the 14th amendment of the U.S. Constitution defining the terms of citizenship and civil rights. One example of this in credit was the automatic refusal of credit to mixed marriages documented by the Federal Trade Commission. See Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Sheldon Feldman, Assistant Director for Special Statutes, Federal Trade Commission, p. 215. Because the term was interpreted to mean “any differentiation that could provoke resentment, dislike or discontent” it was dropped on the grounds that it was too broad to be useful for credit legislation. See Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Thomas A. Haussler, President and Chief Executive Officer, Capital Financial Services INC, Columbus Ohio, speaking on behalf of the National Consumer Finance Association, p. 92.

³⁷⁷ Credit Discrimination. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking and Currency. House of Representatives. 93rd Congress. June 20-21, 1974. Opening statement by Mrs. Sullivan, p. 2.

³⁷⁸ To Amend the Equal Credit Opportunity Act of 1974. Opening statement by Mr. Annunzio, p. 12.

based on— “group identification, rather than upon factors specifically related to an individual’s creditworthiness”³⁷⁹. The following remark by Rep. Sullivan, in which she offered her summary of the original version of the ECOA in 1974 is perhaps the most revealing of the original legislative intent: “Basically [...] what we do is to require the creditor to look at *the individual’s creditworthiness not as statistics of loss experience among a class of debtors*, in making a determination as to whether to extend credit”³⁸⁰.

Legislators respected the discretion of lenders. They left the determination of credit eligibility to organizationally situated policies of credit assessment that were already being practiced within the industry (see Chapter 3). This is why the core of the act was prohibitive rather than prescriptive—it did not provide a definition of either ‘creditworthiness’ or of ‘ability to repay’. Deputy Secretary of the Treasury Stephen S. Gardiner argued that such measures could not be considered unduly restrictive because “Most lenders fully recognize that it is not good business to deny credit to any potential borrower because of prejudice. Indeed, when discrimination enters into a credit decision it represents a failure of our free enterprise system”. In Mr. Gardiner’s reasoning, because the discriminatory behavior did not make economic sense it was “sound to provide a simple workable law to rule out prejudice from credit transactions.”³⁸¹ The FRB, the agency charged with administering the law, expressed the exact opposite opinion. As described by Mr. Bucher the ECOA

³⁷⁹ Credit Discrimination. June 20-21, 1974. Statement of Hon. Jeffrey M. Bucher, Member, Board of Governors, FRB, p. 30. Guidelines for mortgages issued by the Federal Home Loan Bank Board (FHLBB) (Part 528 Guidelines relating to nondiscrimination in lending from Chapter V, Subchapter B, Federal Home Loan Bank Board [No. 74-124]) contained similar suggestions. The FHLBB stated that “Each loan applicant’s credit worthiness should be evaluated on an individual basis without reference to presumed characteristics of a group.” Credit Discrimination. June 20-21, 1974. Reproduced from the Federal Register, Dec 17, 1974, p. 134.

³⁸⁰ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement International Consumer Credit Association June 17, 1975, p. 594. Quoting a statement by Rep. Lenore K. Sullivan, p. E6207 of the Congressional Record, Oct 2, 1974 (emphasis added).

³⁸¹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement, Stephen S. Gardiner, Deputy Secretary of the Treasury, p. 347.

attempted “to eliminate from creditor behavior certain considerations that are judged to be improper”³⁸². But since “improper considerations are often subjective and are, in an economic sense, totally irrelevant to the credit decision”, legislative action was unnecessary. What is more, Mr. Bucher continued, “We seriously question whether sanctions forbidding the use of such considerations lend themselves to specific rules.”³⁸³

The original ECOA prohibiting the consideration of ‘sex’ and ‘marital status’ passed in 1974 despite lingering questions about the appropriateness of banning categories as a legislative remedy against politically disfavored forms of discrimination.³⁸⁴ Before the new act could be instituted into actual practice, persistent fair credit legislators rallied behind amendments to extend coverage to “the entire waterfront of discrimination”³⁸⁵ stoking the debate for a second time. One vivid illustration of just how complex the restrictions were can be understood from the details of a distinct controversy surrounding the category of ‘age’. Consider the statements of Mr. Dillon (the executive vice-president at NBI) who appeared at hearings in both 1974 and 1975 to discuss this issue. Mr. Dillon testified that “NBI believes in equal credit opportunity for all creditworthy people”³⁸⁶. He asserted, that “NBI supports expansion of the coverage of the Act to prohibit discrimination based on

³⁸² Credit Discrimination. June 20-21, 1974. Statement of Hon. Jeffrey M. Bucher, Member, Board of Governors, FRB, p. 30.

³⁸³ Credit Discrimination. June 20-21, 1974. Statement of Hon. Jeffrey M. Bucher, Member, Board of Governors, FRB, p. 30.

³⁸⁴ The reasons for this gap are beyond the scope of the current study. The initial success of sex and marital status may be because women’s groups were better organized to present compelling evidence of invidious cases of exclusion. But it may also be because between the two bills considered side by side, the more lenient H.R. 14908 which only prohibited sex and marital status was considered palatable, while the more ambitious H.R. 14956, which proposed expanded coverage, also contained greater latitude for enforcement by the attorney general.

³⁸⁵ To Amend the Equal Credit Opportunity Act of 1974. Opening statement by Mr. Annunzio, p. 9.

³⁸⁶ To Amend the Equal Credit Opportunity Act of 1974. Statement of John Dillon, Executive Vice President, National BankAmericard, Inc. Prepared statement, p. 82 .

race, color, religion or national origin”³⁸⁷. Nonetheless, he continued, “We urge the subcommittee to treat age discrimination differently”³⁸⁸. More so than the other blacklisted categories, age was considered “a significant factor not only in determining creditworthiness, but in evaluating credit reports and in preliminary establishment of credit limits”³⁸⁹.

John B. Martin, the legislative consultant for the National Retired Teachers Association and the American Association of Retired Persons, did the most thorough job of describing the everyday conditions that had led to a demand for protecting the category of age. “Because so many department stores will no longer accept a personal check from an individual without a major credit card” he explained, “more and more older persons find that they must apply for credit after they reach age 65”. Older people—who, for example, may have “decided to apply for credit because they are afraid to carry cash with them” — were encountering “credit discrimination when they try to establish credit for the first time after a lifetime of paying cash”³⁹⁰. Seniors also found that the credit they already had was being retracted. Continental Illinois National Bank and Trust Company of Chicago, systematically informed its customers that “at the time you applied for a Check-Credit account, we explained that factors made it necessary that this service be available only to persons under 63 [y]ears old. Our records indicate that you have reached this age.

³⁸⁷ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975 Statement John A. Dillon. Executive VP National BankAmericard Inc., p. 366.

³⁸⁸ To Amend the Equal Credit Opportunity Act of 1974 Statement of John Dillon, Executive Vice President, National BankAmericard, Inc., p. 81.

³⁸⁹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement John A. Dillon. Executive VP National BankAmericard Inc., p. 364.

³⁹⁰ To Amend the Equal Credit Opportunity Act of 1974. Statement of John B. Martin, Legislative Consultant, National Retired Teachers Association and American Association of Retired Persons, p. 71.

Reluctantly, therefore, we must ask you not to issue any more checks against your account”³⁹¹.

Among the credit industry’s most commonly invoked reasons for not lending to the elderly was the increased potential for bad health and death. An oft cited scenario was that it made no sense to give a 30-year mortgage to an 85 year old who would never live out the duration of the loan. The incentive to decline older applicants as a rule of policy was highest among bank card issuers who were able to offer credit life insurance without a premium charge only “because their insurance carriers limit their policy holder group to persons less than sixty-five years of age”³⁹². A letter from MasterCharge sent from Sioux Falls South Dakota on Nov. 6, 1973, politely advised a prospective card holder “that we were unable to approve your application as MasterCharge insurance regulations prohibit issuance of cards to individuals over the age of sixty-five”³⁹³. A similar arrangement explained the retraction of check credit privileges³⁹⁴. In a letter dated June 6 1975, E. R. Sisson, supervisor of the Merchandise Check Plan at Merchandise National Bank of Chicago, would explain this situation to a client in this way: “As you know, Merchandise Check Plan involves a line of credit which is insured by a Credit Life Insurance.”³⁹⁵

³⁹¹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, p. 78.

³⁹² To Amend the Equal Credit Opportunity Act of 1974. Statement of Interbank Card Association, p. 64.

³⁹³ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, p. 84.

³⁹⁴ Check credit was the earliest form of revolving credit product offered by banks. It allowed the holder of an account to discretely write special checks that drew bank credit, and to repay the loan in fixed monthly installments. The amount of credit available to the account holder was automatically renewed as the balance was paid down.

³⁹⁵ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, p. 82.

Another potential deficit of older applicants that led to credit policy rules against them was their lack of employment and apparent lack of income if retired. As Sheldon Feldman, Assistant Director for Special Statues at the Federal Trade Commission put it, “In effect, those creditors who use age as an absolute criterion have made a blanket assumption that all persons over a certain age have insufficient fiscal resources to be a good credit risk”³⁹⁶. Mr. Martin provided numerous letters from the members of the two associations he represented as evidence that many retirees in the 1970s were, to the contrary, in excellent financial standing. The letters were from people “with considerable assets and excellent credit ratings who were apparently denied credit solely on the basis of age”³⁹⁷. This explains how a credit card solicitation turned into a personal crusade for a Mr. Brown of Lakewood N.J., and a public relations disaster for MasterCharge. The Browns found themselves rejected after responding to an invitation to apply for a card. Even though they did not need the credit Mr. Brown’s vexation drove him to respond. He documented the couple’s financial situation in stunning detail: no dependents, a retirement income over \$14,000, \$3,000 annually from \$50,000 in securities, \$2,000 in a savings account, a \$35,000 apartment owned free and clear, no outstanding debt except for \$50.00 due at Texaco, and a \$2,000 acre of land in Florida.

In a letter to Chemical Bank Mr. Brown spelled out the principle motivating his outrage: “Failure to receive the card is of relatively minor importance for me but the implication of credit unreliability causes me concern and I wish to have the record cleared”. “‘Retirement,’ alone,” he fumed, “is the damning condition. Vigorously applied this rule

³⁹⁶ To Amend the Equal Credit Opportunity Act of 1974. Statement of Sheldon Feldman, Assistant Director for Special Statues, Federal Trade Commission, p. 54.

³⁹⁷ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, p. 73.

would mean that the bank would reject such a person as Averill Harriman [the 48th governor of New York] who is, I believe, in the retired status”³⁹⁸. Born at the turn of the century, retirees in the 1970s were a generation that had grown up alongside consumer credit and had strong ideas about how it should work. In their estimation, applicants should be evaluated based on their individual situation rather than on the mere fact of having attained a certain age. The lesson Mr. Martin drew out for legislators was that “If a man in his twenties with no previous credit experience can be granted credit on the basis of his income, assets, employment record, and residence, then a man in his seventies or eighties with no previous credit experience should be judged by the same criteria”³⁹⁹.

To many prominent figures, the case that seniors needed to be protected from being systematically ejected from the eligible credit population was worthy of action. The Hon. Arthur S. Flemming, the Chairman of the U.S. Commission on Civil Rights pronounced that “we do have an obligation, as a society, to make sure that our older persons are dealt with as individuals and not as members of a class or a group”. Flemming urged Congress that basic respect for the individual should be enforced even “where some statistical study may indicate that risk is a little bit greater than with some other group”⁴⁰⁰. For his part, the Chairman of Federal Deposit Insurance Corporation, Frank Willie, endorsed placing restrictions on the consideration of age “so long as it is made clear that what is prohibited is discrimination against a credit applicant who has the legal capacity to contract”. Mr. Willie, however, added

³⁹⁸ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, dated Nov 2, 1974, p. 86-7.

³⁹⁹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of John B. Martin, Legislative consultant, National Retired Teachers Association and the American Association of Retired Persons, p. 74.

⁴⁰⁰ To Amend the Equal Credit Opportunity Act of 1974. Statement of Hon. Arthur S. Flemming, Chairman, U.S. Commission on Civil Rights, p. 42

that the prohibitions should only apply to decisions “based solely on an arbitrary age limit that has no reasonable relationship to the applicant’s willingness or ability to meet his credit obligations”⁴⁰¹. “In sum,” stated Sheldon Feldman, Assistant Director for Special Statutes at the Federal Trade Commission, “creditors should never be permitted to establish a cut-off age for applicants above which they will never extend credit”⁴⁰².

The insertion of the term ‘solely’ into the conversation was a subtle but important addition. The word allowed the lending industry to draw a crucial distinction between decisions based on rules from those made by additive methods, most notably, credit scoring. At the 1974 hearing, The Interbank Card Association employed the word strategically, stating that “Interbank recommends strongly that the bill should make it abundantly clear that the prohibition against discrimination on the basis of race, color, national origin or religion should be applicable only to discrimination based solely on those grounds”⁴⁰³. In the 1975 hearings, The American Bankers Association also resorted to this word when it defined the language it would find acceptable for the law: “It shall be unlawful for any creditor to deny or revoke credit to an applicant who has the capacity to contract solely because of establishment by the creditor of an arbitrary age limit”⁴⁰⁴. The inclusion of the word ‘solely’ softened the scope of the regulations—it would potentially allow lenders to censure the systematic exclusion of seniors, while implying that statistical analyses were exempt from the statutes because they never drew conclusion from only one factor.

⁴⁰¹ To Amend the Equal Credit Opportunity Act of 1974. Statement by Frank Willie, Chairman, Federal Deposit Insurance Corporation on H.R. 3386, p. 62.

⁴⁰² Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Sheldon Feldman, Assistant Director for Special Statutes, Federal Trade Commission, p. 216.

⁴⁰³ To Amend the Equal Credit Opportunity Act of 1974. Statement of Interbank Card Association, p. 63.

⁴⁰⁴ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Forrest D. Jones, Executive Vice President, Fidelity Bank, Oklahoma City, On Behalf of the American Bankers Association, p. 263.

In 1975, in his second appearance to testify, Richard E. Cramer, Montgomery Ward's assistant corporate credit manager, attempted to convey why the type of legislation being pursued by the ECOA was inappropriate for credit scoring. He began to explain that the proposed policies targeted a traditional action known as 'blackballing' within the credit industry. Under blackballing all members of a group that fell under suspicion were dismissed out of hand as though the category indicated an inherent flaw. The practice, Cramer noted, had emerged when "retail credit was viewed as a privilege extended only to the very best customers (initially without a finance charge)", and when credit principles had "focused on excluding customers or denying credit on the basis of several rules of thumb, that is 'blackballs'"⁴⁰⁵. It was at this moment that Sen. Joseph Biden, the chairman of the committee, interrupted the hearing so that he and Sen. Jake Garn could rush to the floor to vote. But before they dashed off Sen. Biden drew attention to legislators' awareness and curiosity about credit scoring. He pointedly remarked, "The next portion of your testimony is the portion we are most interested in getting, where you talk about your [credit scoring] system..."⁴⁰⁶

Montgomery Ward defends credit scoring

During the ECOA hearings, the onus of fully explicating the technical differences that distinguished multi-factorial credit scoring from other methods of credit decision

⁴⁰⁵ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Richard E. Cremer, Assistant Corporate Credit Manager, Montgomery Ward; accompanied by Morton H. Schwartz, Corporate Credit Research and Planning Manager, p. 436.

⁴⁰⁶ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Richard E. Cremer, Assistant Corporate Credit Manager, Montgomery Ward; accompanied by Morton H. Schwartz, Corporate Credit Research and Planning Manager, p. 432.

making fell to scorecard dependent operations. Scorecard users presented remarkably uniform information about the nature of scoring. This is not surprising given that Fair Isaac, the only commercial specialist of scoring systems at the time, was the direct source of all of the credit industry's information. Fair Isaac was never mentioned by name nor did it appear as a witness during any of the ECOA hearings⁴⁰⁷. It was the testimony given under the aegis of its customers that channeled the technology manufacturer's voice to the ear of the state. Given the long-standing collaboration between Fair Isaac and Montgomery Ward, the giant retailer was the witness most capable of presenting technically articulate evidence.⁴⁰⁸ "We have been fortunate in being able to build a substantial body of statistical and mathematical information regarding our credit system," Mr. Cramer informed Congress, "much of which is proprietary in nature. We stand ready to put the information at the service of regulatory agencies working in this area."⁴⁰⁹

From the time Montgomery Ward signed its first contract with Fair Isaac in 1960, the retailer enjoyed a privileged relationship with the scorecard developer. "We are able to extend credit to a broad spectrum of consumers," Mr. Cramer testified, "in large part because Ward's expended millions of dollars and considerable effort over the past decade to develop its own unique credit evaluation system". The amount of work that Ward's

⁴⁰⁷ When testifying the involvement of Fair Isaac was frequently implied. For example, Marcus A. Brown, vice-president of TIT Aetna stated that "In 1973 our company employed an outside consulting firm for the purpose of analyzing the factors upon which we grant credit for the purpose of setting up a Credit Scoring System" Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975, p. 607. The consultant in question was almost certainly Fair Isaac, since Management Decision Systems, Fair Isaac's the first competitor was only started in 1974. Fair Isaac was not named directly until the 1978 hearings on credit card redlining. See, for example, the statement by Mr. William B. Blackwell speaking on behalf of Amoco. Credit Card Redlining, Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs, U.S. Senate, 96th Congress, p. 280.

⁴⁰⁸ In 1974 Ward's reported net sales amounting to \$3.62 billion, approximately half of which were made on credit.

⁴⁰⁹ To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 91.

commissioned from Fair Isaac would help to structure the scorecard's early production process, and the partnership between Fair Isaac and the Ward's credit department was so intense that it eventually led to new product innovation. From the first installment in 1962, the Ward's project grew to a geographically segregated 26-custom scorecard monolith that bore all of the trademarks of a Fair Isaac project. "Based upon a mathematical model of our recent past experience with good and bad Ward's credit accounts," began Mr. Cramer's telling description "we developed a system which utilizes [*sic*] a credit applicant's unique combination of approximately 12 factors to predict objectively whether the applicant is likely to be a good credit risk for Ward's"⁴¹⁰.

"Our system" Mr. Cramer underscored, "does not measure credit worthiness in the abstract"⁴¹¹. Scores were to be understood as "an assessment, based on our experience with persons similarly situated to the applicant as to a number of variable factors"⁴¹². Because only factors with a proven relationship to outcomes were included in any given scoring system and because experience was constantly changing, Ward's express position was "that age, marital status or other meaningful characteristics developed scientifically from the credit grantor's actual experience should not be prohibited from use by the credit grantor". On these grounds, Mr. Cramer implored "that legislation and regulation restrict neither our inquiry into information which is relevant to the credit decision nor our use of such information in a manner which is statistically valid". Ward's was to convince politicians

⁴¹⁰ To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 86.

⁴¹¹ To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 93.

⁴¹² To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 94.

that credit scoring was capable of responding “directly and immediately to changes in the economic structure and demands for social and legal equality”⁴¹³.

Ward’s submitted a carefully constructed paper entitled “Credit Scoring – An Objective and Dynamic Credit Granting System”. Its description of how score weight tables were being developed was pure Fair Isaac.⁴¹⁴ As the document explained, to build a scorecard, “All information items (characteristics such as employment, age, marital status, address, etc.) from the application are candidates to be part of the scoring weight table”. The goal of analysis was to find out which of these items of information could best distinguish between borrowers predefined as having been ‘good’ or ‘bad’. In Fair Isaac’s jargon a ‘characteristic’ referred to the questions posed on the application form; an applicant’s answers were their ‘individual qualifications’ (later renamed ‘attributes’). A characteristic was a ‘strong separator’ and a candidate for inclusion in the scoring model if the attributes did not appear with equal frequency in both good and bad accounts. “For example,” illustrated the paper “if 90% of the good accounts were home owners, and only 20% of the bad accounts were home owners, home ownership would be a ‘good’ separator”. “Conversely,” the document continued, appealing to a soon to be prohibited factor, “if 60%

⁴¹³ To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward p. 91.

⁴¹⁴ There are other, albeit minor interpretations of how scoring works that relate to non-Fair Isaac systems. For a psychological point of view see the study funded by the NCCF on the feasibility of scoring low income consumer by Ronda S. Paul at Purdue. As reported on in the NCCF report “Unable to develop a credit scoring system with predictive power, she concluded that the typical credit application form provided information useful for making credit decisions about more affluent consumers but that much of the information sought was not relevant for low income consumers. She suggested a need for variables to measure (or serve as proxies for) psychological attributes such as future-orientation, sense of commitment to obligations, stability, or awareness of events outside the immediate environment. For example, information possibly useful could be club and church affiliations, possession of optional insurance, enrollment in optional training or educational programs, and magazines or newspapers read.” National Commission on Consumer Finance, *Consumer Credit in the United States*, p. 158.

of the good accounts are male and 60% of the bad accounts are male, sex would have no value as a separator”⁴¹⁵.

What proponents sought to emphasize to government officials was that the decried forms of action were not possible given the additive and empirical nature of credit scoring models. Under credit scoring “*no single characteristic will permit an approval nor cause a rejection for credit extension to the applicant*”⁴¹⁶. “We firmly believe” reiterated Mr. Cramer in his oral testimony, “that no single characteristic can be the sole determinant for credit denial”⁴¹⁷. As Cramer explicated, “Wards [*sic*] system avoids class discrimination” because it “recognizes that each applicant is not a member of one class but rather a member of a number of groups, whose characteristics must be taken into account in combination to ascertain the credit risk of that individual”⁴¹⁸. Cramer further underlined that “No one characteristic is given any preeminence or special stature: a characteristic ‘earns’ its weight in the total system by its being a better differentiator between good and bad accounts than other qualifying characteristics”⁴¹⁹. As a result of empirical variation, therefore, the classes that counted were not fixed between scorecards, and a wide variety of factors were constantly being utilized. “The smallest number of combinations of factors of any Wards systems [*sic*]” reported Mr.

⁴¹⁵ To Amend the Equal Credit Opportunity Act of 1974. Wards Paper ‘Credit Scoring – An Objective and Dynamic Credit Scoring System’, p. 89.

⁴¹⁶ To Amend the Equal Credit Opportunity Act of 1974. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 90 (emphasis in original).

⁴¹⁷ To Amend the Equal Credit Opportunity Act of 1974, Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 91.

⁴¹⁸ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 437.

⁴¹⁹ To Amend the Equal Credit Opportunity Act of 1974. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 91.

Cramer, “is three-quarters of a million; the largest, 124 billion combinations. Wards 26 systems permit approximately one half trillion combinations”⁴²⁰.

The permutations of factors represented by credit scoring algorithms were impressive. Users pointed out that not only did scoring models vary between regions and between finance operations, but they also varied between the credit products offered by a single firm. As Homer L. Seward, Jr., a senior vice president at Republic Bank of Dallas noted, “Much to our amazement, or at least to my amazement, the system designed for our credit card cannot discriminate between good and bad check-credits”⁴²¹. “I *was* surprised” the banker insisted, “because I felt that the criteria used for evaluating credit applications would be pretty much the same across the board. But this is not so”. The observation brought Mr. Seward to remark upon the growing professionalism being manifested through increased specialization within the finance business. In addition to policies, he reflected, the innovation of new credit product configurations was also influencing performance outcomes. “We now believe” he stated, “that a variety of numeric scoring systems are necessary because each loan has its own peculiarities, its own mix of characteristics, which have to be understood to assure the best possible credit decision”⁴²². This empirical finding resurfaced and reinforced an age-old truth about the contribution of multiple variables such as loan type—and not solely the qualifications of the borrower—to producing credit quality (see Chapter 3).

⁴²⁰ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 437.

⁴²¹ To Amend the Equal Credit Opportunity Act of 1974. Statement of Homer L. Stewart, Jr. Senior Vice President Republic Bank of Dallas, Speech “Credit in Recessionary Economy—Back to the Basics”, submitted to the record, p. 103-4.

⁴²² To Amend the Equal Credit Opportunity Act of 1974. Statement of Homer L. Stewart, Jr. Senior Vice President Republic Bank of Dallas, Speech “Credit in Recessionary Economy—Back to the Basics”, submitted to the record, p. 103-4.

Scoring's inherent check against arbitrariness lay in the critical fact that scoring models did not identify fixed human types. As Mr. Cramer explained, an acceptance or rejection of a credit application based on scores "does not translate at all to any particular applicant characteristic that is a component of the score weight table"⁴²³. Credit scoring did not lead to blackballing because the method did not produce or extrapolate any hard and fast statements about the non-creditworthiness of any one category such as sex, marital status, race, color, religion, national origin, and so on. Since "score weights, when properly calculated, are derived from the credit grantor's actual experience"⁴²⁴, the dynamism of credit scoring models was evidence of their resistance to arbitrary discrimination. That is, the choice of factors were not rigidly set but needed to be discovered and assembled again and again for each organizational unit being scored. Simply put, then, because a credit score was never based solely upon only one factor, and because the factors that counted in any empirical dataset responded to the idiosyncrasy of operating policies, the technique was incapable of committing the kinds of typological offenses that political intervention was seeking to curb.

Bill Fair argues for another vision of credit justice

Fair Isaac has always considered enforcing fairness a part of its core mission. The company's conviction as to the social importance of its own expertise only grew as its members were exposed to the inner workings of the credit world. Early analysts and staff

⁴²³ To Amend the Equal Credit Opportunity Act of 1974. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 91.

⁴²⁴ To Amend the Equal Credit Opportunity Act of 1974. Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward, p. 89.

members can all recall situations in sales meetings that had profoundly disturbed them. One senior analyst and former executive reluctantly recounts having accompanied Ted Lewis, the company's charismatic third in command after Fair and Isaac, to a lunch meeting with the president of a now defunct finance company in a southern state. "We were sitting in the restaurant", he nervously begins to tell me, "with lots of tables around, and we were talking about things in general, and he said there were [...] things that he just couldn't believe happened in the U.S.". The finance company president went on to decry "'giving women the right to vote' and I thought, 'oh my god' [...], and, this was a direct quote, 'giving those God damn niggers the right to vote.'" This retired Fair Isaac executive shifts uneasily in his chair some thirty years after this exchange as he relives his own discomfort. "I mean it was... it was kind of shocking to me. This was definitely the mid-70s"⁴²⁵.

The Fair Isaac founders were never shy about voicing their political disagreement with prospective scorecard customers. But their most powerful weapon against unwarranted stereotyping was not rhetoric; it was their command of data. Robert Sanderson proudly recalls one of the first projects he worked on in 1970. "At that time" he quips, "to be in management for Household Finance you had to be white, male and tall. They also were very firm believers that race was a predictive factor." Sanderson describes how Household "used to put race on applications. They had a box called 'N/S'. You circled 'N' for Negro, or 'S' for Spanish, or left it blank." At a project meeting, some up-and-coming executive boldly announced that he "had a feeling that all other things being equal, a black man is not going to pay you as well as a white man". So, Earl Isaac issued a head-on challenge: "Well let's see what the data says!" The Fair Isaac team selected a major segment of Household's

⁴²⁵ Interview by author, with retired Fair Isaac executive, September 5, 2005.

population and mocked up two scorecards - one that used the racial data and the other that did not. The results were identical, which proved that among Household's existing clientele racial classes repaid at equivalent rates. Sanderson cheerily recounts that "we went back and showed it to him six weeks later, and this crusty old boss said, 'Mr. Isaac, why do you win all the arguments?'"⁴²⁶

In a sign of the shifting times, the Department of Justice had launched a Commission investigation into some of Household's hiring and lending practices in 1970-71. In his testimony before the 1975 ECOA hearings, Sheldon Feldman, the Assistant Director for Special Statutes from the Bureau of Consumer Protection at the Federal Trade Commission reported on the findings in the case. He pointed out that "In some instances, different point values were assigned to a particular group in the creditor's point scoring system. For example, a person of the Caucasion [*sic*] race might receive seven points, a person of Spanish origin, four points and a black person no points". Senator Proxmire could scarcely conceal his indignation at the news: "...you say a major consumer finance company had this point rating system, which is shocking, where you had no points at all for blacks..."⁴²⁷. Mr. Feldman spun out the consequences to the legislators: "in a situation in which two applicants were identical in all other respects, one would be granted credit and the other denied credit merely on the basis of his or her racial characteristics or national origin."⁴²⁸

The investigation of Household had ended in a consent decree in which the company agreed to eliminate racial consideration across its hiring and credit practices, but

⁴²⁶ Interview by author with Robert Sanderson, June 22, 2004.

⁴²⁷ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975, p. 226

⁴²⁸ To Amend the Equal Credit Opportunity Act of 1974, Statement of Sheldon S. Feldman, Assistant Director for Special Statutes, Federal Trade Commission, p. 52.

not before making it clear that “the United States is without authority” to prosecute them “with respect to that portion of the company’s business not dealing with commercial real estate loans”⁴²⁹. Mr. Feldman pointed to this legalistic display of defiance to call for swift ECOA reform. Feldman’s testimony was perceived to be so damaging that the assistant vice-president of Household was compelled to respond. In a letter appended to the hearings J. Thomas Nelson detailed that “For a short period of time, Household used a credit scoring guide [...] which did assign different point values for race”. The experimental guide had been part of a test project “developed by an independent company [...] and was discontinued voluntarily by the Corporation in 1970” prior to the Justice Department’s investigation. “The finalized and proven guide”, Mr. Nelson emphatically underlined, “did not contain any distinction based on race, color, religion, or national origin, nor have any such factors been used by Household in any guide since.”⁴³⁰

What the letter provokingly reveals is that Fair Isaac, the ‘independent company’ in question, was perfectly willing to consider including race in its models. When asked whether the list of protected factors were once included in scoring models Sanderson’s response is frank: “Yeah, we included them in them”. In fact, he clarifies, “in this study we did for Household, race *was* a predictor. If you didn’t know anything, a white man was more likely to pay than a black man”. If Isaac won his wager and was able to deliver ten race-free scorecards to Household Finance it was only because in this specific case “if [racial data] added anything on margin it was infinitesimal and not anything worth fighting for”⁴³¹. For Fair Isaac, the fairness of using a factor was tied to its statistical significance, assessed

⁴²⁹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Enclosure, Sep. 11, 1975, Quoted in letter by Feldman, letter to Senator Biden, p. 687.

⁴³⁰ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975, Letter from J. Thomas Nelson, Assistant vice-president of Household Finance to Senator Biden, p. 228.

⁴³¹ Interview by author with Robert Sanderson, June 22, 2004.

independently of its social meaning. In other words, within the logic of credit scoring, “[f]airness is achieved by a process wherein an applicant is refused only when an accurate calculation, by an objective decision method derived from relevant experience establishes a level of economic risk unacceptable to a credit grantor.”⁴³² What ‘objectivity’ meant was that only the factors that had a demonstrable relationship to the repayment pattern in a sample of known accounts handled by a specific lending operation were included in the scoring model.

The pursuit of restrictive consumer protection initiatives that affected the construction of scoring systems placed Fair Isaac’s methods at the heart of the regulatory storm. Bill Fair would appear himself before legislators at a 1978 hearing on Credit Card Redlining.⁴³³ As his testimony reported, by then, of the tens of millions of decision to grant or withhold credit to an application each year, some 20 to 30 percent were being reached with the aid of a credit scoring system. In his oral statement, Mr. Fair all but eschewed the concrete problem of considering the location of the applicant in credit screening, choosing to expound instead upon a deeper philosophical point. “The connections between the proposed law and its possible effects are complex”, he heedfully began, “but if these complexities are ignored or underestimated, the results of the decisions of this subcommittee may be directly contrary to the intention.” As the scorecards lost access to information, he

⁴³² To Amend the Equal Credit Opportunity Act of 1974. Wards Paper ‘Credit Scoring – An Objective and Dynamic Credit Scoring System’, p. 91.

⁴³³ Credit Card Redlining. Hearings before the Subcommittee on Consumer Affairs of the Committee on Banking, Housing and Urban Affairs, U.S. Senate, 96th Congress, p. 221. As this chapter documents Fair Isaac would end up on the frontlines of implementing the ECOA. This explains why, rather than continuing to speak through its customers, Bill Fair would have felt compelled to appear himself on behalf of the company at these hearings in 1978. The bill against credit card redlining appeared in response to an offensive adverse action code designed by Fair Isaac to explain application rejection to consumers as required by the law. Geography was an integral part of a scoring system’s design since a company would often have different scorecards for different regions of their operation. It is noteworthy that Fair Isaac was no stranger to dealing with the federal government. Ted Lewis had worked for many years with the Job Corps, a poverty alleviation program started during the Johnson administration in the 1960s and run by Sergeant Shriver. Fair Isaac has also worked on a system with the IRS for identifying candidates who should be subject to tax audit.

forewarned, the number of poorly performing cases accepted per number of borrowers would increase. Fair's professional diagnosis was that the entire regime of prohibiting information was a technical intervention that would only introduce and increase unfairness in a system where consumer lending was being managed by a scoring system.

When questioned about the restrictions on race passed only a couple of years prior, Mr. Fair stoically answered "If it's the law of the land, one obeys the law". But when Senator Levin pressed him further asking, "Should the law deny you [the predictive value] relative to race, in your opinion?" Fair cracked the philosophical conundrum open in plain view. He openly responded that "If the object of the exercise is to produce decisions which grant credit to [the] creditworthy and deny it as best we can, however faulty it is—and it is faulty—my answer has to be "Yes."⁴³⁴ In hot pursuit, Senator Levin pressed him for more details, "Just to make sure that you are answering my question. You feel that you should be allowed to consider race?" Mr. Fair coolly replied, "That is correct". In a pointed exchange, he unreservedly reiterated his answer when the question was repeated with regards to religion, sex, age, marital status and ethnic origin.⁴³⁵ Fair's point was that recourse to any factor that could be proven to contribute to statistically differentiation was, by definition, not a stereotype. The use of such factors in screening was therefore acceptable so long as they were weighted in among a selection of other, also empirically relevant data points.

⁴³⁴ Credit Card Redlining, Question period after Mr. Fair's testimony, p. 221.

⁴³⁵ When scoring systems did not or no longer contained these factors lenders did not hesitate to tell legislators. As Mr. Cramer would point out, "Ward's credit scoring system does not consider race, creed, color, or national origin, and Ward's credit applications do not even request information in these areas." To Amend the Equal Credit Opportunity Act of 1974 Statement of Richard Cramer, Assistant Corporate Credit Manager, Montgomery Ward p. 94. Nevertheless, most systems had used prohibited characteristics at one time or another, and lenders wanted at least some of them to be included.

This is what spokespersons such as Ward's had meant when they insisted that "Credit scoring is objective; it is more rational, accurate, and unbiased"⁴³⁶. Scoring did not promise to distributed credit evenly across all social groups. Fair Isaac would firmly hold that "As long as income, property, and employment and education are not equally distributed, there is no reason to expect equal approval for different racial/ethnic groups—or by gender"⁴³⁷. Instead, what the score maker and its customers were signaling to legislators was that with a scorecard, "the process of calculating what the risk is in each individual case is *objectively* verifiable" against a given record, "and thus is 'fair'". Fair Isaac's curtly stated position was that "Credit scoring permits this verification process; its competitor techniques do not". By this criterion, the logical conclusion was that "Credit scoring is the only available method that meets the criterion of fairness"⁴³⁸. To shield the epistemic integrity of the technology was to protect the inherent mechanism of justice that was the property of empirically derived algorithms— that the decisions could be matched against recorded pattern.

Fair Isaac was advocating for the protection of type of objectivity that historians of science Lorraine Daston and Peter Galison have called 'mechanical objectivity'—the act of restraining interpretation in favor of "fixed, specifiable criteria of evaluation"⁴³⁹. What was fixed in the scorecard were not the characteristics upon which consumers would be

⁴³⁶ To Amend the Equal Credit Opportunity Act of 1974. Wards Paper 'Credit Scoring – An Objective and Dynamic Credit Scoring System, p. 93.

⁴³⁷ Peter McCorkell, "Spotlight on Ecoa Regulation B," *Credit World*, no. September/October (1995).

⁴³⁸ To Amend the Equal Credit Opportunity Act of 1974. Wards Paper 'Credit Scoring – An Objective and Dynamic Credit Scoring System, p. 91.

⁴³⁹ Lorraine J. Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), p. 334. In this volume, historians of science Lorraine Daston and Peter Galison demonstrate that multiple versions of objectivity have been practiced throughout the history of the sciences. For a review of this book see Martha Poon, "Illustrating Objectivity in an Atlas of Epistemic Virtues," *Science, Technology & Human Values* (2010).

evaluated, but rather the relationship between the empirical data that was available and the statistical process for selecting the characteristics out of that data that would be included in each system. The virtue of this kind of objectivity as a political tool is that it promises to draw consistent relationships between discrete cases and general principals. But the strength of mechanically objective systems—to stick to data as faithfully as possible and to be hardwired with a set of rules for reproducing the same outcomes in the future—can also be a great weakness. This is certainly the case if the original actions that are captured in the model have been deemed to be unjust or discriminatory. As a tool of replication, a textbook scorecard is as racist, sexist, and as discriminatory in unpalatable ways as its own past.⁴⁴⁰

Recognizing this fundamental quality of the scorecard Mr. Fair's argument was that "there is a good way of favoring a set of people, and there is a bad way. And, unfortunately the tack we are on is the bad way; it isn't going to accomplish what you're trying to do". The engineer's urgent plea was that legislators should "separate the social choices from the mechanism that is brought to bear to implement the social choices"⁴⁴¹. His prescription was simple: "If you want to favor blacks, women, divorcees, older, younger people, say so. Say so, so it can be observed and measured." Acknowledging that his alternative approach to

⁴⁴⁰ As charming as it is, this is why the Isaac anecdote does not signal the definitive victory of credit scoring over racial prejudice. Because the dataset Fair Isaac used to produce its proof came from consumers that Household had already selected, the results Earl Isaac used to subdue his interlocutor could arguably have been produced by the very efficiency of a racially tinged screening system. That is to say, if all racial groups were shown to be repaying at similar rates it was possible that this was because Household had selecting a group of racial minorities that resembled their better paying white peers, while leaving behind those who did not. The technical name for this problem is called 'selection bias', which refers to the fact that data on outcomes is only available for those cases that are selected, but not for those which are rejected. To truly demonstrate that racial minorities were as reliable as their non-minority peers Isaac would have had to have shown what the performance outcomes would have been among the rejected cases; he would have had to have demonstrated to managers that there were plenty of paying customers among the people from whom Household's staff had withheld credit on account of race. The technical solution this problem is called 'reject inference' in which a process is applied to data to guess what the outcome of the rejected cases would have been. Fair Isaac's internal solution to this problem was called 'augmentation' in which inferred outcomes were added in with the empirical data.

⁴⁴¹ Credit Card Redlining, Question period after Mr. Fair's testimony, p. 222.

policy was politically tenuous, he optimistically ventured that “if you say that women should be favored to the extent of having a tenth or 1 percent greater acceptance rate, the creditors will comply. If you say 1 percent they’ll comply. If you say 10 percent they’ll comply. But they’ll know what they’re complying with”. “After that”, he anticipated, “they can pursue their economic interest which most of us believe is in the interest of the country as well.”⁴⁴²

In Fair’s vision, policy makers should feel free to dictate specific social objectives; their enactment should be entrusted to his technologies of mechanical reproduction and control⁴⁴³.

The FRB endorses the ‘effects test’ as a means of enforcing the ECOA

The purpose of the ECOA was to create an enforceable principle of political objectivity in the consumer credit industry. As FRB observers would remark, “The legislative history of the act shows quite clearly Congress did not intend to bar legitimate credit screening. As always the challenge has been to produce an operational regulator structure that enhances the credit opportunities of protected classes while permitting creditors to exclude poor credit risks legitimately”. The FRB, the agency mandated with administering the law, faced the daunting challenge of issuing a set of disambiguating guidelines that could clearly demarcate legal from illegal screening practices. Section 202.2(n) of Regulation B stated that to discriminate illegally was “to treat an applicant less

⁴⁴² Credit Card Redlining, Question period after Mr. Fair’s testimony, p. 221.

⁴⁴³ Mr. Fair’s political model resembles what Bruno Latour has described as the ‘old bicameralism’ in which questions of value being debated by people are kept strictly separate from questions of fact being managed by technological systems. Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy*, trans. Catherine Porter (Cambridge MA: Harvard University Press, 2004).

favorably than another applicant”. As observers remarked, however, this did not “offer an unquestionably unambiguous operational definition of socially unacceptable ‘discrimination’ in a screening context where limited selections are constantly being made from a longer list of applicants”⁴⁴⁴. What remained murky was the location at which administrators should assess discriminatory action—at the level of the effects of screening, through an adherence to a set of prescribed practices, or by detecting purposeful intent.

Worked by analogy, legislators had drawn upon previous legislation on discrimination in employment to extend the ECOA’s coverage in 1976, such that the final act resembled Title VII of the 1964 Civil Rights Act, which prohibited employment discrimination based on race, color, religion, sex and national origin.⁴⁴⁵ One procedural technique that had been established in the domain of employment was the ‘effects test’ which measured discrimination by disparate impact. The suitability of the test had been remarked upon in the ECOA amendments where Congress “expressed its intent that the effects test, first developed in relation to employment discrimination, apply to credit discrimination”⁴⁴⁶. Within two years, David Hsia, as staff attorney at the FRB’s Division of Consumer Affairs published two articles exploring the application of the effects test in the case of consumer credit. He described the test as having three parts: to initiate a complaint, the plaintiff bore the burden of establishing the *prima facie* case demonstrating the

⁴⁴⁴ Gregory E. Ellihansen and Thomas A. Durkin, "No. 28: Theory and Evidence of the Impact of Equal Credit Opportunity," in *Credit Research Center Monographs* (West Lafayette: Krannert Graduate School of Management - Purdue University, 1989), p. 6.

⁴⁴⁵ Legal observers have noted that through the extension, the ECOA graduated from a consumer credit law to a proper civil rights initiative.

⁴⁴⁶ David C. Hsia, "Credit Scoring and the Equal Credit Opportunity Act," *The Hastings Law Journal* 30 (1978-1979): p. 417. It is noteworthy that in an earlier paper, Hsai expressed a much less intentional connection stating that when elevating ECOA “to the status of a full coverage civil rights law, Congress expressed almost as an aside, its intent that the effects test apply to credit discrimination” David C. Hsia, "The Effects Test: New Directions," *Santa Clara Law Review* 17 (1977),.

discriminatory effect of a particular practice on a protected class; next, the employer could rebut by showing that the practice under scrutiny had a ‘manifest relationship’ to the job in question; and finally the plaintiff could respond by showing that there was “an alternative employment practice available which would have a less discriminatory effect on the protected class and which serves the employer’s legitimate needs at least as well as the disputed practice”.⁴⁴⁷

The implicit adoption of the effects test by analogy to employment was profoundly consequential to the case of credit. As Hsia noted, in cases of employment discrimination, statistics could be deployed to establish whether disparate impact was occurring⁴⁴⁸, as well as to identify the practice that would have the least possible discriminatory effect⁴⁴⁹. That statistical evidence could be an adjudicator of disparate impact was especially important in cases where “a facially neutral employment practice having a disparate impact on a protected class [...] even though the employer did not actually intend to discriminate”⁴⁵⁰. When applied to the case of credit, there was therefore an obvious convergence between the application of the effects test as a legal technique and credit scoring methodology. In a footnote Hsia remarked that determining creditworthiness was already “a much less subjective decision than estimating employment qualifications”. Reinforcing the place of statistics within credit screening he further noted as though it were an established fact, that “the validity of the creditor’s practices can be checked by the statistical analysis of the data”⁴⁵¹.

⁴⁴⁷ Hsia, "The Effects Test: New Directions," p. 780.

⁴⁴⁸ Ibid.: p. 784.

⁴⁴⁹ Ibid.: p. 784 footnote 38.

⁴⁵⁰ Ibid.: p. 777.

⁴⁵¹ Ibid.: p. 793 footnote 86.

In Hsia's analysis the role of statistics in the effects test became only more robust in the transfer from employment to credit. This was because "users of credit scoring system can measure both the credit performance of individual borrowers and the predictive performance of the scoring system with much greater precision than an employer can measure either the job performance or the ability of employment practices to predict such performance"⁴⁵². Hsia was attentive to the custom nature of scoring systems, observing that "Creditworthiness depends upon proprietary information in the possession of the creditor". So he recommended that after a litigant established a *prima facie* effects case against a particular screening practice, administrators could "leave it to the creditor to rebut by showing that the statistical disparity is actually related to creditworthiness". Hsia suggested that "Where the creditor invariably uses the credit practice in question, its relationship to creditworthiness can be determined by use of statistics which associate default rates with certain applicant characteristics and by empirical analysis of defaulted loans". In short, he promoted statistical methods as the final arbiter of whether illegal discrimination was occurring even in non-statistical credit practices.⁴⁵³

The conciseness of Hsai framing was not accidental. To write his second article, which provided more than forty, meticulously documented pages on how credit scoring worked, he, like the industry his agency regulated, had had to consult extensively with Fair Isaac to gain an understanding of the technology⁴⁵⁴. It is perhaps no surprise, then, that Hsai reinforced through official channels what the legal apparatchik of the credit world had

⁴⁵² Hsia, "Credit Scoring and the Equal Credit Opportunity Act," p. 419. Controversies over whether the fair credit statutes precluded data keeping on banned categories were central to both the FHA and the ECOA. As a statistical technique credit scoring demands record keeping, but can transparently show when these data is being used. It is therefore compatible with the task of assessing regulatory oversight.

⁴⁵³ Hsia, "The Effects Test: New Directions," p. 794-95.

⁴⁵⁴ Hsia visited Fair Isaac on June 28, 1977.

already decided was the best strategy for the industry's defense. In response to the regulations, a 1976 article in *Banking*, a publication of the American Banker's Association (ABA), had soberly noted that "Credit judgments, by their very nature, are discriminatory. You must be ready to prove they are not *unfairly* discriminatory." The trade magazine emphasized that "It's the *interpretations* and the fuzzy areas that can get you into trouble – lawsuits." The buoyant editorial prescription was that "If your bank makes consumer loans in any significant volume, and you don't screen loan applications by credit point-scoring, you had better start doing so – fast, and well." "If you do use point-scoring," the editors continued, "you had better take a close look at your program with attorneys and experts, to make sure it doesn't get you into trouble".⁴⁵⁵

Roland Brandel, the author of the feature article, was a practicing lawyer at Morrison & Foerster. He expressed confidence that "In their use as a device to identify persons who have a similar level of credit worthiness, credit scoring systems may be said to achieve true equal credit opportunity, treating like individuals alike in assigning an appropriate credit worthiness value." Brandel's tone, however, was rife with caution. What was critical was to understand that a scoring systems ability to assign an appropriate creditworthiness value was linked to its proper construction. He warned that "Traditional methods of subjective credit evaluation [...] are invitations to costly lawsuits", but so were "the use of scoring systems that have not been scientifically designed"⁴⁵⁶. To truly offer legal protection the properties of a scorecard would have to be managed and vetted by scoring experts (Chapter 6). But even so, in the absence of precedent, regulatory ambiguity did not necessarily end with possession of a commercially acquired scoring system. "While one can conclude, then, that

⁴⁵⁵ Commentary by the editors in Roland Brandel, "New Dangers Arise in Point Scoring, but You Can't Afford to Be without It," *Banking* 1976, p. 86.

⁴⁵⁶ *Ibid.*

equally credit opportunity constitutes a major impetus for creditors to move in the direction of statistically sound credit scoring systems,” Brandel counseled that “even those systems are not problem free as presently constructed”⁴⁵⁷.

The intransigent problem with statistics as a site of regulatory control was that there was no unequivocal way to distinguish between discriminant analysis and illegal discrimination.⁴⁵⁸ Hsai ended his first review article with the remark that “Almost everything about the intention of credit scoring and ECOA remains unsettled”. His somber diagnosis was that “This universal uncertainty stems from the underdeveloped condition of the law, insufficient dissemination of knowledge about the operation of credit scoring, and the evidentiary difficulty of establishing whether a particular system discriminates [illegally]”⁴⁵⁹. Credit scoring was by no means a ‘safe harbor’. Nonetheless, the effects test did much to bolster the place of scoring within the credit industry. The act of identifying empirical statistics as the method through which just discrimination might be decided collapsed the quest for legal evidence of disparate outcomes with the content of scoring models; for all of the remaining ambiguities, this move positioned scoring technology as the terrain upon which the battle to assess the legality of day-to-day operations would be carried out.

The utility of statistics was confirmed by the state of New York, which had already accumulated some experience in the oversight of credit discrimination having independently instituted some of the most proactive state level policies in 1974. A pamphlet issued to

⁴⁵⁷ Ibid., p. 94.

⁴⁵⁸ One early example of this observation was made by Mr. Bucher of the FRB who noted that “In some cases this involves judgment with regard to congressional intent that aren’t easily resolved. Credit scoring is clearly one of them. We are told how important credit scoring is in increasing the efficiency and in reducing the cost of extending credit. But it is our feeling that reading the face of the statue, a credit scoring system which gives more points for a married person as opposed to anyone unmarried, is probably in violation of the act.” To Amend the Equal Credit Opportunity Act of 1974. Mr. Bucher in question period, p. 35.

⁴⁵⁹ Hsia, "Credit Scoring and the Equal Credit Opportunity Act," p. 448.

inform consumers of their rights under New York State Human Rights Law announced that “Creditors may make distinction in granting credit but only if they rely on factual evidence and fair criteria”⁴⁶⁰. Werner H. Kramarsky, the Commissioner of the Division of Human Rights, testified before Congress that in his state creditors were permitted to “make inquiries and records to compile statistics to demonstrate compliance with the law” or—quoting the text of the law itself— “for the purpose of establishing and evaluating valid, objective criteria of credit worthiness”. Kramarsky optimistic assessment was that the very existence of the law is was spurring lenders “to review their credit practices and to develop credit criteria which are not discriminatory”. The unproblematic recommendation from New York was that “Statistical evidence can be used in credit discrimination cases to the same extent such evidence is used in cases involving other types of discrimination”⁴⁶¹.

Statistical methods which had been rejected outright by civil rights organizations for credit screening ended up at the center of the anti-discrimination project in consumer credit through a circuitous path. Recommendations solicited by Congresswomen Fenwick and Wylie from the US Commission on Civil Rights are telling of scoring’s back-road ascent. In 1974, the Commission’s unequivocal statement was that “Lenders should assess all credit applications on an individual basis and should not employ actuarial or statistical findings in their assessment of an applicant’s credit eligibility”. However, it also advised that “The objective criteria used by lenders to determine the credit eligibility of individual applicants

⁴⁶⁰ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975, p. 71. Pamphlet issued by the New York State Banking Department entitled ‘Discrimination in Credit... Prohibited by the State of New York by sex or marital status’ (undated).

⁴⁶¹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement of Werner H. Kramarsky, Commissioner, Division of Human Rights, State of New York, p. 47.

must be consistently applied”⁴⁶². As scorecard users had already argued before regulators, statistical screening’s primary asset was that it mechanically applied whatever criteria of (legal) discrimination were hardwired within, equally across all cases. The Commission’s combination of positions unwittingly set up a foothold for scoring systems—a screening tool that by definition considered groups, not individuals—even though in principle it had set this method aside.

In a regulatory environment where the implementation of the legal mandates was profoundly ambiguous, an algorithm devoid of prohibited factors that mechanically predicted rates of default was the strongest defense against the charge of illegal discrimination downstream. An 1997 article in the ABA’s *Banking Journal* noted that “The lack of any clear standards for determining what justifies use of [practices that discriminate out of business necessity] has been one of the biggest hurdles to compliance”⁴⁶³. The vexing interpretive slipperiness of the ECOA has arguably never been eliminated, although after a bulletin on credit scoring models was issued by the Office of the Comptroller of the Currency (OCC) in 1997, it was eventually assuaged. The OCC concluded that “If credit scores are the sole basis for granting credit, the fact that two applicants have different scores means that they are not ‘similarly situated’ in terms of creditworthiness. There is no disparate treatment if applicants get different results”⁴⁶⁴. With those words, the agency sent the first

⁴⁶² To Amend the Equal Credit Opportunity Act of 1974. Commission’s on Civil Rights Recommendations solicited by Congresswoman Fenwick and Wylie p. 49.

⁴⁶³ Jo Ann S. Barefoot, "Compliance Clinic: Shooting the Rapids of Credit Scoring and Fair Lending," *ABA Banking Journal* September (1997).

⁴⁶⁴ Office of the Comptroller of the Currency, "Bulletin 97-42: Credit Scoring Models," (May 20, 1997). In other words the OCC’s comment was that a decision is not discriminatory if people in a protected category are given credit with equal frequency to people with the same characteristics in the non-protected category, even if these the number of cases in each group differs.

definitive signal that under the law, scores might be used as a fully legitimate reason for differentiating between consumers.

Regulation transforms discriminant analysis into a tool of political reform

The original statistical method that Fair Isaac selected for its credit scoring models was called discriminant analysis. The technique was designed by one of the modern founders of modern statistics, the biometrician R. A. Fisher for separating between two (or more) classes of events. For example, if an anthropologist were to come across a human mandible, Fisher suggested that statistically comparing certain dimensions of the bone to a number of known mandibles might yield a clue as to its sex. He described the technique as being useful for “finding which of all possible liner compounds of a set of measurements will best discriminate between two different groups”⁴⁶⁵. Bill Fair noted in a memoir that Fair Isaac had faced a problem “in making the connection between the extremely abstract language of mathematical statisticians and the world we wanted to invade”⁴⁶⁶. Although he was referring to the difficulties in adapting Fisher’s technical description of discriminant analysis to the material realities of the credit world, he might as well have been referring to the symbolic mismatch between the technique’s very function—to discriminate—and the politics of consumer credit.

⁴⁶⁵ R. A. Fisher, *Statistical Methods, Experimental Design, and Scientific Inference*, ed. J. H. Bennett (Oxford: Oxford University Press, 1990), p. 287.

⁴⁶⁶ Fair Isaac & Company Incorporated, "History of Fair, Isaac and Co.."

By the end of the Civil Rights movement discrimination had acquired a pejorative connotation; to discriminate was anything but a politically neutral act.⁴⁶⁷ As practitioners wryly pointed out, however, “The entire credit granting process is one of discrimination in the sense that a creditor must distinguish between those who can and are willing to repay the debt and those who are not”⁴⁶⁸. The scientific promise of credit scoring was not that it could eliminate classification entirely; rather its guarantee was that it would “not discriminate with respect to credit quality”⁴⁶⁹. Bob Sanderson puts it most bluntly. The output of scoring is to group people, but in such a way that in the end, “somebody whose odds are 10:1, it’s 10:1 whether that person is white, black, Asian, American Indian, whatever.”⁴⁷⁰ This does not deny that scoring privileges some groups over others. When statistics are used to make fair distinctions based strictly upon loan performance, the assumption is that “by granting the credit you have to give out to the people most likely to pay you.” Sanderson openly acknowledges that “What this does result in, is that a less privileged group will have a high reject rate because [this group of] people score lower than the better off group.”⁴⁷¹

Because of the moral and legal implications, raising the topic of discrimination in the credit scoring world solicits an acute response. “What you gotta define here very clearly,” a former VISA executive reminds me, in a voice that is at once charged and emphatic, “is what you call discrimination. Please be very careful in that. What Fair Isaac wants to do, the goal

⁴⁶⁷ For a thoughtful treatment of multiple social meanings of a closely related term, ‘exclusion’, see Emmanuel Didier, “De L' "Exclusion" À L'exclusion,” *Politix* 34 (1996). Emmanuel Didier identifies three definitions of exclusion that exist in France: a blameless outsider status, a lack of cognitive competence in a valorized culture, and the inability to reach the established threshold to participate in a labor market.

⁴⁶⁸ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Letter from Marcus A. Brown, vice-president ITT Aetna Corporation to Mr. Ralph Rohner, Counsel, United States Senate Subcommittee on Consumer Affairs, p. 606.

⁴⁶⁹ Interview by author with Robert Sanderson, June 22, 2004.

⁴⁷⁰ Interview by author with Robert Sanderson, June 22, 2004.

⁴⁷¹ Interview by author with Robert Sanderson, June 22, 2004.

of Fair Isaac is to discriminate as strongly as possible between people who pay their bills and do not pay their bills.” “What I’m arguing” he continues, drawing a crucial distinction, “is that Fair Isaac basically does away with discrimination the way the term is used in the popular and in the political language out there, because it doesn’t look at characteristics like gender, age, all that stuff.”⁴⁷² This distinction is reiterated by Sanderson: “Discriminate means to separate between two groups. And [scores] do discriminate between two groups – goods and bads”. But having said this, he leaps quickly to what is now the central principle of justice expressed within the scoring industry, which is that “They don’t discriminate illegally”⁴⁷³. Thus, credit scoring can be defined as being ‘non-discriminatory’ only when and because it adheres to the restrictions imposed by U.S. federal law.

Despite Fair Isaac and its customer’s diligent efforts to resist, credit scoring did not escape the anti-discriminatory regulation. By including the technology under the scope of the ECOA, political actors issued a clear sign that they did not deem the technology to be an inherently superior method for discerning the eligibility of credit candidates. In the eyes of the law, a credit scoring system can be just as guilty of politically unacceptable forms of discrimination as any other method. So what is meant today when a Fair Isaac informational pamphlet declares that “Credit decisions are fairer. Using FICO® scores, lenders can focus only on the facts related to credit risk, rather than their personal opinions or biases”, is not just that the technology adheres to statistical principles for drawing differentiations. What the company is also referring to is the fact that “Factors like your gender, race, religion, nationality and marital status are not considered by FICO® scores.” “So when a lender considers your FICO® score,” the company concludes, “they are getting an evaluation of

⁴⁷² Interview by author with Fair Isaac associate, June 22, 2004.

⁴⁷³ Interview by author with Robert Sanderson, June 22, 2004.

your credit history that is fair and objective.”⁴⁷⁴ The shift is subtle but remarkable. To extol the virtues its products Fair Isaac positions them in relation to the politically constructed notion of objectivity which it initially rejected, the very one defined by the ECOA.

The review of the congressional record in this chapter displaces two distinct accounts of how a connection was forged between credit scoring technology and social justice. First there is the state-centered claim that credit scoring methods were sanctioned by the government, which is too straightforward a reading of the relationship of statistics to the project of equal credit opportunity.⁴⁷⁵ Equally lacking in historical nuance is the economist’s argument that the ECOA was merely “monument to principles” because competition provides a natural impetus for lenders to rid themselves of unwarranted discrimination through recourse to statistical tools.⁴⁷⁶ The NCCF’s position on the matter reveals the flaws in both accounts. As the document clearly states, “The Commission believes that legislation requiring use of statistical credit scoring systems would be biased against small credit grantors who could not afford such expensive analyses”⁴⁷⁷. So even if the NCCF economists presumed that credit scoring was naturally attractive in conditions of heightened competition, they also recognized that in practice, the cost of acquiring a system placed it

⁴⁷⁴ Fair Isaac Corporation. *Understanding your FICO® score*. Undated pamphlet c 2003, p. 2. Available online at: http://www.myfico.com/Downloads/Files/myFICO_UYFS_Booklet.pdf

⁴⁷⁵ With reference to credit scoring, sociologist Donncha Marron has argued “this novel form of intervention was given official sanction by the state through legislation as a means of guaranteeing equality of opportunity to the market according to the individual’s capacity for self-government” Marron, “Lending by Numbers: Credit Scoring and the Constitution of Risk within American Consumer Credit.” Marron draws this conclusion having consulted the text of the ECOA and of Reg B as his primary evidence. To draw its alternative conclusion, this chapter has had to examine a wider selection of government documents which provide access to the churning controversies behind these official statements.

⁴⁷⁶ Ellihhausen and Durkin, “No. 28: Theory and Evidence of the Impact of Equal Credit Opportunity,” p. 26.

⁴⁷⁷ National Commission on Consumer Finance, *Consumer Credit in the United States*, p. 156.

beyond the reach of smaller operations. The technology would neither be naturally absorbed by the credit industry, nor would it be instituted by governmental injunction.

To the cost conscious credit industry the burden of changing business practices was a perennially sensitive issue and a key point of regulatory dissent. The International Consumer Credit Association forewarned that because of legislative intervention “Small creditors will be driven out of the field in droves, which others who will remain beyond the effective date of October 28, 1975 will generally be operating in violation of the regulation, while perhaps not the statute itself, out of sheer lack of knowledge and understanding as well as the impossibility of compliance”. The Association further lamented that “What was once an industry of many small businesses will become a field where only larger companies able to afford the costs and legal hazards will compete in a legislative and regulatory environment which frustrates any really effective competition”.⁴⁷⁸ Industry attorneys concurred, predicting that “The independent finance companies would be put in such peril both as to potential loss and the effect of his business credit standing that his desire to sell to a considerably larger competitor with greater resources would be compelling”⁴⁷⁹.

It is certainly the case that government initiatives thoroughly investigated and endorsed (express acceptance of) the use of statistics in credit allocation. But the state was never in a position to sanction (give formal explicit approval to) credit scoring systems. For all of the confidence the NCCF had in the promise of statistical screening, it explicitly renounced any policy initiatives that would impose recourse to credit scores. A profound respect for small business as well as for the autonomy of business agents prevented

⁴⁷⁸ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Statement International Consumer Credit Association, p. 604.

⁴⁷⁹ Equal Credit Opportunity Act Amendments and Consumer Leasing Act – 1975. Letter from Riddell, Taylor, Davis & Holroyd, attorneys at law, Washington Building, Washington, D.C. dated July 23, 1975 to Senator Biden on behalf of Beneficial Corporation, p. 576.

legislators from favoring any particular method of credit screening. What ultimately boosted the technology was not written into the content of regulation which was designed to promote a flexible respect of individuality. The impetus to turn to scoring resulted from the requirement of uniform application and regulatory control. The administrative protection provided by the scorecard transformed the cost of acquiring the technology, which had once been such an impediment to its widespread adoption (see Chapter 2), into a necessary business expense. Sanderson easily concedes that the ECOA “turned out to be a real benefit to Fair Isaac because it forced a number of lenders who hadn’t really accepted credit scoring to adopt the use of credit scoring because they could demonstrate they were consistent in their decision making”⁴⁸⁰. The putative cost of compliance so hotly anticipated and contested by the credit industry, would simultaneously absorb the negative cost barrier to and create a positive incentive for procuring commercial scoring systems.

Michel Foucault has written that tensions are at play whenever there is “an institutional incitement to speak about it, and to do so more and more; a determination on the part of the agencies of power to hear it spoken about, and to cause it to speak through explicit articulation and endlessly accumulated detail”⁴⁸¹. Although the ‘it’ for Foucault refers to the much juicier topic of sexuality, his insight is equally relevant to the proliferation of discourse about statistical scores. What the congressional record of the ECOA reveals is that during the course of the legislative proceedings there were intensive efforts to enunciate and unravel the delicate contradictions associated with this form of regulatory control. It would be a mistake to take the frequent appearance of the technology in federal documents for an overt push by the state to institute scoring. What its overwhelming presence reveals,

⁴⁸⁰ Interview by author with Bob Sanderson, Jan 22 2004

⁴⁸¹ Michel Foucault, *The History of Sexuality: An Introduction*, trans. Robert Hurley, vol. 1 (New York: Vintage, 1980), p. 20.

instead, is an attempt to manage a pervasive sense of uneasiness with regards to the use of credit statistics by explicitly delineating an appropriate role for credit scoring technology within the project of social justice and political reform.

Conclusion—Credit scoring is a handmaiden of oversight and administrative law

A reading of government record shows that from the NCCF's report to the FRB's issuance of Regulation B, credit scoring was deeply implicated in almost every aspect of the design and implementation of a civil rights regime to govern the U.S. the consumer credit industry. This chapter has examined how the position of credit scoring evolved within one slender reed of these debates. It has focused on the emergence of an epistemic tension between the political project of preventing arbitrary stereotyping, and the statistical requirements for attaining scientifically objective scorecards. This particular controversy emerged as that ECOA was extended beyond sex and marital status, elevating it from a consumer protection act to the full status of a civil rights law.⁴⁸² Legislators understood the issue of discrimination through the established model of employment under Title VII of the Civil Rights Act. Once it was established that unjust discrimination was indeed occurring in the consumer credit domain, the immediate solution was to ban lenders as in hiring from considering membership to a protected group from screening practices.

As political intent became aligned around the cause of outlawing a number of categories, the naturalized relationship of statistics to fairness—of credit scoring technology to the project of fair credit—that was originally expressed by the academic staff of the

⁴⁸² Hsia, "The Effects Test: New Directions."

NCCF, became severely strained. As Fair Isaac and its clients would strenuously argue, the offensive categorical events the laws were designed to prevent were not committed by scoring systems. Scorecards did not seek to identify or fix stable types. They never excluded anyone based on only one characteristic, and they dynamically considered an infinite combination of empirically relevant factors from multiple, discrete sources of data. Not only did any attempt to extend the laws to credit scoring systems bring the technology under unwanted scrutiny, but the requirements threatened to weaken the segregation of consumers through discriminant analysis. From within the logic of statistics, the proposed regulations would dilute the objectivity of the models and therefore diminish the fairness of the scores.

As the oldest provider of scoring systems and the most authoritative source of information on the science of credit statistics, Fair Isaac's knowledge was as incontrovertible a reference point for the government as it was for the credit industry. Through numerous channels the company presented officials with systematic and sophisticated explanations for how the technology functioned; it attempted to dissuade federal legislators from pursuing the established regulatory course. This was not to say that credit scoring did not perpetuate inequalities. Bill Fair readily acknowledged that by mechanically replicating established patterns, it most certainly did. If politicians wanted to change the underlying composition of the national credit pool, however, Fair Isaac suggested that it was in the public's best interest to do so by issuing clearly executable policy directives that did not meddle with the scientifically assessed content of scorecard models. Either because it was politically unfeasible or because it was not understood, Mr. Fair's vision failed to make its mark. Statistical reasoning was unable to trump political convictions, and Fair Isaac's scientific expertise would not be held beyond the reach of the law.

When the legislation moved from congress into the realm of legal administration, the relationship between statistics and fairness would be renewed. As an arm of both justice and coordinated action, administrative objectivity values the same qualities that credit scoring provides to managers as a tool of operational control (see Chapter 3). Mechanistic qualities such as consistency, tracking and verification which had failed to persuade elected officials that the technology should be immune from regulatory scrutiny in the first place, were embraced as virtues when it came to demonstrating compliance with the law⁴⁸³. The translation of equal credit legislation into actual practice through the ‘effects test’ pinpointed statistical methods—and therefore credit scoring systems—as an appropriate site through which compliance could be monitored and controlled. Fair Isaac had become the guardians of an expertise that was delegated the responsibility of standing between the credit industry and the punitive threat of litigation⁴⁸⁴. Through the regulatory process, this staunch opponent of intervention was refashioned into the handmaiden of oversight in the administration of the law.

⁴⁸³ ECOA regulation meant that decisions were not submitted to undocumented, untracked or unsubstantiated human override were immediately suspect. The OCC bulletin clearly stated that “Examiners will focus particularly on overrides” Office of the Comptroller of the Currency, “Bulletin 97-42: Credit Scoring Models,” p. 10. Although overriding would continue, the effects test might be seen as a vindication of Fair Isaac on this question.

⁴⁸⁴ On the concept of delegating to technologies the task of maintaining social order, see for example Bruno Latour, “Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts,” in *Shaping Technology / Building Society: Studies in Sociotechnical Change*, ed. Wiebe Bijker and John Law (Cambridge MA: The MIT Press, 1994).

Conclusion

In a 1924 essay entitled ‘The Limitations of Scientific Method in Economics’, Frank Knight argued that science could never provide a complete explanation of economic activities. His position is frequently invoked today to bolster criticism of the mainstream discipline of economics, which continues to celebrate positivist methods as the basis of its inquiry. Many non-economists hark back to Knight’s early writings to justify why other approaches must also be important if we are to fully understand economic phenomena. What goes almost completely unobserved, however, is perhaps the most significant part of Knight’s statement. Knight modified the definition of science to temper its limitations.

“Science,” wrote Knight with emphasis, “is merely the *technique of prediction*”. The original purpose of science was “to enable us to *understand*”, by which he meant “the understanding both of beauty and of the technique of action”. “But,” he continued, “our modern, sophisticated way of thinking tends more and more to subordinate the desire for

understanding as such to a desire for control". Control was significantly different from understanding. When consciously deciding how to act, Knight observed, "we are not interested in the world as it is, except as the basis of predicting what it will be in the immediate or remote future to which conscious plans of action relate".⁴⁸⁵ Knight narrowed the purpose of economics so that it could stand alone as a science. He was not, as many social scientists have mistakenly claimed, endorsing the need for a science that acknowledged multiple types of knowledge. Once knowledge was whittled down to a quest for control through prediction, science was no longer lacking in the realm of economic action.

Predictive science has become so prevalent today that it is difficult to recall the time when sciences were not heavily focused on predicting. Yet even the most cursory glance into the history of science makes this shift patently evident. To give but one example, when historians of science Lorraine Daston and Peter Galison characterize historically distinct modes of scientific objectivity, all of the practices they identify (truth to nature, mechanical objectivity, trained judgment) involve seeing, classifying and representing natural entities⁴⁸⁶. Much of scientific practice has been preoccupied with fixing and collecting the components of the natural universe, not with predicting what will happen in the future⁴⁸⁷.

Economic science is said to be in crisis because it failed to foresee the recent collapse of credit markets. Playing upon a classic Knightian distinction, commentators have argued that financial markets crashed because professional groups with economic expertise such as

⁴⁸⁵ Frank H. Knight, "The Limitations of Scientific Method in Economics," in *Selected Essays by Frank H. Knight: "What Is Truth" In Economics?*, ed. Ross B. Emmett (Chicago: University of Chicago Press, 2001).

⁴⁸⁶ Daston and Galison, *Objectivity*.

⁴⁸⁷ I am not trying to imply that scientific prediction is new, only that it used to follow from a primary interest in describing the nature of the material universe. Classical prediction in physics was deterministic, not statistical. As I have discussed here, credit scoring and most new forms of predictive science and risk management are expressed through algorithms that eschew the project of description. These sciences pursue prediction for its own sake.

investment bankers, risk managers, ratings agencies and traders confused incalculable uncertainties with calculable risks. But another conclusion is equally plausible. If economic science did not forecast the crash it is not because the discipline failed to absorb Knight's teachings. Predictive failure is only a crisis for a discipline that has—precisely as Knight advocated—turned itself into a science with a mandate to issue predictive statements.

Instead of asking why economists and financiers fail to decipher the future—a question these professionals relentlessly ask of themselves⁴⁸⁸—the history of science demands that we pose an altogether different question: *How did we come to live in a world that is bound up in economic prediction?* The four empirical chapters of this dissertation begin to provide the outlines of an answer to this question. Within the field of consumer lending, the emphasis on prediction that Knight advocated in the 1920s was parasitic upon credit scoring, a privately innovated operating technology engineered and manufactured by Fair Isaac in the late 1950s. Through computer-assisted analysis, the scorecard introduced credit managers to information that enabled them to exercise internal control over rates of default. This information was a tool for controlling credit production, but because it was also a probabilistic statement it could also be interpreted as a projection of credit risk.

This research has pursued a material anthropology of contemporary financial risk. My argument is that the changes attributed to 'neoliberal finance' are the result of technical projects that have been slowly renovating the economic environment with systems that run on circulating risk information. As historian of economics Philip Mirowski has noted, under the ideas developed in the 1970s there has been "a shift in the center of gravity of economic conceptions". While earlier *neoclassical* theories conceived of exchange as "brute allocation -

⁴⁸⁸ For the most famous exploration of the limits of financial modeling see Nicholas Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007).

that is, as physical motion in commodity space mirroring the movement of goods from one trader to another”, the *neoliberal* image of a market was “as a conveyor and coordinator of “knowledge” or “information” between agents”⁴⁸⁹.

My position is substantially different from critiques of financial markets that challenge the efficiency of market information. Numerous academic groups have attacked the efficient market hypothesis, arguing that rational calculation is always bounded or that information is necessarily asymmetric. But while ardent claims about the inevitable imperfection of information might challenge the notion of efficiency, they confirm and reinforce the assumption that flows of information have always been the natural basis of economic activity. In contrast, I examine how information processing has become the basis of production in consumer finance. The story of the Fair Isaac scorecard illustrates how industrial concerns about controlling the production and movement of goods have been reworked and extended by the production and movement of information products.

The overarching point is that financial markets—the trade in products that result from practices of predicting risk through information—do not spring up out of nowhere. The technical conditions under which these markets can exist must be imagined, politically defended and actively built. In order to evolve, the financial world has had to shift gears, if you will. To move from the concrete solidity of the bank vault to the perpetual motion of the high-frequency traders, finance has been rebuilt and reequipped. And where does this new equipment come from? The story of Fair Isaac shows how the business of consumer finance was retrofitted with predictive information technology by a commercially driven and

⁴⁸⁹ Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science*, p. 235.

increasingly specialized team of operation researchers—scientists interested in assessing, managing, and improving the performance of operating units.

The scorecard is a tool of mechanical replication

In examining how a market for consumer risk technology has evolved I have established continuity between older forms of industrial productivity (equipment manufacturing), and newer techniques of operating control over business processes (risk management). These findings give perspective on how industrial infrastructure founds the ‘information economy’, in which information drives business practice, and the business of producing business information is a profitable venture. As this research begins to show, technical practices for predicting the future have grown out of the 20th Century desire to exert control over military and industrial operations. Automated replication, the dream of military-industrial production, is the grandfather of the management systems that undergird new forms of financial risk-taking⁴⁹⁰.

Operations researchers are interested in wresting control over ground-level operations. They seek to empower military commanders and corporate managers. Like an architectural or engineering firm, then, the goals at Fair Isaac were overtly interventionist⁴⁹¹. The Fair Isaac Company has made its mark on the world by building office specialized equipment for the consumer finance industry. Squaring with Knight’s claim that efficiency

⁴⁹⁰ The Dodd-Frank Act (2010) pushes for automated trading and exchanges for swaps and derivatives are a good example of how machines have become the solution to increased financial security.

⁴⁹¹ For a discussion on the interventionist nature of economics see Callon and Çaliskan, "Economization: New Directions in the Studies of Markets."

can only be gained where work is “essentially repetitious,”⁴⁹² Fair Isaac isolated one moment of credit production—application screening—and subjected it to intensive technical intervention. Their technology product, the scorecard, was in some ways no different from a pencil sharpener or a stapler sitting beside it on the desk. It was a relatively simple device that assisted in organizing an aspect of daily operations. Like many mundane mechanical objects, the scorecard renovated an existing structure to support pattern repetition.

In Chapter 1, I explore how the company made the first scorecards and show that credit scoring was not merely an intellectual project. Like a gear on a bike or a hinge on a revolving door, the scorecard was designed to be physically inserted into a local credit office. The technology imported the factory’s aesthetic of uniform execution to one task being carried out by office workers. On the backbone of the repetitious industrial order it produced, the scorecard also added an element of control. It gave managers the ability to adjust the number of files that would be accepted, depending on where they set the cutoff score. Just as a gearbox allows the rider to adjust the relationship between the speed of the crank and the wheel or a revolving door regulates how people move in and out of a building⁴⁹³, the scorecard was a tool for moderating the flow of cases passing through a finance operation.

Machines that perform repetitive labor are tools for conserving an existing state. The Fair Isaac scorecard conforms to Knight’s restricted vision that “science, manifestly, cannot direct creation in any true sense; it can only copy or at best rearrange old elements in new combinations”⁴⁹⁴. Just as a printing press faithfully reproduces a text written by a

⁴⁹² Knight, "The Limitations of Scientific Method in Economics," p. xxx.

⁴⁹³ Jim Johnson, "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer," *Social Problems* 35, no. 3 (1988). Jim Johnson is a pseudonym for Bruno Latour.

⁴⁹⁴ Knight, "The Limitations of Scientific Method in Economics," p. xxx.

conscious author, or a rubber stamp recreates the impression of a handwritten signature, the basic scorecard did nothing more than recreate a pattern already imprinted in an archival record. Fair Isaac's technique was to fold time forward onto itself by analyzing historical data⁴⁹⁵. Perhaps the most important lesson that this analysis of the basic scorecard reveals is that statistical analysis does not select for credit candidates *de novo*. A scorecard copies an established pattern, but does not make original decisions⁴⁹⁶.

This observation is significant because it is profoundly at odds with what we now think the technology is doing. We think that credit scores provide an independent assessment of financial quality. We think of scoring algorithms as mathematical attempts to describe or model an externalized rather than a systemic reality. Our confusion stems in part from philosophical ideas introduced by military-inspired scientists about how the machines they build function in which analogies are made between human cognition and machine processing. Through the spread of influential ideas about the universality of control through communication, the human brain has been reconceived of as a computer and machines have

⁴⁹⁵ This established the rudimentary structure of a system with an inside (the record of its own past activity) and an outside context (everything else). When a system like this acts—to give out loans—it modifies its own context. In theory, if data circles back through the algorithm it will recognize and adjust to the conditions it is itself creating. It is noteworthy that in this model of the system, the system is not struggling with a Cartesian problem of 'representation' because it does not seek respond to a world that is external to itself; it responds to a context that it is itself producing, that is, it made to respond to itself. A robust self-referential system will, again in theory, reestablish stability. Think of two mirrors placed face-to-face. Any object that you introduce will immediately be reflected and internalized in the infinitely repeating image. Credit scoring algorithms, however, are not quite like mirrors. The models have to be updated as the material world outside the control of the system bleeds in. Michel Callon calls this 'overflowing. Michel Callon, "An Essay on Framing and Overflowing: Economic Externalities Revisited by Sociology," in *The Laws of the Market*, ed. Michel Callon, *Sociological Review* (Oxford: Blackwell Publishers, 1998).

⁴⁹⁶ With the original Fair Isaac scorecard, there was no feedback and scores did not reflect dynamic action. Accounts were only scored once, at the moment of application. When a scoring algorithm is implemented at a credit bureau there is feedback loop as new data gets lodged about ongoing credit accounts. This is called behavioral scoring because it updates predictive information as the system moves forward through time. It is noteworthy that behavior refers to the behavior of the system as a man-machine complex and not to the behavior of human beings as independent individuals.

earned the capacity to be intelligent⁴⁹⁷. Over the course of the post-war period, we have fallen prey to the idea that ‘decision-making’ and ‘information processing’ are the universal concern of both individual cognition and organizational systems.

This theory of universal decision-making has merged with a very old industrial fable about the nature of technology. According to this fable nothing is gained or lost when new technologies are adopted except a *de facto* social good called ‘efficiency’. The truth of this proposition was, of course, deeply contested during the 19th and 20th Century battle between labor and capital, when it became clear that the drive to achieve productive efficiency through machinery benefited industrialists, but severely threatened workers’ ways of making a living⁴⁹⁸. Nevertheless, technical neutrality is being reasserted once again with regards to digital information systems. The current version of the myth says that, since we have always been engaged in the act of decision-making through information processing, we need only evaluate new information processing systems for the efficiency gains they contribute.

Information technologies claim to be alternative methods of executing choice. They change the amount of information that is available, but they do not change the basic task that people and organizations are executing. Once we take this proposition for granted we treat technologies like the scorecard, as mere substitutes in the act of decision-making. This reduces our analysis to the very task Knight assigned to economic science: that of testing interchangeable equivalents to adjudicate which will perform a task marginally more

⁴⁹⁷ Among others see Halpern, *The Eye of Time: Histories of Representation, Perception, and Archiving in Cybernetic Thought*.

⁴⁹⁸ Notions of efficiency were born in mechanics, but how it is expressed will vary depending on whether the topic is energy, cost, movement, productive output, profit, risk and so on. For a history of the various meanings of efficiency see Jennifer Karns Alexander, *The Mantra of Efficiency: From Waterwheel to Social Control* (Baltimore: Johns Hopkins University Press, 2008).

efficiently⁴⁹⁹. But, as I have shown, manual organizational control and cybernetic systems are not competitive methods that exist in parallel, as economic and military theories presume. One approach to action grows out of the other such that the two methods are linked together, in sequence. This finding suggests that what we now call prediction can only work in environments that have been heavily formatted to support mechanical replication.

Fair Isaac's technology started out as a machine of replication, not decision-making. It built upon, added to, and modified—but did not substitute for—the organic underlying creativity of organizational process and human intellect.

Credit scoring provides operating information

In the internal workings of a credit scoring algorithm, repetition and change are no longer opposites. They are placed in relation that is just as historian of art George Kubler described when he wrote that “No act is ever completely novel and no act can ever be quite accomplished without variation”. Kubler's insight, that every act is bound up in the ones that precedes it⁵⁰⁰, expresses a cybernetic vision of the balance between stasis and creativity that is reflexively built into technical innovations that feature mechanisms of control through feedback. In cybernetic theories as in cybernetically inspired systems, “Everything made now is either a replica or a variant of something made a little time ago and so on back

⁴⁹⁹ From inside the Knightian paradigm, the goals of credit scoring are the same as that of economic and social scientific research. The purpose of both is to select which figure will perform better from among a number of alternatives that vary only in terms of some definition of efficiency.

⁵⁰⁰ For a study of the creative work involved in producing similarity see Catherine Grandclément, "Le Marketing Des Similarités: Les Produits À Marque De Distributeur," *Revue* 24, no. 135-136 (2006). The paper discusses the case of manufacturing generic brand goods.

without break”⁵⁰¹. In a world reconceived through cybernetics, continuous action reproduces but modifies existing processes and infrastructures. Change happens through minute inventions that pull and tug history in tiny increments⁵⁰².

Fair Isaac’s cardboard scorecard is a Darwinian finch of modern finance. It signals an important step in the evolution of consumer lending and exemplifies the onset of a greater movement in economic history. What was innovative about the scorecard was not only its capacity to repetitively reproduce a past pattern with precision, but how it linked this mechanically enhanced action in the present (case selection) to a performance outcome the underlying credit operation would itself actively produce (case processing). Credit scoring is an industrial technology that provides mechanical control over action in the here and now, but it is also a financial technology that ushers in concerns with controlling operating outcomes. The technology created information about the operation and tied that information to responsive action⁵⁰³.

The desire to *know* the future may well be an age-old preoccupation in human societies. What characterizes our contemporary fixation with risk, however, is the desire to

⁵⁰¹ George Kubler, *The Shape of Time, Remarks on the History of Things* (New Haven: Yale University Press, 1962).

⁵⁰² The influence of cybernetics on science studies among other social sciences runs deep. Paris School’s vision of science in particular has been heavily influenced by cybernetics though through the work of philosopher Michel Serres. For Serre’s lyrical contemplation of information theory, see Michel Serres, *Genesis*, trans. Genieviève James and James Nielson, *Studies in Literature and Science* (Ann Arbor: University of Michigan Press, 1995). For a conversation about his influence on Latour, see Michel Serres, *Conversations on Science, Culture and Time*, ed. N. Katherine Hayles, *Studies in Literature and Science* (Ann Arbor: University of Michigan Press, 1988). In another example, Susan Leigh Star was a professed follower of Gregory Bateson, a social scientist who is strongly identified with cybernetic theory. See Gregory Bateson, *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 1999 (1972)). Most infamously, anthropologist Donna Haraway has openly embraced cybernetics as a tool of feminist critique. Donna Haraway, *Modest_Witness @ Second_Millennium. Femaleman©_Meets_Oncomouse™* (New York: Routledge, 1997). For a reprimand of Haraway, see Peter Galison, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision," *Critical Inquiry* 21, no. 1 (1994).

⁵⁰³ For an example of how the technical connecting between action and outcomes has been implemented to set the terms of executive compensation see Aditya Chakraborty, "Who Came up with the Model for Excessive Pay? No, It Wasn't the Bankers – It Was Academics," *The Guardian*, Monday, January 12 2010.

control the future. The origins of OR suggest that our intellectual concern with controlling the future is a legacy of how military thinking has developed over the post-war period. In military campaigns waged by democratic armies, where death is a looming concern, managing the incidence of deleterious events to conserve the lives of citizen-soldiers became a priority⁵⁰⁴. The capacity to foresee a well-defined future occurrence and to deem it undesirable is to conceptualize action in terms of risk; to act to exert influence over when and how such an event happens down the line is to engage in risk management⁵⁰⁵.

Fair Isaac inherited its sensitivity towards risk from the military and introduced it as a managerial objective to consumer financiers. In military campaigns risk is conceived of as an endogenous property of the operation. This is a pragmatic position: you can modify outcomes by changing how the operation responds to the attacks of enemy combatants but you cannot control the actions of the opponent's forces. Through statistics, the enemy is viewed from afar as a stochastic element, rather than moral or meaning-making being whose psychological map must be understood⁵⁰⁶. Built upon of this kind of reasoning, the scorecard was a piece of equipment that offered lenders mechanical control over missed

⁵⁰⁴ Managing risk does not necessarily mean eliminating risk in an absolute sense. Military engage in efficiency calculations to maximize the force exerted given the expected loss of life. One infamous example in aerial combat is known as the 'kill-ratio', the number of the opponent that will be decimated for every plane lost. This impact ratio can be increased by flying planes lower, but losing more pilots. Loss of life is an accepted tradeoff as long as it is deemed worth the return.

⁵⁰⁵ Some scholars would argue that financial risk originates in 19th C techniques of insurance, but if anything I would argue, that insurance is being 'financialized'. The original form of insurance over merchant ships was primarily a form of risk mutualization (sharing risk), not risk management (selecting the level of risk one is prepared to take). This distinction, which defines the difference between risk in insurance and risk in finance needs to be further explored.

⁵⁰⁶ Galison, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision." This approach might be contrasted against the relationship between Irwin Rommel and George S. Patton as portrayed in the Academy Award winning film, *Patton* (1970). Both WWII generals are reading the other's books as a means of deciphering the other's psychology and philosophical approach to strategy.

payments on loan agreements⁵⁰⁷. From an intellectual perspective, the technology focused upon the impact of default as a bothersome event. From a business perspective, it tied operational efficiency and the promise of profitability to a novel objective—managing this event as a risk.

The idea that credit managers should concern themselves with default disrupted the established stakes of the consumer finance industry. In Chapter 2, I provide evidence from trade literature that prior to Fair Isaac's involvement, consumer lending was, from a business standpoint, a profoundly cost sensitive but not a risk sensitive environment. Given how the industry was organized and regulated, experienced lenders were worried about the numerous operating expenses that gnawed away at meager revenues and threatened rates of return. Controlling default was not a priority to lenders. This explains much of why Fair Isaac's technology was so poorly received by the credit industry. Investing in a device that reduced already low incidence of non-payment made no sense to credit professionals who were interested in drawing down the overall cost of day-to-day operations, not in purchasing expensive newfangled gadgets from inexperienced business consultants.

Fair Isaac's technology solved a problem that was irrelevant to improving profitability of mid-century lenders. But as useless as it was from a business standpoint the scorecard nevertheless exerted control over default rates. In Chapter 3, I examine the scorecard on its own terms to explain how it worked in practice. The crux of Fair Isaac's business model was that it made a custom statistical product. Because it was a custom model, the scorecard implicitly acknowledged that favorable outcomes were the result of an

⁵⁰⁷ It is noteworthy that default is a contractual and moral offense, but it is not necessarily related to the amount of revenue a loan will produce for a lender. (This is why the credit card industry calls people who pay their bills in full 'deadbeats'). Marking default as the event that should be controlled is a good example of how values inherited from the past get carried over into new technical systems.

extended interaction between a lender and a subset of cases that responded well to a particular set of credit policies. Every algorithm fit the outcomes produced by the specific conditions of credit offered by a lender. The same person asking for a loan would get a different score at each lender, so unlike today, scores were fixed to lenders not borrowers.

This brings us our key question about the status of the credit score as a piece of information. The scorecard generated information to make case selection more efficient in terms of risk. In order to do this it ‘communicates’. But what does it communicate? Who does it communicate to? And what exactly does it communicate about?

Operations researchers are interested in how operations function. It should come as no surprise, then, that scorecards describe the overall dynamic of an operation, and credit scores are pieces of *operating information*. The original custom scorecard was an operating tool that allowed a consumer finance operation to communicate what it could expect from its own performance on a case-by-case basis. In other words, credit scores provided a finance company with information about itself. This description of credit scoring flies in the face of studies that treat scores as quantified measures of individual creditworthiness. What the empirical evidence in this dissertation shows is that mimicking the assessment of creditworthiness or credibility understood as facet of personal character was never the

scorecard's technical objective⁵⁰⁸. As operations researchers, Fair Isaac was equipped to model the performance of distributed organizations⁵⁰⁹, not people⁵¹⁰.

The algorithm correlated predictive factors to the incidence of default at the aggregate level, *post facto*. Fair Isaac sought to mechanically reproduce the pattern left behind in an archival trace without seeking to understand, describe or imitate the myriad intermediary activities inside the finance office or in the borrower's personal life that had produced these outcomes in the first place. Just as a photocopier does not drip paint to reproduce the image of a canvas by Jackson Pollock, or a film conveys motion without transporting the movie star into the room⁵¹¹, likewise, a scorecard replicates a pattern of lending outcomes without reenacting the gestures of the creative process. Human underwriters might well have considered cultural categories of moral worth or engaged in

⁵⁰⁸ It is easy to mistake the factors in scoring algorithms for descriptive or independent variables in a causal model. But Fair Isaac's models, as discussed in Chapter 4, are correlative not causal. So long as they replicate the pattern of outcomes, the meaning of the variables in the model is irrelevant. These variables are, as I have emphasized here, statistical descriptors of *operating outcomes*. So although Fair Isaac considered data drawn from personal credit files, the algorithm was not modeling risk as an independent property of individuals. It is noteworthy that scoring would only appear to become a technology of the individual in 1986, when scorecards became detached from firms and generic algorithms were implemented at central data banks called credit bureaus to create FICO® scores.

⁵⁰⁹ American environmentalist and systems theorist Donatella Meadows describes a simple experiment she contrived to demonstrate that behavior is a property of systems. In class, Meadows would hold up a Slinky toy, remove her other hand, and then ask students why the helical metal coil was bouncing up and down. When students pointed to the fact that she had removed her hand, she would take up the box the Slinky came in and repeat the experiment again. Held up without support from below, the box, of course, did nothing. Meadows' point was that the capacity to execute predictable and repetitive motion was a property of the spring itself. "This", Meadows noted, "is a central insight of systems theory". Donatella Meadows, *Thinking in Systems, a Primer*, ed. Diana Wright (White River Junction: Chelsea Green Publishing, 2008), p. 1..

⁵¹⁰ Other sciences, such as behavioral economics, model the performance of people where the individual's brain is conceived of as an information processor. For a science studies account of neuro-economic models and how these have become tools for policy interventions see Natasha Dow Shull and Caitlin Zaloom, "The Shortsighted Brain: Neuroeconomics and the Governance of Choice in Time," *Social Studies of Science* 41, no. 4 (2011). For an ethnographic account of an attempt to combine neuro-economics with behavioral genetics see Alison Cool, "Translating Twins: Twin Research and the Production of Economic and Genetic Knowledge in the Swedish Welfare State" (New York University, 2012 (forthcoming)).

⁵¹¹ Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge: Harvard University Press, 2002).

complex social negotiations when sorting credit applicants, but just as Knight advocated, credit scoring obviated the question of understanding credit evaluation.

The scorecard is a machine of replication that regularizes the overall output of an operating unit. The technology reselected for types of cases that will thrive within the existing credit environment as it had been designed and created by credit professionals. As the scorecard ploddingly replicates the past, however, it also offers credit managers a way to adjust statistically projected credit outcomes. It is a rudder for steering the system's overall performance without reevaluating operating procedure. In other words, credit scoring shifts the managerial objectives shift towards the governance of default risk, but leaves the guts of the preexisting credit production process conserved, untouched. What credit managers see if they focus on scores are projected production outputs and what they control is the risk level of the credit cases they accept as inputs. Operating policies continue to function to produce these outcomes but from a managerial perspective these bureaucratic activities are removed from the field of vision. Credit control rescinds into a black-box.

Fair Isaac never attempted to tinker with credit policies and did not claim to have expertise in the art of credit underwriting. The scorecard algorithm modeled results, but it did not describe, understand or improve upon the underlying production practices that led to credit outcomes. This is why a credit score is not knowledge, if by knowledge we mean a description that interprets, represents, and preserves the likeness of an entity, process or system. Like a scrawl on a calendar at the dentist, or the ticket that gives my order to a short-order chef, a score communicates a message that moves organizational processes forward. It tells the dentist when I'll arrive for my appointment or the short-order chef how I want my eggs, but it does not describe what will go on during the appointment or the

technique for preparing an omelet. Nor does it say anything about me that is relevant outside of these situated interactions⁵¹².

So what then, if anything, is a credit score predicting? The original custom scorecard might be said to have predicted the output of the routines and policies of the office for which it was built and implemented. In contrast to what we often assume predictive science is doing, looking to the past was a means of mechanically reinforcing a lender's established practices for managing credit cases. Fair Isaac did not look into paper records to divine what would happen in some unknown, open-ended and unstructured future that lies outside the influence of a lender's purposeful actions. Credit scores rank ordered cases according to the likelihood that default might result given how a credit operation engaged in production, that is to say, how it treated and processed credit cases.

The custom scorecard predicted the credit outcomes that would be fashioned by mid-century finance companies. These numbers assessed the likely results of a loan that was processed within bustling operating units filled with desks and moving file folders, scurrying personnel and ringing telephones. *They communicated the risk produced by a specific organizational system*⁵¹³ whose interior features were architected by conscientious credit operators working within the boundaries of government policies. The scorecard introduced an element of reproduction into internal bureaucratic processes and then predicted the outcome of mechanically enhanced activities. This historical observation—that predictive information

⁵¹² Is the statement "I'll have an omelet," predictive information? It might be if you say it at a diner where the statement triggers a set of actions from the server to the kitchen to make the omelet for you. It's not a predictive statement if you say it in the park or at the carwash. Another good example of operating information is the number that drops down on the screen at Whole Foods check out line. The number tells you which till to go to. It creates situated order that spurs action without making a statement about you that is of any relevance outside of that moment.

⁵¹³ Michael Power, *Organized Uncertainty: Designing a World of Risk Management* (USA: Oxford University Press, 2009).

refers to and reflects how an operation works as a constructed artifact in three-dimensions⁵¹⁴—gives us reason to think about the relationship between operating control in business and economic prediction.

Like one domino placed to hit another as it falls or the reliable click of my electric kettle as it rolls to a boil, operating systems might be engineered to perform consistently. And probabilistic information could potentially provide a window on how such a system is likely to perform.

Future research: Operating control founds modern finance

The story of the Fair Isaac scorecard tells only the beginning of how the consumer finance industry spawned by small loan laws has been restructured to support command and control principles. What remains to be understood is *how* scoring information bolsters financial productivity. Although the art of financing is as old as the hills⁵¹⁵, there is rising concern that its importance is expanding in a general movement called ‘financialization’⁵¹⁶. Most research traces ‘modern finance’ to the big ideas of financial theorists and mathematicians⁵¹⁷. What I demonstrate is that modern finance is also the result of infrastructural projects that are progressively attempting to enclose the world into technically

⁵¹⁴ In other words, operating systems are to risk assessment as Nancy Cartwright’s nomological machines are to the laws of nature. Nancy Cartwright, *The Dappled World: A Study of the Boundaries of Science* (Cambridge: Cambridge University Press, 1999). I am reminded here of the following passage that describes Boyle’s infamous air pump: “the physical integrity of the machine was vital to the perceived integrity of the knowledge the machine helped to produce” Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump* (Princeton: Princeton University Press, 1985), p. 30.

⁵¹⁵ Niall Ferguson, *The Ascent of Money* (New York: Penguin, 2009), David Graeber, *Debt: The First 5000 Years* (New York: Melville House, 2011).

⁵¹⁶ Greta Krippner, "The Financialization of the American Economy," *Socio-Economic Review* 3 (2005).

⁵¹⁷ Perry Mehrling, *Fischer Black and the Revolutionary Idea of Finance* (New York: Wiley, 2005).

constructed spaces⁵¹⁸. Monitoring devices such as scorecards communicate the potential results of action taken inside these semi-automated enclaves.

A key characteristic of modern finance is how it deploys information technology to transform the future into a site of military control and industrial productivity. In other words, modern finance modifies the relationship between time and economic value⁵¹⁹ so that acting upon ‘risk’ (potential future outcomes) signals opportunity, enterprise and added value⁵²⁰. Instead of hoarding actualized value to secure our forthcoming existence, the objective of contemporary finance is to draw resources from the future into present circulation. Innovative financial activities combine predictive modeling with contract law and techniques of accountancy to pursue sources of as yet un-actualized value⁵²¹. This shifting orientation towards time distinguishes conservative financial techniques such as insurance, saving and trusts, from volatile financial arrangements, in which projected value get booked and traded to create current liquidity⁵²².

The continuation of this research will be to trace how, as a technology that facilitates modern financial practices, credit scoring has profoundly modified the loan production process. My future research will show how, as credit scoring developed, it has transformed

⁵¹⁸ Edwards, *The Closed World*.

⁵¹⁹ An increasing number of scholars have observed that in finance, a future that does not exist is built and acted upon out of information. This information is not knowledge because it does not represent any external reality, and some have gone as far as to liken this future to a kind of literary fiction. See in particular Elie Ayache, *The Blank Swan: The End of Probability* (New York: Wiley, 2010), Annelise Riles, *Collateral Knowledge, Legal Reasoning in the Global Financial Markets*, ed. John Tryneski, *Law & Society* (Chicago: University of Chicago Press, 2011). There is an important distinction to be made, however, between future predictions that have no empirical basis, and operating information which has an empirical basis in a material system.

⁵²⁰ Power, *Organized Uncertainty: Designing a World of Risk Management*.

⁵²¹ Riles, *Collateral Knowledge, Legal Reasoning in the Global Financial Markets*.

⁵²² The class of financial products called derivatives might be described as financial products that import value from temporally as opposed to geographically distant places, they are a means of colonizing the future. I use the word colonize quite literally with reference to the mercantilist process of moving goods around from one place to another.

U.S. consumer credit into a booming market for freestanding retail products⁵²³. Only a hundred years ago, consumer credit was retail credit, a handcrafted arrangement negotiated between a borrower and a lender and a method merchandizing that offered delayed payment on consumer durables. Today, giving people access to liquid cash has become, in and of itself, a financial product. So although, as many authors contend, credit has always been with us, it has not always existed in this all-consuming format. In the hands of financiers the scorecard allows the risk produced by financial operations to become a primary material that can be shaped into a tradable product by crafty financial operatives and their lawyers.

My overarching research objective is to explain the technological foundations of U.S. consumer credit dependency⁵²⁴. I would like to show that the consumer credit boom is not simply a result, as some economists and institutional scholars have claimed, of lax underwriting standards or heightened appetite for credit in the American culture. In other words, the phenomenon of consumer credit use in the U.S. is not just a question of changing credit volume. Rather, the amplification of credit in the U.S. is due to a qualitative and strategic shift in production, a major material transformation in what the U.S. credit industry can do to broker credit relations between individuals and institutions. FICO[®] is a critical piece of productive infrastructure that allows the financial markets to extract contingent value from consumer lending, in the absence of collateral or a claims on property.

The contemporary FICO[®] system is an inter-firm information system that descends from the relatively simple intra-firm scorecard examined here. It ranks among the great

⁵²³ By freestanding I mean bank and monoline credit cards (cards from companies that only lend but do not take deposits) where the credit is not attached to a particular retailer or a specific good.

⁵²⁴ There are many works in both academia and journalism that attempt to explain consumer credit use in the U.S. The best explore the rise of consumer credit institutions or products, but none explore changes in technical practices inside the industry. See for example Louis Hayman, *Debtor Nation: The History of America in Red Ink* (Princeton: Princeton University Press, 2011), Manning, *Credit Card Nation: The Consequences of America's Addiction to Credit*.

exemplars of American economic engineering on par with the interstate highway or the electrical grid. Through these freely circulating credit scores, the financial industry is able to manufacture, handle, package, transport and export U.S. consumer credit risk as though the expected consistency of operating practice was a kind of industrial substance. Analytic information from Fair Isaac about how the credit system is expected to process its contracts secures their value in international capital markets. In the hands of financiers a tool of mechanical replication becomes both a filter and a faucet of expected future value⁵²⁵.

FICO[®] serves an operating function. It is not a passive intellectual technology that looks onto an externalized or naturally occurring marketplace. In providing information to market participants about the overall state of the U.S. consumer credit markets, it acts as a piece of capital machinery that permits and sustains industrial-strength U.S. consumer credit productivity. It is no coincidence, for example, that when Freddie Mac and Fannie Mae endorsed FICO[®] as a standard in mortgage underwriting in 1995 (which brought credit scores to the attention of consumers), nonprime mortgages funded by capital markets and issued by private label lenders proliferated⁵²⁶. Treating FICO[®] as geographically specific infrastructure of financial production accounts for why the flow of consumer credit risk is overwhelmingly in one direction: from U.S. consumers, to international investors⁵²⁷.

⁵²⁵ Mary Poovey and co-author Kevin Brine are writing a history of financial models that begins with Irving Fisher's work to value future dividend streams.

⁵²⁶ One leg of this argument appears in an article published in 2009 entitled *From New Deal Institutions to Subprime Markets*, in which I discuss how the pivotal endorsement of FICO[®] as an underwriting standard for mortgage underwriting by Freddie Mac and Fannie Mae in 1995 led to the proliferation of exotic, subprime mortgages issued by private label lenders. Poon, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance."

⁵²⁷ The FICO-system—to invoke Chandra Mukerji's book title—is a territorial feat of 'impossible engineering'. Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal Du Midi* (Princeton: Princeton University Press, 2009). Mukerji's narrative task, however, is quite different from mine. The Canal du Midi is a visually and physically stunning achievement illustrated in maps and carved into the French countryside. In contrast, even though it should be considered an altogether similar feat of engineering from the point of view of distributed practice, the grandeur of the FICO-system is all but

The anti-authoritarian politics of market information

This dissertation has argued that the financial world is being developed through a massive restructuring of business through operating control and information technology. As an isolated statement, however, this observation does not tell us much about how this process is unfolding as a political project⁵²⁸. The politics of the information matter immensely if we are to comprehend that markets fueled by information are human-made constructs, and not, as per economic theory, natural entities that are progressively unshackled from socially imposed restrictions. If critics are to defeat the intellectual hegemony of universal economic thinking they will have to do much more than harass economists for inadequately representing economic markets in their theories. In order to effectively confront the agenda of professional economics, research must convincingly demonstrate the myriad political processes that are pushing the transition towards information-based markets at the ground level.

Commercial technology providers play an important role in the laborious project of renovating industry to adopt information systems. That is why I have repeatedly emphasized the scorecard's private origins. The story of Fair Isaac is both business history and a history of technology. Two separate business endeavors must be synched for credit scoring to emerge as the new infrastructure of consumer finance. The first is the business of

hidden. While Mukerji seeks to dissolve a solid piece of infrastructure into an array of distributed activities, I have tried to reconstitute an entrenched system that has progressively receded from sight. It is important to note that when the Canal du Midi was constructed it reinforced the central power of the state, whereas privately-owned FICO[®] undergirds the activities of capital markets. Science studies has yet to examine how distributed technical projects—identical from the point of view of our theory and method—give rise to historically oppositional forms of power. The social studies of finance raises this challenging question.

⁵²⁸ The following section gives the state an overt role in Callon's performativity thesis. The role of the state is more difficult to decipher in the U.S. than in France where engineering and innovation remain the province of state-sponsored technocrats.

selling scorecards to the consumer finance industry. The second is the business of consumer finance, which must figure out how to use the technology to innovate credit products. Thus, two industries are interconnected in sequence such that a market for risk management technology feeds new productive capacities into a primary industry. This configuration fits the definition of free market innovation in which technology is developed and distributed through exchanges in an open and competitive marketplace.

Fair Isaac's standard narrative of its own success is that the technology survived because of its obvious utility for reducing default rates and improving credit quality. But they also admit that the scorecard was a big flop in the open market. When left on their own to assess the device prospective users judged the technology to be totally uninteresting. The technology was not faulty—it performed the task it set out to do (Chapter 3)—but it lacked value to the business community because it provided an unfamiliar kind of efficiency. Before the scorecard could make risk the new form of business efficiency, it would first have to meet the established 19th century definitions of cost efficiency on their own terms. It would have to make itself economically attractive within the reigning economic paradigm. Fair Isaac redesigned the scorecard so that users did not need to purchase credit bureau reports to calculate scores (Chapter 2). This distributed the burden of purchasing the technology, but only assisted the largest lending firms.

In the end, what made Fair Isaac technology affordable was the added burden of complying with civil rights regulation. In Chapter 4, I describe how ECOA policies imposed at the federal level changed the cost of operations across the entire credit industry. The law created the conditions under which the hefty price tag of credit scoring technology was outweighed by the threat of punitive action should consumers begin to pursue lenders they

felt had acted in an illegal fashion. Given that the federal government had already accepted statistical evidence to determine whether illegal discrimination was occurring in employment, the scorecard was well suited to the pressing administrative problem introduced by equal credit opportunity legislation. Probabilistically expressed default risk has infiltrated credit markets in a rather surprising fashion. Lenders did not adopt the technology because they wished to become more efficient at parsing out risk. They adopted it only in situations where it promised to offset recognized expenses.

Blanket intervention by a strong federal government was the only force powerful enough to synch a market for information with its target industry (consumer financing). Because federal regulation applied across the board, without exception, the cost equation for Fair Isaac technology was immediately inverted for all types of lenders. But strictly speaking, the U.S. government has never endorsed credit scoring or risk management as a superior form of credit screening. The mandate of elected representatives was to ensure that individual worth was being respected in the markets. Politicians were shocked to learn that lenders made recourse to statistics. Federal economists, to the contrary, supported statistics behind the scenes but could not recommend scoring without implicitly disadvantaging small businesses. These economists concluded that natural competition in credit markets to properly screen risk would eventually move lenders towards credit scoring. Yet, it was in fact state policies that incentivized market agents to adopt Fair Isaac technology⁵²⁹.

⁵²⁹ Greta Krippner has argued that U.S. policymakers turned towards financial markets in the 1970s because they were unwilling to make the tough political decisions to solve distributional conflicts. Her compelling book gives a detailed account of what was at stake in policy debates, but assumes that credit markets were already 'out there' passively waiting to be turned on like a 'tap'. Greta Krippner, *Capitalizing on Crisis: The Political Origins of the Rise of Finance* (Cambridge: Harvard University Press, 2011). Louis Hyman makes similar arguments about how and why state policies facilitate consumer and mortgage credit. Louis Hyman, *Debtor Nation: The History of America in Red Ink* (Princeton: Princeton University Press, 2011). Neither of these authors explores the politics of market construction, the technical

What was immediately at stake when legislators set up the conditions that regularized the use of credit scoring?—A political attempt to define the democratic terms of fair credit access. Privately developed credit scoring technology has been sold to the consumer finance industry and has dramatically altered its business objectives. But the reasons this happened is because military operating techniques could assist the credit industry to minimize the cost of upholding anti-discrimination policies. Before scorecards could remake markets from a financial standpoint, they first had to improve it from a political standpoint: by stomping out the indiscriminate exercise of authority by credit managers. Credit scoring was managerial technology used for regulatory compliance (operating consistency) before it was a tool of financial productivity (economic prediction). The move towards screening consumers through risk assessment was implemented on the back of state action, but—and this is important—without state sanction.

The shift towards the mechanical control provided by credit scoring has occurred in consumer credit for precisely the reasons legal anthropologist Annelise Riles has suggested—not because market actors rush to embrace risk assessment, but because of a popular anti-authoritarian project to rid markets of the corrupting influence of human beings. As Riles eloquently puts it, automation is a means of ‘unwinding technocracy’⁵³⁰. Automation

innovations necessary to develop financial markets. Relatively easier access to data about government policy than about private innovation perpetuates an important descriptive asymmetry in our accounts of how finance is progressing. It is difficult to study the activities of private enterprise which, unlike the U.S. government, do not invite scholarship or keep publicly accessible archives of its practices.

⁵³⁰ Riles observes that in trading rooms in Japan, technical apparatuses have been implemented to replace “the bureaucratic coordination that was the very hallmark of technocratic intervention, [...] with millions of discrete and individualized units of rights and obligations, now processed automatically by machine”. Riles is concerned with why Japanese government bureaucrats agreed to step back and self-efface in the late-1990s. Her book describes the “self-cannibalization of bureaucratic coordination and policymaking” by regulators who no longer trust themselves in the wake of the Asian financial crisis. Riles, *Collateral Knowledge, Legal Reasoning in the Global Financial Markets*. For a review of this book see Martha Poon, “Collateral Knowledge, Legal Reasoning in the Global Financial Markets,” *American Anthropologist* (2012, forthcoming).

empties markets of injudicious figures like the finance company ‘credit man’ who, when left to his own devices, could make decisions that were more tied to his own social biases than they were to credit justice or the fair assessments of individual creditworthiness. Riles points out that bipartisan support of anti-authoritarianism closely coincides with a politics of markets in which the potential failure of human beings, whether in the public or the private sphere, is perpetually suspected⁵³¹.

Advocates of neoliberal ideals argue that markets can only flourish when market participants are free to define for themselves what is economically valuable. This is why, in so-called free markets, centralized bureaucratic bodies are not allowed to set prices or tamper with the assessment of asset or credit quality. This restricts the kinds of moves the state can make to participate in markets or, for example, to impose prudential regulation⁵³². In rational markets, information is assumed to be available to everybody and decision-making is distributed. Self-regulation through access to information, however, does not amount to deregulation. Rather, self-regulation reconfigures the state’s relationship to market activities where the solution is often to regulate in ways that push market participants to seek out more and more information. This means engaging with more information technology⁵³³.

At the time of the ECOA, Fair Isaac was the lone pioneering provider of credit scoring systems. The company’s dominant position in the market for consumer risk analytics dates back to this period when it scrambled to fill the initial burst of demand. The

⁵³¹ It is perhaps not surprising that Hayek’s views of the market have been endorsed by a working group signing in the name of the ‘Occupy London’ protest. David Dewhurst, Peter Dombi, and Naomi Colvin, "How Hayek Helped Us Find Capitalism's Flaw," *Financial Times* January 25, 2012.

⁵³² For an account of how the SEC used bond ratings (from S&P, Moody’s, Fitch...) to communicate prudential investments standards without imposing a bureaucratic definition of investment quality on markets see Poon, "Chapter 13. Rating Agencies."

⁵³³ Michael Power has argued that what defines the age of risk is that corporate governance forces companies to turn themselves ‘inside out’, that is, to report information about internal operations. Power, *Organized Uncertainty: Designing a World of Risk Management*.

FICO® franchise of today is deeply rooted in this peculiar convergence—between a blanket regulatory environment that made all lenders seek a method of statistical operating control, and a singular commercial provider of a candidate technology⁵³⁴. The downstream result is a U.S. consumer credit market that booms, but only because it defies Hayekian ideals about the efficiency of decentralized information gathering while at the same time appearing to fulfill them. FICO appears to be a headless source of freely circulating market information.

Fair Isaac exemplifies the new figure in the ostensibly distributed and anti-authoritarian world governed by financial information—the figure of the private information authority, anchored in place by a web of material and regulatory constraints that make it the provider of choice in the markets for information. If the market is able to value and trade consumer debt despite the fact that risk is the disparate quality of financial operations, it is only because Fair Isaac has managed to implement a standardized assessment as well as a common understanding of what that risk means, across market participants⁵³⁵. Yet strictly speaking, FICO is a command and control structure. Only instead of being presided over by a military commander, government technocrat, or elected official acting in the name of national sovereignty or the public interest, the system is managed by a corporate board of directors that nurtures it for profit on behalf of shareholders and business partners.

⁵³⁴ This is not to underplay the contractual arrangements that Fair Isaac managed to negotiate with all of the credit bureaus in the 1980s which undergird them, but it is to emphasize just how many layers of contingent history lie beneath the contemporary FICO® franchise.

⁵³⁵ The uniformity of FICO® and its responsiveness to individual level data makes risk appear to reside on the side of the consumer, and not in the systemic complexity of industrial credit markets.

Conclusion—What Lenders See

Credit scores have been designed and manufactured by Fair Isaac for their customers, the financial institutions. So whose scores are they? They're the financial industry's! The central finding of this research is that the propensity of default reflected in credit scores is neither the property of naked individuals, nor the stochastic outcome of an inherently uncertain future. Default risk is the material property of how a credit system—composed of underwriting practices, loan product arrangements, competitive lending firms, as well as interactive techniques of case management—is shaped by regulations but largely structured by credit industrialists. The consumer financial industry does not face financial risk, it mass-produces financial risk within controlled environments. Credit scores have no meaning outside the structure of financial enterprises because the risk they capture is an operating outcome of industrial strength financial activities.

This is not how the scores are portrayed to the public. In 2009, *freecreditreport.com* came out with a series of ads featuring an animated credit score that runs about in the form of a dog complete with a bouncing red bow. When the score is a '509' it is a bad dog that soils the rug and chews pantlegs—"Mom! Get it off!" shouts a child. "I guess it's because I wasn't watching it" says the hapless mother. But by monitoring her score daily, the woman tells us, she has gained the confidence to look after it. Nose-to-nose with the newly tamed beast on her lap, she lovingly tells it "Who's a good 745? You're a good 745!" while stroking the cross stroke of the 7 as one would the snout of a favorite pet. The '509' and the '745' are different numbers but they represent the same creature, an externalized but intimate domestic presence that is supposedly attached to you and is responsive to your behavior.

The message from advertisers is loud and clear: this is very much *your* score⁵³⁶.

*my*FICO[®], the first web portal that provided credit scores to individuals for a monthly fee, set the stage for how scoring information would be perceived by the public at large: as an indicator of personal, not systemic or organizational behavior. This helps to explain why Fair Isaac initially had such a hard time showing scores to people like you and me—because the information they’re selling pertains to the internal functioning of a complex industrial apparatus that we are tied to, and participate in, but can not see and do not operate. The name of the first consumer-oriented product Fair Isaac rolled out at Super Bowl[®] 2003 is an effective marketing tool if the objective is to sell scores to consumers, but it is a complete misnomer from the point of view of description. *their*FICO[®] would be a far more accurate name for a score that allows lenders to assign you a position inside the credit system they have collectively built.

FICO[®] is operating information that offers predictive statements about the behavior of the overall consumer financial system⁵³⁷. What lenders see when they look at FICO[®] scores is a reflection of the internal activities of the credit industry. The relationship of the credit industry to your home, your life, and your family—that’s what you see.

⁵³⁶ Jeanne Lazaurus has done an equivalent reading a series of ads featuring the green bonhomme created by the French consumer finance company, Cetelem. This character, who appears all over the Paris subway system, is portrayed as a constant companion to the household. But as a sign that consumer credit use is meant to be kept private, the bonhomme remained discreetly concealed behind the drapes. Both the U.S. and French ads acknowledge that credit entities are omnipresent in the home, but the way these relationships are portrayed illustrates the cultural and organizational difference between the two countries. The hiding bonhomme in France represents an entrenched relationship with a financial institution. The score-as-pet in the U.S. embodies the relationship of the consumer to credit markets that is visible through an open system of inter-organizational credit control. For more on how relationships with pets embody a version of the cyborg relationship, see Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Chicago: Prickly Paradigm Press, 2003).

⁵³⁷ The purpose of this dissertation is to examine and elucidate a credit scoring system’s technical function: to perform operating information. This research does not seek to evaluate whether FICO scores (or any other Fair Isaac system) is adequately performing this function.

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