Knowing the Score:
New Data, Underwriting, and Marketing in the Consumer Credit Marketplace

A Guide for Financial Inclusion Stakeholders

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October 2014

This report was prepared by Robinson + Yu with support from the Ford Foundation.

Version 1.1 (October 29, 2014)

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Executive Summary

“New kinds of data are flowing into the computerized decisionmaking systems that determine who gets access to credit, and on what terms.”

This report describes two important ways that new data and technologies are changing the American consumer credit marketplace.

First, new kinds of data are flowing into the computerized decision-making systems that determine who gets access to credit, and on what terms. This “alternative data” has the greatest impact on financially underserved consumers, whose creditworthiness is not well described in traditional credit reports. Credit bureaus have begun to receive certain kinds of mainstream alternative data — such as a consumers’ monthly bill payments — that are similar in kind to the monthly credit payments that have long been commonly included in credit files. This data has the potential to expand the accessibility of mainstream credit. But at the same time, a much wider spectrum of alternative data, which we refer to as fringe alternative data, is being used by some companies to underwrite financial products (especially when a full credit report is unavailable). The predictive value and fairness of fringe alternative data is unproven.

Second, credit data is being modified and sold for unregulated marketing purposes, despite the fact it was originally gathered for underwriting purposes (and thus originally subject to the regulatory strictures of the Fair Credit Reporting Act). To avoid regulatory limits, credit bureaus sell slightly aggregated information, such as the financial circumstances of a household, rather than an individual. This data can be used to target products to groups of consumers with great precision, based on the financial health of their household or neighborhood. Credit bureaus have sold such marketing data for some time, but the data’s use in online contexts is a more recent development.

This report offers three recommendations. First, we recommend that advocates seriously consider advancing the inclusion of mainstream alternative data into credit files. This new data can make more consumers “scorable” within the mainstream financial system, but must be handled carefully so as not to undermine important public policies or cause disproportionate harm in non-credit contexts. Second, we advise caution concerning credit scoring models that rely on fringe alternative data, whose predictiveness and fairness has yet to be publicly demonstrated. Finally, we urge regulators to intensify their scrutiny of online marketing practices that rely upon credit data. Technological constraints make it difficult for outside observers to understand the impact of online marketing on financially underserved individuals; regulators must play a fact-finding role.

I. Introduction

Data has always been at the heart of consumer credit.[1] Before World War II, merchants rarely sold on credit absent a positive personal relationship with the consumer.[2] However, throughout the 1950s and 1960s, a network of local "bureaus" arose to provide lenders with more data about consumers, gathered through interviews and other labor-intensive techniques. In the decades following, new regulations and the computerization of bureaus' files drove a rapid consolidation of the industry. These trends culminated in the "big three" credit bureaus that we know today: Experian, Equifax and TransUnion. By 1999, American Banker reported that "no [human being] even looks at any [credit request] for $50,000 or less — the computer does it all."[3]

Today, credit bureaus, lenders, and marketers have powerful new tools. They can collect, store, and analyze data at a scale that is hard to fathom. As a result, advocates in the financial inclusion community — who are the target audience for this report — have expressed concerns about the renewed potential for discrimination and other unfair behaviors in consumer credit markets. But there is also hope that these new innovations will benefit the 22% of Americans who are classified as financially underserved,[4] much as the rise of traditional credit scoring models improved the availability and affordability of credit.[5]

This report is an effort to strengthen financial advocates' ability to map their work onto this new and evolving technological landscape. It focuses on two important changes in the American consumer credit marketplace that stem from new data and technologies. First, new kinds of data are flowing into the computerized decision-making systems that determine who gets access to credit, and on what terms. Second, credit report data is being modified and sold into the unregulated "data broker" industry and used to target marketing for a variety of consumer products. We explore both of these trends, explaining the technologies underlying them and discussing their impact.

This report offers three recommendations. First, we recommend that advocates seriously consider advancing the inclusion of mainstream alternative data into credit files. This new data can make more consumers "scorable" within the mainstream financial system, but must be handled carefully so as not to undermine important public policies or cause disproportionate harm in non-credit contexts. Second, we advise caution concerning credit scoring models that rely on fringe alternative data, whose predictiveness and fairness has yet to be publicly demonstrated. Finally, we urge regulators to intensify their scrutiny of online marketing practices that rely upon credit data. Technological constraints make it difficult for outside observers to understand the impact of online marketing on financially underserved individuals; regulators must play a fact-finding role.

"This report is an effort to strengthen financial advocates' ability to map their work onto an evolving technological landscape."

1. *See* Appendix A.

2. *See generally* Robert H. Cole, Consumer and Commercial Credit Management 184 (8th ed. 1988).

3. *See* Paul Nadler, *Weekly Adviser: Horror at Credit Scoring Is Not Just Foot-Dragging*, 164 Am. Banker, no. 211, Nov. 2, 1999, at 9.

4. *See* Matthew B. Gross, Jeanne M. Hogarth & Maximilian D. Schmeiser, *Use of Financial Services by the Unbanked and Underbanked and the Potential for Mobile Financial Services Adoption*, Fed. Reserve Bull. (2012), http://www.federalreserve.gov/Pubs/Bulletin/2012/pdf/mobile_financial_services_201209.pdf.

5. *See generally* Board of Governors of the Federal Reserve System, Report to the Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit (Aug. 2007) [hereinafter FRB Scoring Study], *available at* http://www.federalreserve.gov/boarddocs/rptcongress/creditscore/creditscore.pdf. For more on this study and its conclusions, *see* Section IV.

II. Concepts and Context

This section outlines key concepts and terminology used throughout the report.

Federal Financial Regulations

We assume the reader is familiar with major federal financial regulations, including the Fair Credit Reporting Act (FCRA) and the Equal Credit Opportunity Act (ECOA). Both are summarized in the appendixes to this report.[6] The FCRA, passed in 1970, seeks to ensure that credit bureaus (and other statutorily-defined "consumer reporting agencies" that sell data for certain decisionmaking purposes) maintain relevant, accurate data, and that such data is used only for certain permissible purposes.[7] The ECOA, enacted in 1974, is designed to prevent creditors from unfairly denying credit opportunities to qualified borrowers on account of a "prohibited basis" such as the borrower's race or age.[8] It generally bars creditors from considering a prohibited basis in any system that evaluates the creditworthiness of applicants.

Credit Scores v. Marketing Scores

"Scoring" is a broad concept. Many use the term "scoring" to refer to credit scores — scores used to evaluate individuals' creditworthiness. But today, the word sweeps more broadly. For example, a widely quoted New York Times story described a new crop of "consumer evaluation or buying-power scores . . . [which are] highly valuable to companies that want — or in some cases, don't want — to have you as their customer."[9] A report from Privacy International inventoried a variety of "consumer scores" — some of which, like an assessment of online social media influence, range far beyond the financial industry — and urged that all of these should be federally regulated.[10] And at a 2014 FTC workshop on "Alternative Scoring," regulators acknowledged a "very big fuzzy space in between the loyalty marketing and when you get into [FCRA] eligibility."[11]

Broad usage of the term "score" accurately captures the idea that a growing range of data sources are being pulled together to evaluate and classify people for a growing range of purposes. But major legal and practical differences continue to separate true credit scores from the growing variety of unregulated scores used for other purposes.

In this report, we will explore both credit scores and marketing scores. The key distinction lies in how they are used. A credit score is used to underwrite consumer financial products — to decide how much credit to offer to an individual, and on what terms — and describes a single individual. A marketing score, on the other hand, is not used to underwrite consumer financial products, though it may be based upon information that is relevant to a consumer's finances. As we explain in Section IV, marketing scores can be used to target advertising online and change the appearance of web pages as consumers navigate the web.

Our definition of a "credit score" is closely, but not precisely, aligned with a score that would count as a "consumer report" under the FRCA. Unfortunately, the FCRA's definitions and scope are complex in ways that cannot be easily summarized. New industry practices, and counter-intuitive limits in the scope of the FCRA, mean that it is no longer safe to assume that all scores that might reasonably be thought of as credit scores (as we define them) are FCRA-regulated.[12]

Bureaus, Data, and Models

We use the term "credit bureaus" to refer to the large, national credit bureaus — Equifax, Experian, and TransUnion — and similarly-situated businesses that sell credit data or credit scores.

We use the term "baseline credit data" to describe data that is typically fully reported to credit bureaus — i.e., data that is furnished to credit bureaus regardless of whether it is "positive" or "negative." Generally speaking, baseline credit data consists of a person's history of banking, borrowing, and repayment. "Mainstream alternative credit data" (e.g., monthly bill payments) resembles baseline credit data in that it is a continuous stream of payment information furnished directly by the consumer's counterparty, but differs in that it is not typically fully reported to the national credit bureaus. And "fringe alternative data" (e.g., social networking data) does not resemble baseline credit data and is not generally fully reported to credit bureaus.

Credit scores are built using statistical models, which we categorize based on the types of data they use. "Traditional models" consider only baseline credit data. "Mainstream alternative models" also incorporate at least some mainstream alternative data (when scoring consumers whose files contain such data). And "fringe alternative models" incorporate at least some fringe alternative data. The industry often calls fringe alternative models "alternative credit decisioning tools" (ACDTs).

The following tables summarize the key terms described above.

6. *See* Appendices B and C.

7. *See* Appendix B.

8. *See* Appendix C.

9. Natasha Singer, *Shoppers, Meet Your Scorekeeper*, N.Y. Times, Aug. 19, 2012, at BU1, *available at* http://www.nytimes.com/2012/08/19/business/electronic-scores-rank-consumers-by-potential-value.html.

10. *See* Pam Dixon & Robert Gellman, The Scoring of America: How Secret Consumer Scores Threaten Your Privacy and Your Future 27 (Apr. 2, 2014) (defining "consumer scores" as any "scores that describe an individual or sometimes a group of individuals (like a household), and have a demonstrated ability to predict one or more consumer behaviors or outcomes."). The report urged that all such scores be federally regulated, *Id.* at 84-85 ("The protections consumers receive with respect to credit scores need to be expanded to all consumer scoring, and the rules for credit scores may warrant some reexamination as well.").

11. *Spring Privacy Series: Alternative Scoring Products*, Federal Trade Commission (Mar. 19, 2014), http://www.ftc.gov/news-events/audio-video/video/spring-privacy-series-alternative-scoring-products.

12. For example, a score generated by an online lender, based solely on information gathered firsthand from an individual, would meet our definition of a "credit score," but would not be considered a "consumer report" under the FCRA. *See* Appendix B.

Figure 1: Data Flows and Scoring Models in the Consumer Credit Marketplace

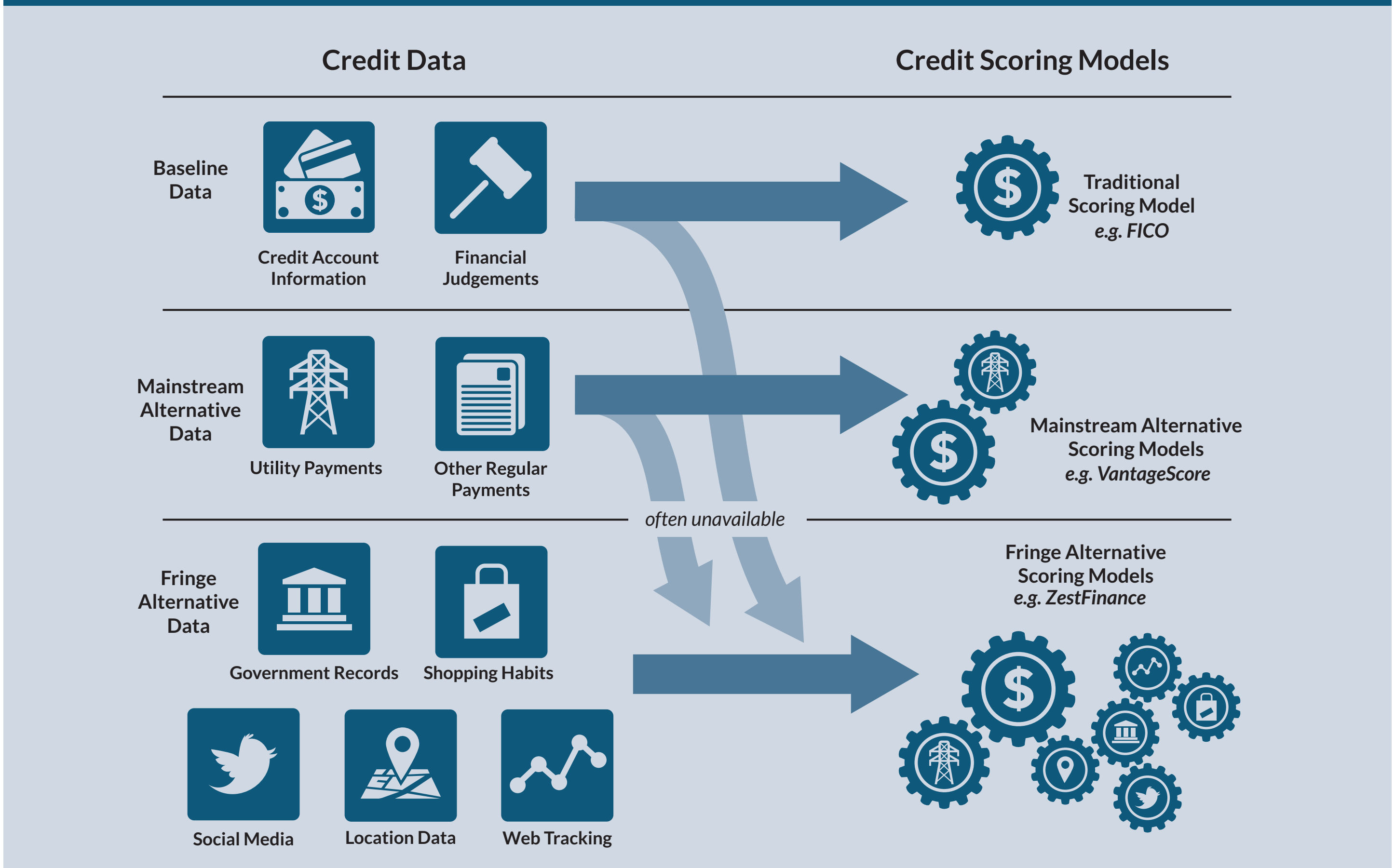

Table 1: Types of Data

Credit Data
Data Collected or Used for Underwriting Purposes

- **Baseline Credit Data**
  Data typically fully reported to the national credit bureaus (*e.g.*, credit card payments, mortgage payments).
- **Alternative Credit Data**
  Data not typically fully reported to the national credit bureaus.
  - *Mainstream alternative credit data*
    Data similar in kind to baseline credit data (*e.g.*, monthly bill payments). This includes data that is payment-related, reported by a furnisher who interacts with the consumer, and reported at regular intervals.
  - *Fringe alternative credit data*
    Data not similar in kind to baseline credit data (*e.g.*, criminal convictions, the number of friends the consumer has on a social networking site).

Marketing Data
Data Not Collected or Used for Underwriting Purposes

Table 2: Types of Scores

Credit Scores
Used for Final Underwriting Purposes

- **Traditional Models**
  Models that consider only baseline credit data (*e.g.*, standard FICO score).
- **Mainstream Alternative Models**
  Models that consider mainstream alternative credit data (*e.g.*, VantageScore).
- **Fringe Alternative Models (aka ACDTs)**
  Models that consider fringe alternative credit data (*e.g.*, Lexis RiskView, ZestFinance).

Marketing Scores
Not Used For Final Underwriting Purposes

- **Prescreening lists** (*i.e.*, FCRA-regulated marketing based on credit data, for specific purposes).
- **Scores derived from credit data** (*e.g.*, aggregated credit data)
- **Scores derived from non-credit data** (*e.g.*, data from online browsing habits).

“Non-credit uses of credit data are deeply concerning.”

An Important Disclaimer: Credit Scores’ Mission Creep

Credit data is used to make federally regulated, individualized decisions (what the FCRA calls “eligibility” decisions) in many non-credit contexts. For example, nearly half of employers reportedly check job applicants’ credit history when hiring, a practice that has been criticized as an illegitimate barrier to employment.[13] And thorny questions plague the use of credit scores for setting insurance rates.[14]

Non-credit uses of credit data are deeply concerning. As we describe in more detail below, industry-standard credit scores accurately reflect underlying differences in credit risk between racial groups, which are themselves a reflection of social disparities and years of economic, political and other biases against racial minorities. Using credit scores in non-credit contexts may do a grave disservice to minority populations.

This “mission creep” is an important topic that deserves continued study and advocacy, independently of the credit-specific recommendations contained in this report.[15]

13. *See, e.g.*, Amy Traub, Discredited: How Employment Credit Checks Keep Qualified Workers Out of a Job (2012), http://www.demos.org/discredited-how-employment-credit-checks-keep-qualified-workers-out-job.

14. *See* Chi Chi Wu & Birny Birnbaum, National Consumer Law Center & Center for Economic Justice, *Credit Scoring and Insurance: Costing Consumers Billions and Perpetuating the Economic Racial Divide* (June 2007), https://www.nclc.org/images/pdf/pr-reports/report-insurance-scoring-2007.pdf.

15. Amy Traub, *Credit Reporting “Mission Creep”: Home and Car Insurance*, Demos Blog — Policyshop (Jun. 29, 2011), http://www.demos.org/blog/credit-reporting-%E2%80%9Cmission-creep%E2%80%9D-home-and-car-insurance.

A credit score is a summary of a person's apparent creditworthiness that is used to make underwriting decisions. Credit scores are designed to predict the relative likelihood of a negative financial event, such as default on a credit obligation.[16] Lenders use credit scores as an important factor — often the only factor[17] — in making lending decisions. These decisions include whether to extend credit, the rates at which credit will be extended, and other terms of repayment. According to the Consumer Financial Protection Bureau (CFPB), "[a] good credit score can mean access to a wide range of credit products at the better rates available in the market, while a bad credit score can lead to greatly reduced access to credit and much higher borrowing costs."[18]

A credit score is a prerequisite for full participation in the mainstream U.S. financial system. Credit is "usually necessary to buy a home, build a business, or send your children to college."[19] Without a credit score, individuals are often rejected by mainstream lenders and must resort to "high cost lenders like pawn shops and payday lenders."[20]

This section explains how credit scores are made. We categorize credit scores based on the types of data considered by their underlying models. Traditional models consider only baseline credit data: data that is typically fully reported to the national credit bureaus. Mainstream alternative models additionally consider mainstream alternative data: data that is similar to baseline credit data, but not commonly fully reported. And fringe alternative models rely on fringe alternative data: any other type of data.

Although all credit models try to predict an individual's financial future, they can differ widely in terms of predictiveness and fairness. Traditional models and certain mainstream alternative models have undergone regulatory and statistical scrutiny of the highest order.[21] Fringe alternative models, on the other hand, are still shrouded in mystery.

"Credit models can differ widely in terms of predictiveness and fairness."

16. These predictions are time-limited — the most widely used scoring models predict the risk that such a negative event will occur in a two year period after scoring.

17. FRB Scoring Study, *supra* note 5, at O-1.

18. Consumer Financial Protection Bureau, The Impact of Differences Between Consumer- and Creditor-Purchased Credit Scores 1 (Jul. 19, 2011), *available* at http://www.consumerfinance.gov/reports/the-impact-of-differences-between-consumer-and-creditor-purchased-credit-scores.

19. Ashoka, *Banking The Unbanked: A How-To*, Forbes (Jun. 14, 2013, 12:43 PM), http://www.forbes.com/sites/ashoka/2013/06/14/banking-the-unbanked-a-how-to.

20. PERC, A New Pathway to Financial Inclusion: Alternative Data, Credit Building, and Responsible Lending in the Wake of the Great Recession 23 (Jun. 2012) [hereinafter PERC New Pathway], *available* at http://www.perc.net/wp-content/uploads/2013/09/WEB-file-ADI5-layout1.pdf.

21. *See generally* FRB Scoring Study, *supra* note 5.

Data Commonly Held by National Credit Bureaus

Traditional credit models — such as the one behind the familiar FICO scores — rely on a limited universe of financial data held by credit bureaus. Credit bureaus are stewards of a "broad range of continually-updated, detailed information about millions of consumers' personal credit histories."[22] These "credit records," which cover the majority of adults in the United States, are not the noisy "big data" of online analytics, social networks, and behavioral advertising. On the contrary, they are composed of financial data that is particular to one individual. Credit records are used to generate "credit reports," which are a core product of credit bureaus and the foundational ingredient of many credit scores.

The financial institutions that report data to credit bureaus are known as "furnishers." Furnishers include almost all commercial banks, savings associations, and credit unions, and most finance companies and major retailers.[23] Furnishers transmit billions of pieces of information to bureaus each month, mostly through a standardized digital format specific to credit reporting. They provide this data because they benefit from credit reporting and because bureaus often require that they do so in exchange for access to credit scores.

We call this data — data that is typically fully reported to the national credit bureaus — baseline credit data. It includes the following:

Table 3: Baseline Credit Data

Type of Data	Examples
Identifying Information	An individual's name, birth date, current and previous addresses, and social security number.
Credit Account Data (furnished by creditors)	Types of accounts (credit cards, auto loans, student loans, mortgages, etc.), dates the accounts were opened, credit limits or loan amounts, account balances, and payment histories.
Payment-Related Public Record Data	Bankruptcies, foreclosures, tax liens, wage attachments, and civil judgments.
Histories of Collections Activities	Dates accounts or debts were turned over to collection agencies, amounts currently owed, names of the original creditors.
Inquiry Record	Dates of inquiry, identification of requestors, and reasons for inquiry.
Limited Payment History from Some Utilities and Other Sources	Total amounts outstanding and a history of timely or late payment. This information is often incomplete, and is not incorporated into traditional credit models.

22. In the Matter of Trans Union Corporation, Federal Trade Commission, Order of the Commission 1, 1 (Mar. 1, 2000) [hereinafter TransUnion], *available at* http://www.ftc.gov/sites/default/files/documents/cases/2000/03/transunionopinionofthecommission.pdf.

23. Fed. Reserve Bull., An Overview of Consumer Data and Credit Reporting 47 (Feb. 2003), *available at* http://www.federalreserve.gov/pubs/bulletin/2003/0203lead.pdf.

Calculating Credit Scores

An individual's credit report can tell a compelling story about his or her financial life. But a lender's ultimate goal is to quickly and accurately predict an individual's creditworthiness. This can be a time-consuming process with only a raw credit report. Thus, credit bureaus and analytics companies, such as Fair Isaac Corporation (FICO), license statistical models to bureaus and creditors that automatically convert the contents of an individual's credit report into a single score. The goal of these models is to identify factors that have a clear, proven relationship to payment performance and then use them to predict risk.

The inner workings of most credit models are proprietary, but their basic workings have been publicly documented and are reportedly similar across the industry. Score developers build credit models by comparing snapshots of data from the same group of individuals at different moments in time (typically, two years apart). They isolate characteristics that correlate with the risk of default by analyzing differences between the two snapshots. For example, a score developer may detect that customers who were using a majority of their available credit at the time of the initial snapshot are more likely to have defaulted two years later. Thus, their model would incorporate "amount of available credit used" as a factor in gauging creditworthiness. The output of this process is a single number that greatly simplifies creditors' assessments by summarizing risk.

Today, the most widely used credit scores are FICO scores. By one estimate, more than 90 percent of the scores sold to firms for credit-related decisions in 2010 were traditional scores created by FICO.[24] FICO's flagship score (like its many specialized variants) relies on a traditional model that considers only baseline credit data.

Table 4: A Traditional Model (FICO)

Score	Summary	Recipe[25]
FICO Score	Uses a proprietary algorithm to translate the contents of an individual's credit report into a three-digit number that predicts the likelihood that a borrower will reach 90 days past due or worse (such as bankruptcy or account charge-off) on any credit account over a two year period following the date of scoring.	• Payment history (35%) • Amounts owed (30%) • Length of credit history (15%) • New credit (10%) • Types of credit used (10%)

24. Consumer Financial Protection Bureau, The Impact of Differences Between Consumer- and Creditor-purchased Credit Scores: Report to Congress 6 (Jul 19, 2011), *available at* http://files.consumerfinance.gov/f/2011/07/Report_20110719_CreditScores.pdf.

25. *FICO Credit Score Chart: How credit scores are calculated*, myFICO, http://www.myfico.com/crediteducation/whatsinyourscore.aspx (last visited Jun. 1, 2014).

Reasons to Look Beyond Baseline Credit Data

Not everyone has a credit score generated by a traditional model. According to the National Credit Reporting Association, as many as 70 million Americans do not have a credit score, or have a lower score than their full financial history would warrant.[26] Fair Isaac reports that approximately 15% of consumer credit files do not contain enough information to calculate a FICO score.[27] And, perhaps in part as a result, nearly 30 percent of U.S. households conduct "some or all of their financial transactions outside of the mainstream banking system."[28]

A predictive credit score requires data.[29] A person with no credit record ("no-hit") or a sparse credit report ("thin file") will often not receive a credit score based on a traditional model. For example, to receive a FICO score, an individual's credit report must fulfill certain minimum criteria, including "one trade line reported by a creditor within the last six months" and "one trade line that is at least six months old."[30] Credit files that have gone more than six months with no reported activity are considered "stale" by the FICO algorithm, and will not produce a score.

Alternative data is an umbrella term for data that is not typically fully reported to the national credit bureaus. It covers a wide spectrum of information. On one end of the spectrum, alternative data can refer to a monthly stream of payment information, obtained directly from the businesses that receive those payments from the consumer (like utility bills). We call this data mainstream alternative data, because it closely resembles baseline credit data. At the other end of the spectrum, there are new types of data about a consumer's non-financial behavior, such as how fast a user scrolls through a web site or how widely she interacts on social media. We call this data fringe alternative data, reflecting the fact that it does not resemble baseline credit data.

Table 5: Alternative Credit Data

26. Rachel Schneider & Arjan Schütte, The Predictive Value of Alternative Credit Scores 2 (Nov. 2007), *available at* http://www.cfsinnovation.com/node/330262?article_id=330262.

27. FICO, To Score or Not to Score? 4 (Sep. 2013) [hereinafter To Score or Not], *available at* http://www.fico.com/en/wp-content/secure_upload/70_Insights_To_Score_or_Not_To_Score_3009WP.pdf ("Having sufficient credit data to predict future repayment risk is essential to any credit score that lenders and regulators rely on as a tool for safe and sound lending decisions.").

28. Federal Deposit Insurance Corporation, 2011 FDIC National Survey of Unbanked and Underbanked Households 11 (Sep. 2012), *available at* https://www.fdic.gov/householdsurvey/2012_unbankedreport.pdf.

29. To Score or Not, *supra* note 27, at 1.

30. *Id.* at 2.

Because credit scores have generally increased the availability and affordability of credit[31] — as well as enabled growth in the consumer financial industry — there has been widespread interest in providing credit scores on a wider range of people.[32] As a result, the credit reporting industry has created credit scoring models that attempt to reliably evaluate new populations using additional data and generate new potential profit streams for lenders.

These alternative models are not new, but interest in them is growing. The macro-economic developments leading up to the Great Recession temporarily crowded alternative data off the agendas of lenders and policymakers.[33] As the financial crisis hit, lenders "worried far more about potential losses on loans they had already made than they did about finding creative ways to make new ones."[34] But advances in technology, the post-recession revival of consumer credit, and an explosion of new start-up companies are reinvigorating the development and use of alternative data in underwriting.

The VantageScore, a well-known model created by the three major credit bureaus, is an emblematic example of a mainstream alternative credit scoring model. It considers only data that is in a consumer's credit report, but it is able to score more people because it considers some credit file data that the FICO score disregards.[35] For example, the VantageScore will consider a line of credit that is only one month old (a shorter period of time than required by the FICO model).[36] It can also incorporate mainstream alternative data such as rent and utility[37] Using this broader set of data, and more sophisticated analysis of existing data, VantageScore developers claims it is more inclusive.

Table 6: A Mainstream Alternative Model (VantageScore)

Score	Summary	Recipe
VantageScore	A standardized competitor to the FICO score that is consistent across the three major bureaus.[38] Developers claim it is more inclusive than the FICO score because it uses a "broader and deeper set of credit file data." For example, it may consider alternative data in the credit file, if available, or draw more inferences from time-sequence trends in traditional credit data.[39]	• Payment History (including certain bill payment data, if available) • Age and Type of Credit • Percent of Credit Limit Used • Total Balances/Debt • Available Credit • Recent Credit Behavior and Inquiries[40] * Listed in descending order of importance.

31. *See generally* FRB Scoring Study, *supra* note 5.

32. To Score or Not, *supra* note 27, 7 ("A better approach to evaluate these consumers is to augment the limited traditional credit information with alternative data that adds predictive value.").

33. PERC New Pathway, *supra* note 20, at 7.

34. Kevin Wack, *Push for New Consumer Credit Data Hits Snags*, Am. Banker (Jun. 20, 2013, 3:50pm), *avaialable at* http://www.americanbanker.com/issues/178_119/push-for-new-consumer-credit-data-hits-snags-1060032-1.html.

35. *How VantageScore 3.0 scores more people*, VantageScore Solutions, http://www.vantagescore.com/scores-more-people (last visited Jun. 1, 2014).

36. Mark P. Cussen, *How Your VantageScore Credit Report Is Calculated*, Forbes (July. 22, 2013, 2:48 PM), http://www.forbes.com/sites/investopedia/2013/07/22/how-your-vantagescore-credit-report-is-calculated.

37. *Id.*

38. *What is the VantageScore?*, Credit Karma, https://www.creditkarma.com/article/vantageScore (last visited Jun. 1, 2014) ("The three major credit bureaus offer their own proprietary models but usually provide the FICO score to lenders. The VantageScore was created as a consistent credit score model across the three bureaus to compete with the FICO score so that they could offer lenders a more standardized score and cut out the Fair Isaacs Company.").

39. *How VantageScore 3.0 scores more people*, *supra* note 35.

40. *What influences your score*, VantageScore Solutions, http://your.vantagescore.com/score-influences (last visited Jun. 1, 2014).

Further Expanding Credit Scores with Fringe Alternative Data

Mainstream alternative models may reach farther, but they are still unable to evaluate individuals with very thin or nonexistent credit reports. Fringe alternative models attempt to fill in the gaps, reaching even further than mainstream alternative models. The use of fringe alternative data is not a completely new phenomenon: thin-file individuals have long been asked to "provide significantly more information during the underwriting process."[41] However, the automated consideration of such data is a more recent development.

The industry often refers to fringe alternative models as "alternative credit decisioning tools," or ACDTs. ACDTs are often built with particular industries in mind — auto lenders, retailers, or telecommunications firms, for example — but they can also be used for general purpose credit decisions.[42] Lenders use ACDTs in an attempt to "squeeze additional performance" out of their underwriting processes. Large credit card issuers are reportedly "always trying find additional data that isn't present on the credit bureau report."[43] As of 2007, "[s]ix of the top 10 credit card issuers" reportedly used LexisNexis' ACDT product, called RiskView.[44] It is not clear how often issuers use these tools today.

Table 7 summarizes some ACDTs offered by large, established companies.

41. Javelin Strategy & Research, Evaluating The Viability Of Alternative Credit Decisioning Tools 24 (May 2013), *avaialable at* http://www.lexisnexis.com/risk/downloads/whitepaper/alternative-credit-decisioning.pdf.

42. Wack, *supra* note 34.

43. Javelin, *supra* note 41, at 30.

44. Schneider & Schütte, *supra* note 26, at 6.

Table 7: Fringe Alternative Models (Large Companies)

Company *Product*	**Summary**	**Example Data Inputs** ***(Not all data is available for all individuals.)***
LexisNexis *RiskView*	Forecasts the probability of default within 18 months, and provides ongoing account monitoring so the lender "can predict if a normally profitable customer has suddenly become a potential risk."[45]	Residential stability, asset ownership, life-stage analysis, property deeds and mortgages, tax records, criminal history, employment and address history, liens and judgments, ID verification, and professional licensure.[46]
FICO *Expansion Score*	Provides a three-digit score in the same range as the traditional FICO score. FICO claims this product allows lenders to accurately score "up to 95% of thin-file and 75% of no-hit applicants."[47]	Purchase payment plans, checking accounts, property data, public records,[48] demand deposit account records, cell and landline utility bill information, bankruptcy, liens, judgments, membership club records,[49] debit data, and property and asset information.[50]
Experian *Income Insight*	Helps lenders reach underserved populations. Can be combined with "Income Insight" models for "a comprehensive measurement of total income, including wages, rent, alimony and investments."[51]	Rental payment data, public record data.[52]
Equifax *Decision 360*	Attempts to model differences in profitability among customers with the same credit score.[53]	Telco utility payments, verified employment, modeled income, verified income, spending capacity, property/asset information, scheduled monthly payments, current debt payments, debt-to-income ratio, bankruptcy scores.[54]
TransUnion *CreditVision*	Provides a more detailed view of borrowers by including details on trends in behavior (e.g., building a balance or paying one down) for up to 82 previous months.	Address history, balances on trade lines, credit limit, amount past due, actual payment amount.[55]

45. *RiskView™*, LexisNexis, http://www.lexisnexis.com/risk/solutions/riskview-credit-risk-management.aspx (last visited Jun. 1, 2014).

46. Schneider & Schütte, *supra* note 26, at 7.

47. *FICO® Expansion Score*, FICO, http://www.fico.com/en/products/fico-expansion-score (last visited Jun. 1, 2014).

48. *Id.* ("Unbiased forecast of credit risk is based on historical behavior across a variety of financial obligations (sources like purchase payment plans, checking accounts, property, public records, etc.).").

49. *FICO® Expansion Score* (*Product Sheet*), FICO 1 (Jan. 2012), *avaialable at* http://www.fico.com/en/wp-content/secure_upload/FICO_Expansion_Score_1709PS.pdf ("Aggregating data from multiple repositories allows the FICO Expansion Score to be calculated from a broad range of both positive and negative non- traditional credit data, such as demand deposit account records, cell and landline telephone utility information, bankruptcies, liens, judgments, membership club records, etc.").

50. Schneider & Schütte, *supra* note 26, at 7.

51. *Income Insight and Income Insight W2*, Experian, http://www.experian.com/consumer-information/income-insight.html (last visited Jun. 1, 2014).

52. *Credit Service for the Underserved, Unbanked and Underbanked Populations*, Experian, http://www.experian.com/consumer-information/unbanked.html (last visited Jun. 1, 2014).

53. *Decision 360 (Product Brochure)*, Equifax, at 3, http://www.equifax.com/pdfs/corp/Decision-360-Brochure_051010.pdf (last visited Jun. 1, 2014)

54. *Id.* at 4.

55. *What is CreditVision*, TransUnion, http://creditvision.transunion.com/what-creditvision (last visited Jun. 20, 2014).

"Startup companies are leveraging even less familiar data."

Startup companies are also joining the scene, often leveraging even less familiar data. For example, ZestFinance sells ACDTs that "analyze[] thousands of potential credit variables — everything from financial information to technology usage."[56] It claims its products can "supplement or replace an organization's current underwriting algorithms."[57] These companies usually incorporate baseline credit data when available.

These companies come and go quickly, making it difficult to construct a complete snapshot of the market. According to one survey of creditors, some are hesitant to use these products because of the "risk associated with the fragility of start-ups."[58] One lender echoed our own observations about the startup scene: "you didn't get a good feeling that the company had either been around for very long or that they were going to be around much longer."[59] But the increasing prevalence of online data collection and growing interest in new financial technologies[60] means that there are likely to be more fringe alternative scores on the horizon.

56. *What We Do*, ZestFinance, http://www.zestfinance.com/what-we-do.html (last visited Jun. 14, 2014).

57. *Id.*

58. Javelin, *supra* note 41, at 32.

59. *Id.*

60. *See* Jessica Kumar, *Investment Activity in FinTech for the Financially Underserved*, Center for Financial Services Innovation (Nov. 2013), http://www.cfsinnovation.com/content/investment-activity-fintech-financially-underserved.

Table 8: Fringe Alternative Models (Smaller Companies)

Company	Summary	Example Data Inputs *(Not all data is available for all individuals.)*
ZestFinance *Available in some states.*	Began as a lender called ZestCash, but shifted its business model to focus to selling underwriting analytics to payday lenders and others.	Major bureau credit reports and "thousands of [other] potential credit variables — everything from financial information to technology usage" to how quickly a user scrolls through its terms of service.[61]
LendUp *Available in some states.*	A direct lender using alternative data sources.[62]	Major bureau credit reports, social network data, how quickly a user scrolls through its site.[63]
Kreditech *Not available in U.S.*	Underwrites its own loans and provides scores for others.	"Location data (GPS, micro-geographical), social graph (likes, friends, locations, posts), behavioral analytics (movement and duration on the webpage), people's e-commerce shopping behavior and device data (apps installed, operating systems)."
Earnest *Available in some states.*	"Provides small loans to individuals based on their earning potential rather than credit history."[64]	Current job, salary, education history, balances in a savings or retirement account, data from online profiles like LinkedIn,[65] as well as credit card information.[66]
Demyst Data	Sells software that integrates fragmented data sources to help lenders evaluate "thin-file" customers.[67]	Credit scores, occupation verification, fraud checks, income, employment stability, work history, and online footprint.[68]

61. Quentin Hardy, *Big Data for the Poor*, N.Y. Times, July 5, 2012, *avaialable at* http://bits.blogs.nytimes.com/2012/07/05/big-data-for-the-poor ("Careful reading of ZestCash's terms and conditions, which the company could watch by tracking cookies, meant that someone was taking a loan seriously, not just rushing to get the money.").

62. *About Us*, LendUp, https://www.lendup.com/en/about (last visited Jun. 14, 2014).

63. Elizabeth Dwoskin, *'Big Data' Doesn't Yield Better Loans*, Wall St. J. (Mar. 17, 2014, 11:19 PM), *avaialable at* http://online.wsj.com/news/articles/SB10001424052702304732804579425631517880424 ("LendUp looks at how quickly a user scrolls through the lender's website. Users who jump to large loan amounts, without reading materials on the site, may be high-risk borrowers, said LendUp CEO Sasha Orloff. "It's like walking into a bank and screaming, 'I need money now!'"").

64. Douglas MacMillan, *Lending Startup Earnest Raises $15 Million to Replace FICO Scores*, Wall St. J. Blog — Digits (May 20, 2014, 12:01 AM), http://blogs.wsj.com/digits/2014/05/20/lending-startup-earnest-raises-15-million-to-replace-fico-scores.

65. *Id.*

66. Gillis Bernard, *Atlas-Funded Startup Launches in Boston to Give Young Professionals Merit-Based Loans*, BostInno (Mar. 24, 2014), http://bostinno.streetwise.co/2014/03/24/earnest-funding-earnest-launches-merit-based-loans-for-young-professionals-and-graduate-students.

67. Diana Taylor and Michael Schlein, *How Big Data Can Expand Financial Opportunities For The World's Poo r*, Forbes Opinion (Apr. 25, 2014), http://www.forbes.com/sites/realspin/2014/04/25/how-big-data-can-expand-financial-opportunities-for-the-worlds-poor.

68. *FinovateAsia 2012 Video Archives >> DemystData*, Finovate Video Archives, http://www.finovate.com/asia12vid/demystdata.html (last visited Jun. 20, 2014).

Credit bureaus sell more than just credit data and credit scores. They also sell products to help target marketing. In fact, calling these firms "credit bureaus" has been misleading for years. These companies are both "consumer reporting agencies" (as defined by the FCRA) and general-purpose data brokers that specialize in selling financial data. Because they are stewards of highly revealing credit reports, their marketing practices deserve special attention. This section explains how credit bureaus enable marketing firms and other data brokers to leverage credit data, even though the FCRA generally prohibits the use of baseline credit data for marketing purposes.

Online Marketing and Credit Reporting Collide

Credit bureaus are but one of many different kinds of "data brokers." Data broker is a broad term that encompasses a broad range of companies that buy, sell, or analyze consumer information. These include companies that provide marketing services, fraud prevention, risk assessment services, data consolidation, and reselling. No comprehensive list of these companies exists, but there are likely several thousand data brokers in operation.[69]

Many brokers vacuum up data from wherever they can — especially those that focus on marketing data. Government and public records that were once accessible only through a courthouse or public library are often available today instantly and at a low cost. Non-public information originating from consumer-facing businesses (such as loyalty card programs) is traded widely. And online tracking provides a new and lucrative stream of data.

Online tracking bears little resemblance to the standardized machinery of credit reporting.[70] Unlike financial furnishers' routinized deliveries of data, online tracking companies directly monitor individuals as they browse the web and use mobile apps. They quietly record consumers' browsing behaviors and geographic locations. This data feeds into behavioral profiles that are used to target advertisements and personalize websites. And, unlike in underwriting contexts, individuals usually have no practical way of knowing what data is collected about them or ensuring that it is accurate.

Data brokers buy and sell databases and use sophisticated techniques to combine and enhance existing collections. Records from one broker's database can be merged into another broker's database when the records contain a common unique identifier, like the same name and address. This practice is known as a "data append" in the industry. An FTC study found that data brokers offer to append "a large array of actual and derived data elements," including sensitive attributes such as household income, race, religious affiliation and various health features.[71]

Data brokers face significant scrutiny in Washington.[72] It is easy to see why: They deal in sensitive information, including "an individual's physical and mental health, income and assets, mobile telephone numbers, shopping habits, personal interests, political affiliations, and sexual habits and orientation."[73] Some data broker products seem to exist solely to target vulnerable individuals. For example, a Senate report identified segments including "Struggling Elders" and "Rural and Barely Making It."[74] And although many lawmakers and regulators have called for greater transparency, federal law does not provide protections for most consumer data used for marketing purposes.[75]

"Credit bureaus are but one of many different kinds of 'data brokers.'"

69. Senate Comm. on Commerce, Science, and Transportation, Office of Oversight and Investigations, Majority Staff, A Review of the Data Broker Industry: Collection, Use, and Sale of Consumer Data for Marketing Purposes 2 (Dec. 18 2013) [hereinafter Senate Data Broker Report], *avaialable at* http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=0d2b3642-6221-4888-a631-08f2f255b577.

70. For more about online tracking, *see* Appendix D.

71. Federal Trade Commission, Data Brokers: A Call for Transparency and Accountability 24-25 (May 2014), *avaialable at* http://www.ftc.gov/system/files/documents/reports/data-brokers-call-transparency-accountability-report-federal-trade-commission-may-2014/140527databrokerreport.pdf.

72. *See generally Id.*; *see also* Government Accountability Office, Information Resellers: Consumer Privacy Framework Needs to Reflect Changes in Technology and the Marketplace (Sep. 2013) [hereinafter GAO Data Broker Report], *avaialable at* http://www.gao.gov/assets/660/658151.pdf; see also Senate Data Broker Report, *supra* note 69.

73. GAO Data Broker Report, *supra* note 71, at 19.

74. Senate Data Broker Report, *supra* note 69, at 24.

75. GAO Data Broker Report, *supra* note 71, at 46.

Barely Aggregated Credit Data Sidestep the FCRA

Although the FCRA generally prohibits the use of baseline credit data for marketing, credit bureaus aggregate individuals' credit records, selling data that identifies only a neighborhood or a household (as opposed to an individual). Because the FCRA applies to data that identifies an individual, credit bureaus believe that this maneuver puts aggregated "marketing scores" beyond the law's scope. The result is a new stream of sensitive financial data, sold into the largely unregulated data broker marketplace.

Porous Regulatory Boundaries

The FCRA generally prohibits credit bureaus — which are "consumer reporting agencies" (CRAs) under the law — from using credit record data for marketing purposes.[76] Congress has recognized that credit bureaus are unique, privileged stewards of individuals' personal financial data. The databases maintained by credit bureaus are also "far richer and more detailed than the data collected and used by non-CRA competitors who sell target marketing lists."[77] For these reasons, Congress limited the circumstances under which credit bureaus may release individuals' credit data.

Over the years, credit bureaus have pushed hard against these limits. The FTC, in turn, has worked to reinforce and strengthen them. We thus have gained some clarity about how and where the FCRA applies. In today's industry parlance, credit data held by a credit bureau may either be a consumer report subject to the regime of the FCRA (called "below the line") or else be available for all purposes including marketing ("above the line").[78] Generally speaking, below the line data is data of the sort that would be used for determining credit eligibility. Above the line data does not bear on creditworthiness or is not actually used for making underwriting decisions. Thus, in assessing a credit bureau's use of data for marketing purposes, regulators are likely to ask: "Is this the kind of data creditors would find valuable? Is it predictive of credit risk?"

Table 9: Data Above and Below the Line

Above the Line Data ***(Open to Any Use)***	**Below the Line Data** ***(FCRA Use Restrictions Apply)***
• Basic identifying information (e.g., names, telephone numbers, social security numbers) • Generation designators (e.g., "Sr." or "Jr.") • Zip codes* ** The FTC was concerned that zip codes might bear on creditworthiness, but declined to rule them as below the line because there was no evidence to establish that zip codes were actually used, or were expected to be used, as a credit eligibility factor in scoring.*[79]	• Age of an individual (the longevity of an individual's financial history is predictive of creditworthiness) • Credit limits • Open dates of loans • Numbers of tradelines • Types of tradelines • Existence of a tradeline • Marketing scores, derived from credit file data, that identify an individual

76. *See* Appendix B.

77. In the Matter of Trans Union Corporation, Federal Trade Commission, Order of the Commission, 1 (Mar. 1, 2000) [hereinafter TransUnion] *avaialable at* http://www.ftc.gov/sites/default/files/documents/cases/2000/03/transunionopinionofthecommission.pdf.

78. TransUnion, *supra* note 77, at 12.

79. *Id.* at 30.

Crucially, the FCRA appears to apply only to data that identifies an individual.[80] The 7th Circuit has ruled that "a 'consumer' under [the FCRA] must, at minimum, be an identifiable person."[81] However, the FTC's more recent guidance, citing advances in technology, states that "information may constitute a consumer report even if it does not identify the consumer by name if it could otherwise reasonably be linked to the consumer."[82] Even if the FCRA's scope is read in the broader fashion advocated by the FTC, this remains one of the most significant limitations of the current law.

The primary exception to the rule that individual credit file data may not be used for marketing is a practice called "prescreening." In short, prescreening gives lenders a powerful tool to make individualized pitches through indirect analysis of consumers' credit records. Credit bureaus provide lenders with marketing lists of consumers who meet certain credit-related criteria, disclosing those consumers' names, addresses, and other information.[83] Prescreening happened for years with regulatory acquiescence, and was codified by Congress in the 1996 amendments to the FCRA.[84] Unlike other forms of marketing, prescreening is limited to "credit or insurance" marketing. A lender relying on such a list must make a statutorily-defined "firm offer of credit" to each person on the list, but such offers are not actually "firm" in any meaningful sense.[85]

Marketing Through Aggregated Scores

Credit bureaus have seized upon the FCRA's focus on individuals to get around the law, converting baseline credit data into non-individualized scores that can be nearly as sensitive as a credit score. Aggregated marketing scores — which are computed on a household or block level, and arguably not tied to any one consumer's identity — have become a primary way for credit bureaus to sell, and for creditors and other actors to use, consumers' credit histories to market to them with greater precision.

These products often come within a hair's breadth of identifying a person. For example, Equifax's aggregated FICO score product is "offered at the household level after undergoing [a] proprietary micro-neighborhooding process."[86] In other words, it provides detailed insight into the financial characteristics of the "group" of people in a single household — and does so putatively without triggering any of the protections of the FCRA.

These marketing scores also look remarkably similar to credit scores. They can predict "the likelihood that an existing account or potential credit customer will become a serious credit risk,"[87] rank households on their "likelihood to perform,"[88] and "specifically estimate[] household deposit balances."[89] And, just like marketing firms, credit bureaus sell marketing segments. For example, a lender might target "Credit Hungry Card Switchers," who are "less financially secure and rely heavily on credit cards."[90] But as long as a credit bureau bars its customers from using these products' for the FCRA-covered final step of "eligibility" determinations, they seem to fall outside the framework of current consumer financial protection law.[91]

These marketing scores are developed with online targeting in mind: they can be accessed and applied in real-time on the web.[92] In white papers and product sheets, the major credit bureaus tout how such scores can be used to change the appearance of web pages, and to target advertisements at a particular consumer as she browses from site to site (likely using cookies and geolocation techniques).[93] Advertisers and other data brokers can also append these marketing classifications to their own consumer profiles for later use.[94]

These products run contrary to the spirit of fair credit reporting law. Many of them flatly contradict the principle that (as the FTC's TransUnion order put it) "factors that are important in calculating credit scores"[95] or "mak[ing] a preapproved credit offer"[96] should not be used for general-purpose marketing. These marketing scores are "far richer and more detailed than the data collected and used by non-CRA competitors" for similar marketing purposes.[97] As such, they leverage the unique position of the major federally-regulated credit bureaus into a major competitive advantage in the largely unregulated field of data brokerage.[98] They inject baseline credit data — originally collected for underwriting purposes — into the online tracking and advertising industry.

80. The FCRA defines a consumer report as one "bearing on a consumer's creditworthiness . . ." 15 U.S.C. § 1681a(d)(1) (2012) (emphasis added).

81. McCready v. eBay, Inc., 453 F.3d 882 (7th Cir. 2006).

82. Federal Trade Commission, 40 Years of Experience with the Fair Credit Reporting Act: An FTC Staff Report with Summary of Interpretations 21 (Jul. 2011), *avaialable at* http://www.ftc.gov/sites/default/files/documents/reports/40-years-experience-fair-credit-reporting-act-ftc-staff-report-summary-interpretations/110720fcrareport.pdf.

83. The statute says a prescreen report may also contain "other information pertaining to a consumer that does not identify the relationship or experience of the consumer with respect to a particular creditor or other entity."15 U.S.C. 1681b(c)(2). The limits are thus not entirely clear.

84. Omnibus Consolidated Appropriations Act of 1997, Pub. L. No. 104-208 § 2404(a)(2) (codified as amended at 15 U.S.C. § 1681b(c)-(e) (2012)).

85. The Act defined "firm offer" to mean "any offer of credit or insurance to a consumer that will be honored if the consumer is determined, based on information in a consumer report on the consumer, to meet the specific criteria used to select the consumer for the offer," but is subject to several contingencies. As a practical matter multiple commentators have suggested a "firm offer" differs little from a sales pitch. *See* National Consumer Law Center, Fair Credit Reporting 13 (7th ed. 2010) [hereinafter NCLC Fair Credit Reporting] at 299.

86. *Aggregated FICO Scores*, Equifax, http://www.ixicorp.com/products-and-services/customer-targeting-and-scoring/aggregated-fico-scores (last visited Jun. 1, 2014).

87. *CreditStyles Pro* (*Product Sheet*), Equifax at 3, http://www.equifax.com/pdfs/corp/CreditStyles_Pro_Product_Sheet.pdf (last visited Jun. 1, 2014).

88. *ConsumerView Profitability Score*, Experian at 1, http://www.experian.com/assets/marketing-services/product-sheets/consumer-profitability.pdf (last visited Jun.

89. *Household Deposits Score*, Experian, http://www.experian.com/consumer-information/household-deposits.html (last visited Jun. 1, 2014).

90. *Financial Personalities*, Experian at 3, http://www.experian.com/assets/consumer-information/product-sheets/financial-personalities-fmcg.pdf (last visited Jun.

91. This is because the FCRA regulates information released by a CRA where the CRA expects that it will be used for eligibility purposes.

92. *Aggregated FICO Scores*, *supra* note 86.

93. *Aggregated FICO® Scores from IXI Services*, *supra* note 93, at 2 ("Improve online ad targeting and landing page optimization").

94. *Id.*

95. TransUnion, *supra* note 77, at 16.

Table 10: Marketing Scores Built From Aggregated Credit Data

Company *Product*	**Summary**	**Example Data Inputs** *(Not all data is available for all individuals.)*
Equifax *Aggregated FICO Scores*	Built from aggregated FICO scores and delivered at a "micro-neighborhood" level.[99]	Sold to help marketers "target prospects with the right offers, messaging, and/or incentives — both online and offline," and "predict which consumers are most likely to respond to a particular offer."[100]
Equifax *CreditStyles Pro*	Built from aggregated FICO scores and other variables, including the number of tradelines, number of days past due, and bankruptcy-focused credit scores. Delivered at a "micro-neighborhood" level.[101]	Allows marketers to "differentiate households based on their likely credit availability" and "identify target segments based on consumers' expected credit behaviors." Also allows targeting by credit variables including bankruptcy, foreclosure, and collections.[102]
Experian *Median Equivalency Score (MES)*	Built from aggregated tradeline data including payment information, credit utilization, mortgage, and retail.[103] Delivered at the neighborhood level.	Promoted as a method to identify neighborhoods that "may be more or less likely to have future derogatory credit activity."[104]
Experian *Summarized Credit Statistics*	Built by aggregating "available consumer credit data" at the neighborhood level. Can be narrowed by specific attributes, including number and types of tradelines, profession ("physicians, attorneys, accountants, etc."),[105] ethnicity, gender, and age.[106] Delivered at a neighborhood level.	Promises to increase response rates for "invitations to apply for a credit card, home equity loans or financial advisement services."[107] Allows marketers to "select from variables such as age, estimated household income, presence of children, automotive preference, estimated current home value and mortgage information."[108]
TransUnion *Aggregated Credit Data*	Built from credit characteristics and key scores (including insurance-specific risk) based on aggregated credit data delivered at a "micro-geographic" level.[109]	Allows marketers to "uncover key traits" of their "highest performing customer segments" in order to better target prospective customers.[110]

96. *Id.* at 17.

97. *Id.* at 5.

98. *Id.* at 43.

99. *Aggregated FICO Scores*, *supra* note 86.

100. *Aggregated FICO® Scores from IXI Services*, *supra* note 93, at 2 ("Improve online ad targeting and landing page optimization").

101. *Id*

102. TransUnion, *supra* note 77, at 16.

103. *Id.* at 17.

104. *Id.* at 5.

105. *Id.* at 43

106. *Aggregated FICO Scores*, *supra* note 86.

107. *Aggregated FICO® Scores from IXI Services*, Equifax, http://www.equifax.com/assets/USCIS/aggregated_FICO_scores_ps.pdf (last visited Jun.

108. *CreditStyles Pro (Product Sheet)*, *supra* note 87.

109. *Products and Services: Credit Styles Pro*, Equifax, http://www.ixicorp.com/products-and-services/customer-targeting-and-scoring/creditstyles/ (last visited Jun. 19, 2014).

110. *Experian ConsumerView - Summarized Credit Statistics Mailing List*, Mailing List Finder, http://lists.nextmark.com market;jsessionid=C63F92C96306CAFC4A5CD8B0B0EE04 4B?page=order/online/datacard&id=93574 (last visited Jun. 19, 2014.)

IV.

Challenges for Public Measurement of Online Marketing

Despite the public marketing and regulatory materials documenting the existence of next-generation, data-driven marketing scores, outside observers are currently unable to measure how these scores are being used in the wild. Academic researchers and consumer advocates have attempted to either document or disprove potential systematic biases in data-driven marketing, but for a number of reasons, their experiments have not been able to resolve the questions under investigation..

Online advertising networks are notoriously complex black boxes.[111] When two users see different advertisements or offers on a website or mobile app, there are a wide range of potential explanations for the difference, many of which may be perfectly innocent, and the experimenter generally cannot know which explanation applies. An advertiser may rotate their ad stock or choose ads from a pool at random.[112] Or, the two users might have arrived at different instants, and because one advertiser's budget ran out for the day, the later visit loaded an ad from a different advertiser.[113] Or, the two users browsed from different geographic locations, and using IP address geolocation, the advertiser was able to serve each user with geographically-specific ads.[114] Or, because the ad network has tracked the users' browsing history over time (and has made predictions about the users' consumer habits), the advertiser behaviorally targeted different ads to each user. Even an identical-looking advertisement may respond differently to clicks from different users.[115]

Unfortunately, a research platform that simulates different users clicking on an ad would be outwardly similar to a "click fraud" campaign (in which hackers divert advertising revenue by creating computer-generated simulacra of user interest in an advertisement).[116] Ad networks invest in highly effective measures to detect and prevent this type of behavior.[117] An alternate approach might be to create long-term, realistic-looking online "personas" that would allow a researcher to examine how an ad network might differentially treat one type of person versus another.[118] In order to create such personas, a researcher would "seed" a browser over time with web browsing activity that mimics a real user with a particular feature, such as (for example) a low-income consumer. Since ad networks track users' browsing activities, an ad network would ideally put this synthetic user in a lower-income marketing segment, and then begin to target ads based on that segment. But developing personas consistently for many different features — across many different ad networks, each of which may track users and "learn" features by different, undisclosed means — would likely be more of an art than a science, and computer science researchers are just starting to experiment with more reliable ways to mimic real user online behavior.[119] Unfortunately, in so doing, they parallel the ongoing efforts of hackers to build automated, revenue-diverting bots, and run headlong into the increasingly sophisticated fraud-detection efforts of advertising networks and publishers.

Taken together, these technical hurdles make it very difficult for outside technologists to measure whether different groups are exposed to different sets of online ads — and what the social justice implications of these different ads might be. Accurately conducting such measurements today from an outside vantage point would amount to bleeding-edge computer science research.[120]

Policymakers need to understand these technological barriers to outside measurement — or at least to have a rough sense of how hard the problem is — because these factors make policy tools more important than ever. Disclosures from inside these companies, whether obtained via voluntary best practice efforts, Congressional inquiry, regulatory supervision, or litigation, are likely to advance the public understanding of these practices in ways no outside observer can.

111. *See* Saikat Guha, Bin Cheng & Paul Francis, *Challenges in Measuring Online Advertising Systems*, Proceedings of the 2010 Internet Measurement Conference (IMC) 81 (Nov. 2010), *avaialable at* http://conferences.sigcomm.org/imc/2010/papers/p81.pdf. ("As it turns out, the level of noise in measuring ads is extremely high. Even queries launched simultaneously from two identically configured clients on the same subnet can produce wildly different ads over multiple timescales.").

112. Rebecca Balebako, Pedro G. Leon, Richard Shay, Blase Ur, Yang Wang & Lorrie Faith Cranor, *Measuring the Effectiveness of Privacy Tools for Limiting Behavioral Advertising*, Workshop on Web 2.0 Security and Privacy 3 (May 2012), *avaialable at* http://www.w2spconf.com/2012/papers/w2sp12-final2.pdf ("Sites generally rotate through more ads than can be shown on a single visit to a test page.").

113. *Id.* at 2 ("It is also important to ensure that tests are run at the same time so that the influence of ad turnover is minimized.").

114. Guha, *supra* note 111, at 86 ("Overall we find that while location affects Google ads, behavioral targeting does not today appear to significantly affect either search or website ads on Google. Location, user demographics and interests, and sexual-preference all affect Facebook ads.").

115. *Id.* at 82.

116. *Id.* at 82 ("[W]e cannot consider the destination URL for the ad since that is revealed only after the ad is clicked (and clicking on the ad in an automated matter constitutes fraud).").

117. *See, e.g.*, Google's Protection Against Invalid Clicks, Google *avaialable at* https://www.google.com/ads/adtrafficquality/invalid-click-protection.html (last visited June 1, 2014).

118. See Arvind Narayanan, *Web measurement for fairness and transparency*, Freedom to Tinker (Nov. 25, 2013) *avaialable at* https://freedom-to-tinker.com/blog/randomwalker/web-measurement-for-fairness-and-transparency.

119. *Id.*

120. *Id.* ("While many concerns have been raised [about web tracking and potential discrimination], not much is known quantitatively. . . Successfully deploying such a platform is a significant systems research challenge.").

We have thus far described new flows of data into credit scores (Section III) and marketing scores (Section IV). This section describes these developments' implications for financial inclusion.

In credit scoring, the most promising trend is the inclusion of mainstream alternative data in credit files. This practice could improve nationwide access to financial opportunity by making more consumers "scorable" within the mainstream financial system. At the same time, inclusion of even mainstream alternative data may undermine important assumptions of certain public policies, such as eligibility criteria for public benefits programs. Credit scores based on fringe alternative data, on the other hand, are still shrouded in mystery. It is not entirely clear how these models, and the scores they produce, will cope with the requirements of reporting and fair lending laws. They should be treated with caution and be further scrutinized by regulators and advocates.

As for marketing scores, policymakers and advocates face a glaring knowledge gap. We know marketing scores exist, that they can be derived from credit data, and that they can be used to target advertisements and change the appearances of webpages. But it is exceedingly difficult to demonstrate how they are being deployed and used. We worry that these tools will give unscrupulous actors a potent new opportunity to identify vulnerable consumers. Accordingly, we recommend scrutiny by regulators.

Credit Models That Rely Primarily on Baseline Credit Data Accurately Predict Credit Risk, and Have Withstood Regulatory Scrutiny

Credit scores that are derived primarily from baseline credit data have been subject to rigorous public testing. They are "predictive of credit risk for the population as a whole and for all major demographic groups."[121] In a 2007 study, the Federal Reserve Board (FRB) concluded that, based on the best available evidence, "credit scoring has increased the availability and affordability of credit."[122] It also found that credit scores expanded access to credit for previously credit-constrained populations, because creditors were better able to evaluate credit risk, thus offering credit to higher-risk individuals.[123]

However, it is also true that these credit scores are not distributed equally across society. Racial and other minorities face a range of obstacles (including diminished educational opportunities, workplace bias, and disproportionate law enforcement) that can make it more difficult for them to repay loans. Credit scores, which are designed to communicate the risk that a consumer will default on a loan, reflect these realities, and studies have documented huge differences in scores between racial groups.[124] For example, a 1996 study by Freddie Mac found that African Americans were three times as likely as whites to have a FICO score below 620.[125] A 1997 Fair Isaac analysis showed that individuals living in minority neighborhoods had lower overall credit scores.[126] And the FRB found that, under certain scoring models, African Americans' credit scores were approximately half those of non-Hispanic whites.[127]

But such disparities do not tell us whether the scoring models themselves are biased — whether they exaggerate, accurately reflect, or understate the average difference in credit risk between racial groups.

According to the FRB, credit history scores using baseline credit data do not overestimate credit risk among minority groups.[128] In fact, these scores are likely to slightly underestimate credit risk among minorities.[129] The FRB reached these conclusions after building a nationally representative sample of more than 300,000 credit records from a national credit bureau, enriching that data with demographic information, and running rigorous statistical tests.

Fringe Alternative Models' Predictive Value is Not Yet Proven

Fringe alternative models have not received the same rigorous examination. ACDT vendors and users have "conducted hundreds of tests of [ACDTs'] effectiveness," but such testing is generally internal to the companies involved, or their trade groups.[130] Public studies are few, and provide only vague, aggregated results. Although industry white papers claim that ACDTs allow lenders to "improv[e] crediting decisions on key metrics" and provide "increased approvals of thin- and no-file customers," these contentions remain difficult to validate.[131]

What public evidence there is about the potential impact of fringe alternative models tends to be equivocal. For example, in 2007, the Center for Financial Services Innovation (CFSI) released a study on the predictiveness of large-scale alternative credit score products (including

121. FRB Scoring Study, *supra* note 5, at S-1.

122. *Id.*

123. *Id.* ("The large savings in cost and time that have accompanied the use of credit scoring are generally believed to have increased access to credit, promoted competition, and improved market efficiency.").

124. For a longer list of such studies, see National Consumer Law Center, Credit Discrimination 133 (6th ed. 2013) [hereinafter NCLC Credit Discrimination].

125. Federal Home Loan Mortgage Corporation, *Automated Underwriting: Making Mortgage Lending Simpler and Fairer for America's Families* (Sep. 1996).

126. Fair, Isaac & Co., *The Effectiveness of Scoring on Low-to-Moderate Income and High-Minority Area Populations* (Aug. 1997).

127. FRB Scoring Study, *supra* note 5, at O-13.

128. Going further, the FRB observed that credit history scores do not have a notable differential effect on protected demographic groups. In other words, its model's predictiveness did not stem significantly from the fact that credit characteristics served as proxies for demographic factors. (Except for the length of an individual's credit history, which predictably served as a proxy for age.) *Id.* at S-2.

129. *Id.* at S-1.

130. Schneider & Schütte, *supra* note 26, at 8.

131. Javelin, *supra* note 41, at 6.

132. Schneider & Schütte, *supra* note 26, at 8.

flagship ACDTs from LexisNexis, FICO, and L2C). It found that these products provide "a reasonable method of ordering risk among potential borrowers."[132] But the report acknowledged that "many outstanding questions remain about these products."[133] A separate CFSI report, published five years later, in 2012, echoed the need for continued research to "evaluate the impact of these types of data on consumers and access to credit products over the longer term."[134]
The public record on fringe alternative models is so thin that a 2013 paper commissioned by LexisNexis still cited that 2007 CFSI study as a primary resource on their effectiveness.[135] That report highlighted the still-unmet need to "[t]horoughly appraise solutions' predictive capability through post hoc tests . . . by applying historical data and comparing the predictions of the solution with actual performance."[136]

Less still is known about the financial startup scene, which relies on even more exotic data. For example, ZestFinance boasts that its "big data underwriting model provides a 40% improvement over the current best-in-class industry score."[137] But it is unclear how accurate the "best-in-class industry score" actually is for Zest's target population of consumers, much less how ZestFinance measures up to that benchmark.

We are a long way from being able to judge the usefulness of most fringe alternative models. "It's going to take years to understand what measures are truly valid," says Peter Fader, co-director of the Wharton Customer Analytics Initiative. "It's the Wild West . . . like the early days of FICO."[138]

Fringe Alternative Models Have Not Faced Systematic Regulatory Scrutiny

The use of fringe alternative data in credit scoring presents new compliance challenges and ambiguities. Lenders are well aware of this fact and have expressed "concern over compliance" with the FCRA and the ECOA.[139] ACDTs are likely to exacerbate existing challenges regarding accuracy and completeness of data and raise fair lending questions.

Reporting Challenges

Fringe alternative data will exacerbate challenges regarding accuracy and completeness of data. As one large lender observed, ACDT providers are "trying to develop a massive lot of data that's coming from many different vendors, and so keeping the data contributions stable over time is difficult."[140]

Credit bureaus are still struggling to maintain baseline credit data. The FTC conducted an extensive study with several hundred consumers in 2012, finding that "26 percent of [the] consumers reported a potential material error on one or more of their three reports and filed a dispute with at least one credit reporting agency (CRA)[,] and half of these consumers experienced a change in their credit score."[141] Of the 262 consumers who disputed those errors with at least one CRA, "206 consumers (21% of the sample) encounter[ed] a confirmed material error on one or more of their credit reports."[142]

Adding alternative data will force new questions. For example, under the FCRA, will a consumer be able to decipher an even more complicated, alternative-data-based consumer report following an adverse action? Under Regulation B (which implements ECOA), will a lender even be able to articulate the specific reason for the action taken? As new data sources come online, both furnishers and CRAs will need to redouble their efforts to provide meaningful insights for consumers.

Fair Lending Challenges

ACDTs raise thorny fair lending questions. This is already evident in the way regulators and vendors classify credit scores. For example, the Federal Deposit Insurance Corporation (FDIC) categorizes credit scoring systems in two distinct buckets: "bureau scores" (generated primarily from baseline credit data) and "custom scores" (everything else, including ACDTs). Lenders are given permission to freely use bureau scores, but are cautioned to review custom scores carefully before adopting them.[143] Scoring products

133. *Id.* at 17.

134. Kate Dole & Rob Levy, Building Consumer Credit: A Winning Strategy for Financial Institutions and Consumers 22 (Jun. 2012), *avaialable at* http://www.cfsinnovation.com/sites/default/files/CFSI_BuildingConsumerCredit_6_2012_0.pdf.

135. Javelin, *supra* note 41, at 6.

136. *Id.* at 8.

137. ZestFinance, *supra* note 56.

138. *The 'Social' Credit Score: Separating the Data from the Noise*, Knowledge@Wharton (Jun. 5, 2013), http://knowledge.wharton.upenn.edu/article/the-social-credit-score-separating-the-data-from-the-noise.

139. Javelin, *supra* note 41, at 7.

140. *Id.* at 31.

141. *FTC Testifies on Credit Reporting Accuracy Study, FCRA Enforcement, Credit Education*, Federal Trade Commission (May 7, 2013), *avaialable at* http://www.ftc.gov/news-events/press-releases/2013/05/ftc-testifies-credit-reporting-accuracy-study-fcra-enforcement.

142. Federal Trade Commission, Report to the Congress Under Section 319 of the Fair and Accurate Credit Transactions Act of 2013, at iv (Dec. 2012) [hereinafter FTC FACT Report], *avaialable at* http://www.ftc.gov/sites/default/files/documents/reports/section-319-fair-and-accurate-credit-transactions-act-2003-fifth-interim-federal-trade-commission/130211factareport.pdf.

143. *Supervisory Insights: Fair Lending Implications of Credit Scoring Systems*, Federal Deposit Insurance Corporation [hereinafter Supervisory Insights], *avaialable at* http://www.fdic.gov/regulations/examinations/supervisory/insights/sisum05/article03_fair_lending.html (last visited Jun. 1, 2014).

144. *See* FICO, Safe and Sound: How the FICO Score Helps Lenders Meet Tougher Model Regulations, 5 (2013) [hereinafter FICO Safe and Sound], *avaialable at* http://www.fico.com/en/wp-content/secure_upload/Safe_and_Sound_FICO_Score_Helps_Lenders_2969WP.pdf.

145. LexisNexis, Successfully Lend to the Underbanked Consumer 5 (Feb. 2010), *avaialable at* http://insights.lexisnexis.com/creditrisk/wp-content/uploads/2012/04/Successfully-Lend-to-the-Underbanked.pdf ("These scores are designed to be used in a compliant manner by lenders, taking into account considerations such as Equal Credit Opportunity Act (ECOA) and

self-certify in different ways, mirroring this divide. For example, FICO self-certifies that its flagship score under Regulation B,[144] while LexisNexis' RiskView product cautions that lenders must ensure their own compliance.[145] An essay from several industry lawyers warns creditors that they should not "assume that [the] use of a credit-scoring system is an automatic safe harbor," and urges them to ask "self-diagnostic questions" before "the government comes knocking on [their] door."[146] These self-diagnostic questions are not easy. As one DC law firm partner summarized:

"Are you comfortable defending each characteristic and attribute that is scored? Was the system built on stale or current data? Whose data was used? What type of credit was involved? What was the source and breadth of the application flow involved? Has the credit-scoring builder given you appropriate warranties of compliance with the ECOA, including indemnification of legal defense costs? Does the vendor have the required expertise and experience . . . necessary to build a system?"[147]

Lenders should avoid building scorings systems that rely on datasets that skew toward certain demographic groups over others. If "discriminatory data are input into the system, the system will produce a discriminatory result."[148] It is hard to predict what data might be discriminatory without knowing how a model evaluates that data. For example, "[i]f you are a mortgage lender that has a racially and economically diverse application flow, what impact will there be if you use a credit-scoring system designed principally on a population borrowed from a high-income travel and entertainment card credit operation?"[149] Answering that question will require quantitative analysis, in addition to policy thinking.

Lenders must also guard against discrimination within a scoring system itself. The FDIC notes that a system can violate fair lending laws if it includes a variable that is "so highly correlated with a prohibited basis that it serves as a proxy for the basis."[150] For example, "[a] variable that considers the geographic area in which an applicant lives should be carefully scrutinized to determine if the geographic distinctions are so highly correlated with a prohibited basis that they serve as a proxy for that basis."[151] This is the same sort of "disparate effect" that the FRB tested for in 2007.

In short, although today's industry-standard credit scores have been given a clean bill of health, ACDTs have not yet had their check-up.

Reporting of Mainstream Alternative Data Could Bolster Financial Inclusion

Mainstream alternative data — payment-related information, such as regular bill payments — is some of the best evidence that thin-file and no-file consumers have of their ability to repay financial obligations. With appropriate planning and policy adjustments, its inclusion in credit scoring has the potential to benefit the underserved because it is "especially predictive of future repayment behavior."[152] A number of research projects have concluded that full reporting of certain mainstream alternative payment data would result in "measurable material benefits to low-income borrowers, especially those with little or no credit history . . . "[153] Thus, we believe these data sources merit further discussion.

There are several types of routine payment data not fully reported to credit bureaus. Today, for example, the majority of energy utilities and telecommunications companies do not fully report customer payment data to credit bureaus. They sometimes submit negative data, either directly or indirectly (such as when a very late payment is sent to collections).[154] However, most do not regularly submit positive results or minor negative results. Thus, some wonder: Why not submit positive information along with negative information?

Utility data is a useful case study, because it is among the most controversial categories of mainstream alternative data. In 2006, prior to the Great Recession, the Policy and Economic Research Council (PERC), a non-pofit think tank focused on economic policy, published an empirical study quantifying the credit impacts of adding routine, positive utility and telecommunications payment data in consumer reports.[155] It found that the inclusion of telecommunications and utility payment data would allow some consumers who were unscorable to become scorable,

Regulation B compliance, in addition to FCRA compliance.").

146. Warren L. Dennis, *Fair Lending and Credit Scoring*, 56 Mortgage Banking 55 (Nov. 1995) *avaialable at* http://www.thefreelibrary.com/Fair+lending+and+credit+scoring.-a017878680.

147. *Id.*

148. *Supervisory Insights*, *supra* note 143.

149. Dennis, *supra* note 146.

150. *Supervisory Insights*, *supra* note 143.

151. *Id.*

152. To Score or Not, *supra* note 27, at 8.

153. PERC New Pathway, *supra* note 20, at 8.

154. According to a 2009 survey of utility companies, telecommunications companies, and other alternative data providers, 89% referred delinquencies and defaults to collections agencies, and most were aware that these accounts would then be reported to CRAs. PERC, Credit Reporting Consumer Payment Data: Impact on Customer Payment Behavior and Furnisher Costs and Benefits 18 (Mar. 2009), *avaialable at* http://www.perc.net/wp-content/uploads/2013/09/bizcase_0.pdf. However, the National Consumer Law Center surveyed a number of state utility providers and found that "the vast majority of electric and natural gas utility companies only report when a seriously delinquent account has been referred to a collection agency or written off as uncollectible — a tiny percentage of the accounts that are late." National Consumer Law Center, Full Utility Credit Reporting: Risks to Low Income Consumers 2 (Dec. 2009) [hereinafter NCLC Utility Reporting], *avaialable at* https://www.nclc.org/images/pdf/credit_reports/credit_reports_full_utility_dec2009.pdf

155. *See generally* Political and Economic Research Council & The Brookings Institution Urban Markets Initiative, Give Credit Where Credit is Due: Increasing Access to Affordable Mainstream Credit Using Alternative Data (2006), *avaialable at* http://www.perc.net/wp-content/uploads/2013/09/alt_data.pdf.

156. *Id.* at 36.

157. NCLC Utility Reporting, *supra* note 154, at 1.

158. *Id.* at 13.

and that inclusion of this data was particularly beneficial to certain minority communities. Its conclusion was that "systematic reporting of telecommunications and utility" payment histories would likely "benefit consumers and increase their access to low-cost credit."[156]

In 2009, the NCLC replied with a white paper detailing its opposition to full utility credit reporting. It questioned the motives behind full utility credit reporting, arguing that utilities favor such reporting "as a way of pushing utility bills to the top of consumers' 'to-pay' piles."[157] It also warned that such reporting would conflict with some state-level consumer protection statutes, which shield consumers from electric or gas cutoffs if they fall behind on their utility bills.[158]

The third round in this debate comes from a 2012 PERC report analyzing more than four million credit files that included payment histories from one or more alternative accounts.[159] It found that, for those consumers who saw their scores change with the inclusion of alternative data, most saw an improvement in their score. It also found that, of the unscorable thin files it analyzed, more than 80% became scorable by virtue of the additional data. Of all the thin file individuals analyzed, 64% rose in terms of their "credit tier" (i.e., would be treated better than when they had been unscored). The authors concluded by claiming that "[m]ore consumers in general, and low-income and thin-file consumers, in particular, benefit when alternative data is fully reported than when it is not. This is true whether the metric is credit score changes, credit score tier changes, or changes in portfolio acceptance given a target default rate."[160]

Importantly, PERC also highlighted the potential for consumer-friendly reporting patterns from alternative data furnishers. For example, it suggested that alternative data furnishers could benefit consumers by "not reporting small unpaid balances on accounts that are closed; not indicating that a customer is subsidized, on a payment plan or in forbearance; only reporting payments over 60 days overdue as late; not reporting retrospective data when the furnisher first begins reporting; and clearly communicating with customers that their payments be fully reported to CRAs."[161] It emphasized that data furnishers would be able to exercise discretion as to the thresholds they use in reporting delinquencies, claiming that reporting standards permit "sufficient flexibility to implement such a reporting regime."[162]

Some individuals' credit situation will not improve, or will worsen, if new payment data is included in the mainstream credit reporting system. On the other hand, preserving the status quo also results in material harms. It is possible that the benefits of such a change would exceed the harms, provided that the change was coordinated with complementary updates to state-level consumer protection laws. If undertaken carefully, the rewards of integrating mainstream alternative data are likely to outweigh the risks.

Unfortunately, PERC's studies on mainstream alternative data are not reproducible, because the data behind them is proprietary. We encourage further transparency and collaboration between advocates and industry as a vital confidence building step.

The Impact of Marketing Scores is Uncertain but Concerning

Broadly measuring the deployment of marketing scores online is prohibitively difficult. Without knowing what ads are shown and why, or how websites might be changing and why, it is impossible to precisely assess marketing scores' on-the-ground impact. However, there is a long history of predatory and exploitative products filling the financial services vacuum that has historically surrounded the underserved. We worry that these new marketing tools will give unscrupulous actors a potent new opportunity to find vulnerable consumers, not just down the block, but around the country.

Similar concerns have been raised in more general terms in recent FTC and Congressional reports on data brokers. But the marketing scores offered by credit bureaus have special urgency because they are fueled by unique, highly detailed financial data. Financial targeting has occasionally been spotted in the wild, but such instances are rare.[163] Regulatory examination will ultimately be necessary.

The CFPB should consider whether its regulatory authority, exercised to protect financially underserved consumers against the risk of disparately impactful predation, might allow it to shed light on these emerging practices. And advocates, Congress, the FTC, and the public should likewise continue to monitor these issues.

159. *See generally* PERC New Pathway, *supra* note 20.

160. *Id.* at 23.

161. *Id.* at 22.

162. PERC, The Credit Impacts on Low-Income Americans from Reporting Moderately Late Utility Payments 11 (Aug. 2012), *avaialable at* http://www.perc.net/wp-content/uploads/2013/09/ADI_ML_Impacts.pdf.

163. Emily Steel and Julia Angwin, *On the Web's Cutting Edge, Anonymity in Name Only*, Wall St. J., Aug. 4, 2010, *avaialable at* http://online.wsj.com/news/articles/SB10001424052748703294904575385532109190198.

New data and technologies

are changing the face of consumer credit. These changes have the potential to expand the affordability and availability of credit. However, they may also create new risks for underserved consumers.

Mainstream alternative data, if combined with baseline credit data in the files of national credit bureaus, may help to broaden access to credit for the underserved. Its use should be limited to contexts where it has publicly demonstrable predictive soundness, consistency, and accuracy across protected groups. Industry groups must provide data and reproducible research demonstrating these qualities. The introduction of these new data should be conditioned on, and coordinated with, updates to relevant consumer protection laws. Determining how to responsibly bring new data sources online should be a priority for the financial inclusion community.

The promise of fringe alternative data remains more theoretical than proven. Until its predictiveness and fairness can be shown, it should be viewed with skepticism by advocates and regulators.

Next-generation digital marketing that is targeted with data derived from credit files might benefit responsible financial actors and consumers. But it also creates new opportunities for predation, particularly for underserved populations. These marketing scores are unique because they are derived from data that are gathered for the purpose of credit reporting. The online deployment of these scores is difficult for technologists to track. Regulators must take the lead in examining marketing scores' impact, particularly how they might impact the business practices of predatory actors and the lives of vulnerable individuals.

Appendix A . A Brief History of Credit Reporting and Consumer Credit Protections

For any lender, the process of underwriting — deciding how much credit to offer to whom, and on what terms — is among its most important tasks. Some small town bankers once enjoyed long-term familiarity with their customers, allowing them to make personal judgments of creditworthiness. But larger-scale merchants cannot know each customer personally, and in any case, individual judgments tend to be time-consuming, inconsistent and often biased. By the close of the 19th century, there was significant demand for centralized, standardized information about individual consumers' likelihood of paying back loans on time.

Despite the obvious value of information about consumers' creditworthiness, however, the high cost of gathering, storing and sharing information prevented the industry from taking off in the pre-computer era. Prior to World War II, "few retailers sold on credit, and those that did confined their credit business to well-known customers."[164] Merchants and landlords had to rely on word of mouth, letters of reference, and basic gossip.[165] During the 1950s and 1960s, small, local "bureaus" arose to help provide lenders with better information. Bureaus, often community-based or cooperative efforts between regional creditors, would track peoples' names, addresses, and loan information. They would also scour newspapers for notices of arrests, promotions, and marriages.

Such credit information was highly localized and non-standard, and some observers saw that its value might be increased if it were distilled into a summary form that would be easier for lenders to use. In the 1950s, Bill Fair and Earl Isaac began experimenting with statistical models to create a numeric "credit score" — a summary of a consumer's predicted creditworthiness, reflecting the relative likelihood that he or she would default on a credit obligation.[166] At first, lenders weren't particularly interested. In 1958, Fair and Isaac sent letters to America's 50 biggest credit grantors asking for an opportunity to explain the new concept. Only one replied.

But the arrival of digital computing marked a turning point for the industry, making mass credit reporting feasible in the form we know today.

The company that is now Equifax began life in 1899 as the Retail Credit Company of Atlanta, Georgia; its co-founders went door-to-door among local merchants to gather information about customers, which they then resold.[167] Over the years, the firm developed a reputation for being inattentive to consumer complaints about the accuracy of its files.[168] The public concern surrounding the company's plan to computerize its files in the late 1960s helped drive Congress to convene the hearings that led to the passage of the Fair Credit Reporting Act (FCRA).[169]

In this first foray into regulating credit bureaus, Congress's primary concern was the accuracy of credit files.[170] By the late 1960s, there were "no definitive studies" about inaccurate or misleading information in credit reports,[171] but there are signs that inaccuracy was a real problem. Reports of the day included "information on drinking; marital discords; adulterous behavior" and other types of gossip.[172] Millions of Americans changed their name, job, or residence — behavior that was likely difficult to track at the time, especially given that bureaus were local and their files were not coordinated. Given that as late as 1991, nearly half of consumer reports still contained errors,[173] it is likely the problem was far worse thirty years earlier.

Passed in 1970, the FCRA responded to the risk that errors in credit reports might lead to unfair denials of credit for individual consumers. It imposed new obligations on credit reporting agencies, forcing them to respond to consumer complaints about accuracy, keep files current as new information was provided to them, and provide greater visibility into the reasons for credit denials. The new law's compliance requirements, and the then-high capital cost of computerizing the files, helped a wave of consolidation among smaller, geographically localized credit bureaus. Small operations sold their files and exited the market. By the end of the 1970s, a smaller set of bureaus, now commonly referred to as "consumer reporting agencies," emerged as leaders. Today's "big three" credit bureaus were formed from smaller credit associations.[174]

Several years later, Congress added a second statute addressing a different problem in the industry: systematic unfairness in the standards

164. Robert H. Cole, Consumer and Commercial Credit Management 184 (8th ed. 1988).

165. Daniel B. Klein, Credit-Information Reporting: Why Free Speech Is Vital to Social Accountability and Consumer Opportunity, 5 The Independent Review 325, 330 (2001), *avaialable at* http://www.independent.org/pdf/tir/tir_05_3_klein.pdf.

166. See Adriene Hill, *A brief history of the credit score*, Marketplace.org (Apr. 22, 2014, 6:42 AM), http://www.marketplace.org/topics/your-money/marketplace-25/brief-history-credit-score.

167. Krista Reese, *Equifax*, New Georgia Encyclopedia, http://www.georgiaencyclopedia.org/articles/business-economy/equifax (last modified Aug. 19, 2013).

168. NCLC Fair Credit Reporting, *supra* note 85, at 13.

169. Simson Garfinkel, *Separating Equifax from Fiction*, Wired (Sep. 1995), *avaialable at* http://archive.wired.com/wired/archive/3.09/equifax.html.

170, 115 Cong. Rec. 2411, 2411 (Jan. 31, 1969), *avaialable at* https://archive.org/stream/congressionalrec115bunit#page/n1211/mode/2up (statement of Sen. Proxmire, "Perhaps the most serious problem in the credit reporting industry is the problem of inaccurate or misleading information.").

171. *Id.*

172. NCLC Fair Credit Reporting, *supra* note 85, at 12.

173. *Fair Credit Reporting Act: Hearing Before the H. Subcomm. on Consumer Affairs and Coinage of the H. Comm. on Banking, Finance, and Urban Affairs*, 102nd Cong. 12 (Jun. 6, 1991), *avaialable at* http://babel.hathitrust.org/cgi/pt?id=pst.000018280777;view=1up;seq=20 (statement of Rep. Rinaldo, "Consumers Union, as you may know, has just completed a study which showed that about 48 percent of the credit reports that they checked contained errors.").

174. Klein, *supra* note 165, at 331. ("TRW (now Experian), for example, broke into the business by taking over the Michigan Merchants' Credit Association. Experian, TransUnion, and Equifax have worked to integrate regional operations and have developed a uniform nationwide service.")

applied by lenders. The Equal Credit Opportunity Act (ECOA), enacted in 1974, initially grew out of Congressional concern that some lenders were unfairly restricting credit for women, by requiring credit-worthy single women to provide male cosigners for their loans.[175] Two years later, the law was expanded to cover unfair denials based on race and other grounds.[176] The ECOA is designed to protect consumers who belong to certain historically disadvantaged groups, by ensuring their access to the most favorable credit for which they individually qualify. The ECOA bars lenders from discriminating against any credit applicant "on the basis of race, color, religion, national origin, sex or marital status, or age."[177] Notably, the ECOA does not address the underlying differences in credit risk between communities, and opportunities for credit in the United States remain starkly uneven across gender, racial and other divides. The law simply ensures that borrowers do not face additional, unwarranted obstacles on account of a covered characteristic.

In the later decades of the 20th century, operating under the strictures of the FCRA and the ECOA, the scoring system pioneered by Fair and Isaac became ubiquitous. Fair and Isaac's company, FICO, first entered coded information through a computer terminal in 1975, and by the late 1980s, most national lenders were incorporating credit scores into their underwriting decisions.[178] (The earliest version of today's FICO score appeared in 1981.) In 1995, the concept of credit scoring became further entrenched when mortgage giants Fannie Mae and Freddie Mac required mortgage lenders to incorporate FICO scores in their approval process.[179] And around the same time, national credit-reporting agencies began developing their own credit scores.

By 1999, 94% of banks cited credit scoring as the most frequent method used for automated loan processes.[180] And even then, American Banker reported that "no [human being] even looks at any request for $50,000 or less — the computer does it all."[181]

The consumer credit market we know today, in which credit scores and automated underwriting play a central role, is the result of computerization and market trends, combined with the regulatory frameworks established by the FCRA and the ECOA.

175. See Note, *Equal Credit: You Can Get There From Here — The Equal Credit Opportunity Act*, 52 N.D. L. Rev. 381, 383 (1975-1976) [hereinafter ECOA Note] (citing, amongst other examples of official reports on the topic, S. Rep. No. 93-278, 93d Cong., 1st Sess. 16-17 (1973)).

176. *See* Equal Credit Opportunity Act Amendments of 1976, Pub . L. No. 94-239, § 2, 90 Stat. 251 (1976).

177. 15 U.S.C. § 1691(a)(1) (2012).

178. *Our History*, FICO, http://www.fico.com/en/about-us/history (last visited Jun. 1, 2014).

179. *Id.*

180. Kenneth G. Gunter, *Computerized Credit Scoring's Effect on the Lending Industry*, 4 N.C. Banking Inst. 443, 443 (Apr. 2000) (quoting, in note 4, Cheryl Jenkins Richardson, *Credit Scoring of the Future*, Collections & Credit Risk 19 (Apr. 1999)).

181. *See* Paul Nadler, *Weekly Adviser: Horror at Credit Scoring Is Not Just Foot-Dragging*, 164 Am. Banker, no. 211, Nov. 2, 1999, at 9.

Appendix B. The Fair Credit Reporting Act (FCRA)

The Fair Credit Reporting Act (FCRA) created a nationwide standard for consumer credit reporting. It seeks to ensure that "consumer reporting agencies" (CRAs) to act in ways that are "fair and equitable to the consumer, with regard to the confidentiality, accuracy, relevancy, and proper utilization of information."[182] More specifically, the law has a twofold purpose: ensuring fairness (through accuracy, relevancy, and disclosure requirements) and protecting privacy (through limiting disclosure and use of data held by CRAs).

Consumer reporting agencies are entities that provide "consumer reports" to third parties for the purposes of determining eligibility for credit, insurance, employment, or certain other transactions.[183] A "consumer report" is broadly defined as any communication by a CRA bearing on a consumer's creditworthiness, credit standing, credit capacity, character, general reputation, personal characteristics, or mode of living that is used or expected to be used for the purpose of making certain eligibility decisions.[184] Credit bureaus are emblematic CRAs, but a range of other entities that meet the statutory definition. The FCRA exempts entities that acquire information solely "first-hand" from consumers (including, perhaps, certain online lenders).[185]

"The FCRA has a twofold purpose: ensuring fairness and protecting privacy."

When the FCRA applies, consumers receive some important rights and protections. For example, CRAs must use reasonable procedures to ensure accuracy of information in consumer reports.[186] Consumers have the right to request, and to receive, the information a CRA holds about them.[187] And consumers can dispute the accuracy or completeness of data in his or her file.[188] As described in Section V, these requirements might prove especially challenging for CRAs dealing with fringe alternative data.

Congress also codified safeguards to protect privacy and confidentiality of consumer reports, limiting the circumstances under which CRAs can release an individual's consumer report. Those limited circumstances are called "permissible purposes," and include, for example, using the data in connection with a credit transaction involving a consumer.[189] Except for narrowly-defined "prescreening" practices, marketing is not a permissible purpose under the FCRA. However, as described in Section IV, credit bureaus find ways to leverage consumer report data anyways.

182. 15 U.S.C. § 1681(b) (2012).

183. 15 U.S.C. § 1681a(f) (2012).

184. 15 U.S.C. § 1681a(d)(1) (2012).

185. 15 U.S.C. § 1681a(d)(2)(A)(i) (2012).

186. 15 U.S.C. § 1681e(b) (2012).

187. 15 U.S.C. § 1681g (2012).

188. 15 U.S.C. § 1681i(a) (2012).

189. 15 U.S.C. § 1681b(a) (2012).

Appendix C. The Equal Credit Opportunity Act (ECOA)

The Equal Credit Opportunity Act is a federal law designed to stop creditors from unfairly denying credit opportunities to qualified borrowers on account of a "prohibited basis" such as the borrower's race or age. The ECOA prohibits creditors from discriminating "on the basis of race, color, religion, national origin, sex or marital status, or age."[190] First enacted in 1974, the law grew out of Congressional concern that some lenders were unfairly restricting credit for women, by requiring credit-worthy single women to provide male cosigners for their loans.[191] Two years later, the law was expanded to cover unfair denials based on race and other grounds.[192]

ECOA cases have often centered on human biases on the part of front-line lending staff, and have used borrowers' credit scores as an evidentiary benchmark for equal treatment. In other words, if minority borrowers are receiving credit on less favorable terms that non-minority borrowers who have similar credit scores, this difference may be evidence that front-line staff are discriminating against certain groups.[193]

Notwithstanding the ECOA's protections, opportunities for credit in the United States remain starkly uneven across gender, racial and other divides. Credit scores aim to reflect the risk that a consumer will default on a loan, and that risk itself is significantly uneven between racial groups.[194] The ECOA does not address these underlying problems — it aims, instead, to ensure that disadvantaged borrowers are not unfairly denied credit on a prohibited basis.

To achieve these goals, the rule implementing the ECOA — Regulation B — generally bars lenders from taking a prohibited basis into account "in any system of evaluating the creditworthiness of applicants."[195] However, lenders are permitted to give borrowers the chance to share such information as part of a self-test "designed and used specifically to determine the extent or effectiveness of a creditor's compliance" with the ECOA's requirements.[196]

Regulation B defines "an empirically derived, demonstrably and statistically sound, credit scoring system" (EDDSS). This term refers only to systems that are:

- Based on an appropriate sample of the applicant pool;
- Designed to predict applicants' creditworthiness with respect to the "legitimate business interests" of the creditor;
- "[D]eveloped and validated using accepted statistical principles and methodology"; and
- Periodically reviewed and revalidated.[197]

"The ECOA aims to ensure that disadvantaged borrowers are not unfairly denied credit on a prohibited basis."

190. 15 U.S.C. § 1691 (2012).

191. *See* ECOA Note, *supra* note 175.

192. *See* Equal Credit Opportunity Act Amendments of 1976, *supra* note 176.

193. *See, e.g.*, Settlement Agreement, United States v. Deposit Guaranty National Bank (1999), *avaialable at* http://www.justice.gov/crt/about/hce/documents/dgnbsettle.php (concerning an alleged "loan approval process under which [bank] employees exercised subjective judgments with respect to . . . loan applications and freely overrode the decisions indicated by applicants' credit scores . . .").

194. *See* FRB Scoring Study, *supra* note 5.

195. 12 C.F.R. § 1002.6(b)(1) (2014).

196. 12 C.F.R. § 1002.15(b)(1)(i) (2014).

197. 12 C.F.R. § 202.2(p) (2014).

Appendix C.

Although the law does not outright require EDDSS validation, many major lenders insist on it, for a variety of reasons. First, EDDSS systems are given a safe harbor allowing them to weigh an applicant's age (a powerfully predictive variable) because, within such systems, the consideration of age is deemed not to constitute discrimination. Second, other regulators have embraced the EDDSS requirements. For example, the Office of the Comptroller of the Currency has required the national banks that it regulates to conform their scoring systems to the definition, as has the National Credit Union Administration for credit unions.[198] Many mainstream scoring products, including the widest-used FICO score, claim in their marketing materials that they comply with the EDDSS rule.[199] Thus, EDDSS has become something of a best practice for large, mainstream scoring products — a frequently-touted compliance factor in fact sheets and white papers. Importantly, however, it is not a hard regulatory floor.

On July 21, 2011, the newly created Consumer Financial Protection Bureau assumed regulatory authority and responsibility for consumer financial protection, empowering it to interpret and enforce the FCRA, the ECOA, and more than a dozen other statutes that protect consumers in the financial markets.[200] In addition, the CFPB is authorized to conduct "supervisions," in which it reviews, on a confidential basis, financial institutions' compliance with these laws.

Much of the regulatory framework for fair lending remains the same under the CFPB as it was before the Bureau's creation. But one early decision by the Bureau may significantly broaden the reach of fair lending law: The Bureau has taken the position that "the legal doctrine of disparate impact [is] applicable" to creditors under the ECOA and Regulation B.[201]

In a disparate impact case, the fact that a challenged policy tends to have a particularly harmful effect on a protected group can be enough to sustain a finding of discrimination, without any evidence that the defendant (here, a creditor) intended to discriminate.

Existing cases and legal documents do not make clear precisely how the CFPB intends to interpret and apply its claimed disparate impact authority. In one of its first actions under the disparate impact theory, the CFPB issued guidance regarding "indirect" car purchase loans,[202] where a car dealer individually negotiates loan terms with a buyer as part of the sales process. The CFPB warned, based partly on its "supervisory experience," that the incentives for hard bargaining in these situations create "a significant risk [of] pricing disparities on the basis of race, national origin, and potentially other prohibited bases."[203] However, the CFPB has not publicly shared the basis for this finding. Given the strict confidentiality rules that surround CFPB supervision, there is some uncertainty around how much information from its supervisory activities the CFPB can permissibly reveal. However, the Bureau may be free to share supporting data which does not implicate the privacy interests of specific firms (such as market-wide data), as well as more information about its methodologies.

Disparate impact is a complex and unsettled area of legal doctrine. Not only the mechanics, but also the fundamental purposes of the doctrine, are subject to argument.[204] Legal scholars argue over whether the ECOA even permits such claims, and the CFPB's position has, predictably, attracted significant criticism.[205] (The courts have yet to weigh in. A legal challenge to a new rule under the Fair Housing Act — which read similar language in that Act to allow for disparate impact claims — was granted certiorari at the Supreme Court, but settled before the Court could resolve it.[206])

Fair lending law traditionally focuses on human bias (even the CFPB's initial use of disparate impact doctrine focused on the human element of auto loans), but the theory could be a powerful tool for investigating computer systems whose effects may reinforce existing bias.

198. NCLC Credit Discrimination, *supra* note 124, at 264.

199. FICO Safe and Sound, *supra* note 144.

200. *See* Linda Singer, Zachary Best & Nina Simon, *Breaking Down Financial Reform A Summary of the Major Consumer Protection Portions of the Dodd-Frank Wall Street Reform and Consumer Protection Act*, 14 J. Consumer & Com. L. 2, 3 (2010).

201. Consumer Financial Protection Bureau, Bulletin No. 2012-04 (Fair Lending) 1 (Apr. 18, 2012), *avaialable at* http://files.consumerfinance.gov/f/201404_cfpb_bulletin_lending_discrimination.pdf.

202. Consumer Financial Protection Bureau, Bulletin No. 2013-02 (Indirect Auto Lending and Compliance with the Equal Credit Opportunity Act) (Mar. 21, 2013), *avaialable at* http://files.consumerfinance.gov/f/201303_cfpb_march_-Auto-Finance-Bulletin.pdf.

203. *Id.* at 2.

204. For example, some see the doctrine as an "evidentiary dragnet" designed to cover cases where a malicious, discriminatory purpose exists but cannot be shown in court; others argue that the doctrine is designed primarily for instances where the defendant acted innocently but in a way that unintentionally reinforced racial or other disparities. See Richard A. Primus, Equal Protection and Disparate Impact: Round Three, 117 Harv. L. Rev. 493, 498-499 (2003); see also Richard A. Primus, The Future of Disparate Impact, 108 Mich. L. Rev. 1341 (2010).

205. *See*, e.g., Letter from a group of Republican House Members to Patrice Ficklin, Assistant Director, Office of Fair Lending and Equal Opportunity, Consumer Financial Protection Bureau (Jun. 20, 2013), *avaialable at* http://www.infobytesblog.com/wp-content/uploads/2013/06/6-20-13-Republicans-Letter-to-CFPB-re-Auto-Lending.pdf.

206. *See* Jann Swanson, *Disparate Impact Case Settled Before Going to Supreme Court*, Mortgage News Daily (Nov. 1, 2013, 3:08 PM), *avaialable at* http://www.mortgagenewsdaily.com/11012013_fair_housing_eoca.asp.

Appendix D. Online Tracking Fundamentals

We use the term "online tracking" to refer to online data collection about an individual that is not intent ionally provided by that individual. Persistent data storage mechanisms (like browser cookies) are the primary means by which large "third-party advertising networks" amass behavioral profiles. Geographic location data is also readily available in many online environments and can be very revealing. And tracking companies can combine these and other types of data to create even more powerful profiles for targeting.

Online Behavioral Profiling

Modern websites are engineered to track users from the moment a webpage loads. Whenever a user visits a website, that website will routinely collect data about the user's computer, including the user's Internet Protocol (IP) address, information about her web browser and operating system, and the time of her visit. (An IP address is a numerical label that functions like a postal address: it tells the website where to send its content.)

Websites will typically place one or more "browser cookies" — small text files — on the user's computer. A cookie will often contain a uniquely identifying number, and it can be accessed by the website during subsequent visits by the user. Cookies allow websites to recognize that they are interacting with a user that they have seen before. Cookies provide a useful function, enabling websites to remember users' preferences or to keep a user logged in across visits. But cookies also enable widespread online tracking, allowing a website to accumulate information about a user's activities over time.

Importantly, most websites automatically direct a user's browser to contact multiple third-party networks, with whom the website (but not the user) has a relationship. For example, a newspaper's website may tell a user's browser to contact advertising networks (to fetch display ads), analytics services (to record the user's visit and referring page), and social networks (to add a "Like" button). All of this happens quickly and quietly in the background, as a website loads. These third-party networks can often place their own cookies, and keep their own records of a user's activities.

A user can thus unknowingly reveal his online browsing behavior to many third parties each time he visits a single webpage. Many of these third parties will plant their own cookies or another type of marker to help facilitate tracking. For example, visiting Dictionary.com in 2010 could result in a browser downloading 223 separate files from web tracking companies.[207]
Some of these tracking companies have enormous coverage, allowing them to amass detailed behavioral profiles based on a user's browsing behavior across many websites and over long time periods of time. For example, Google's advertising tools were found on 70% of the top 100 websites in 2009.[208] This sort of tracking is the bedrock of online data collection.

Geolocation

A user's geographic location is often accessible to websites and mobile apps. Marketing firms can build location data into user profiles, enabling them to target users based on their city, neighborhood, or current location.

There are several ways to ascertain an individual's location as they browse the web. For example, a user's IP address, which is the "return address" when communicating with websites, can reveal his country, region, city, and postal code. The accuracy of location data derived from an IP address varies based on a user's internet service provider, country, and other factors.[209]

Mobile devices provide range of additional capabilities that can provide far more precise information about a user's location. For example, most mobile devices come with global positioning system (GPS) hardware, allowing satellites to triangulate the device's location within a few meters. Even without GPS, nearby cell phone towers can offer location information through a similar process called "cellular triangulation." And perhaps most surprisingly, even the Wi-Fi signals that are near a user's device can be collected to determine the user's current location.[210] Many physical retailers are beginning to use this technique in stores, to track shoppers as they walk through the stores' aisles.[211]

207. Julia Angwin, *The Web's New Gold Mine: Your Secrets*, Wall St. J., Jul. 30, 2010, *avaialable at* http://online.wsj.com/news/articles/SB10001424052748703940904575395073512989404.

208. Joshua Gomez, Travis Pinnick, Ashkan Soltani and Brian Carver, KnowPrivacy 27 (Jun. 1, 2009), http://knowprivacy.org/report/KnowPrivacy_Final_Report.pdf.

209. *See, e.g., GeoIP2 City Accuracy for Selected Countries*, MaxMind, https://www.maxmind.com/en/city_accuracy (last visited Jun. 20, 2014) (MaxMind, a major provider of IP geolocation services, claims that it can correctly identify a U.S. user's city within forty kilometers 83% of the time. It's accuracy is only 37% for locations in Algeria.).

210. This is because a number of companies, including Google and Apple, have built extensive databases associating Wi-Fi access points with physical locations.

211. *See, e.g.*, Natasha Singer, *Attention, Shoppers: Store Is Tracking Your Cell*, N.Y. Times, Jul. 15, 2013, at A1, *avaialable at* www.nytimes.com/2013/07/15/business/attention-shopper-stores-are-tracking-your-cell.html.