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The Emperor's New Codes: Reputation and Search Algorithms in the Finance Sector

Frank Pasquale

Algorithmic methods generate financial reputations by producing consumer credit scores and informing online offers. Complex modeling is an essential part of contemporary securitizations. Algorithmic traders relentlessly search for arbitrage opportunities. This paper develops a normative framework for study of these algorithms, and the social relations they are embedded in.

Reputation-generating algorithms tend to enhance productivity and respect human dignity to the extent they (and the data they are based on) are open, contestable, and diverse. Unfortunately, present commercial imperatives and legal rules bias the finance sector to favor reputation algorithms that fail on all three counts.

The algorithms of securitization can put a patina of mathematical rigor on opportunistic and even fraudulent deals. High-frequency traders can combine rule manipulation and brute speed to extract value from normal trading activities. Normative evaluation of finance's search algorithms must take into account the sector's social function: to spur investment in a fair, sustainable, and efficient future. It is by no means clear that finance algorithms reliably contribute to any of these goals.

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Rules are empty in themselves The successes of history belong to those who are capable of seizing these rules, to replace those who have used them, to disguise themselves so as to perfect them, invert their meaning, and redirect them against those who had initially imposed them.

— Michel Foucault, *Language, Counter-Memory, Practice*

[W]hat if we created a ‘thing’, which has no purpose, which is absolutely conceptual and highly theoretical and which nobody knows how to price? Anyway, not feeling too guilty about this, the real purpose of my job is to make capital markets more efficient and ultimately provide the U.S. consumer with more efficient ways to leverage and finance himself, so there is a humble, noble and ethical reason for my job ;)

-- Fabrice Tourre, email

I. Introduction

Over the past few decades, more decisions in the finance sector have been made computable: they follow steps in mathematicized procedures, and use complex pattern recognition techniques deployed to analyze massive data sets. Elaborately algorithmic sets of rules govern transactions ranging from consumer loans to securitizations. They were supposed to rationalize finance, replacing gut instinct and bias with sound decision frameworks. But it seems that some new tools of constructing financial reputations, and searching for value, are recapitulating old patterns of credit castes, unaccountable corporate power, and financial instability. Even worse, they are starting to give these avoidable features of our social landscape a patina of inevitability—to naturalize, and thus entrench, inequality.

The boosters of these technologies have tended to make large claims for them. For example, credit scoring was to replace the biases and whims of local mortgage officers with expert, neutral, and consistent allocations of credit. Mortgage-backed securities and derivatives based on them promised to manage and minimize credit and counterparty risk. Idealistic pioneers pushed stock and commodities trading away from

physical exchanges and “out of the pits”¹ in order to squeeze out parasitic middlemen and narrow the “bid-ask” spread in any given trade.²

The algorithmic tools deployed in all these scenarios did indeed reduce some inefficiencies, and knocked now-vestigial middlemen out of the industry. Yet they’ve also had many troubling consequences. Black box algorithms—obscured by a triple layer of technical complexity, real secrecy, and trade secret and “economic espionage” laws that can land would-be whistleblowers in prison—fueled the crisis of 2008. As the *Financial Times’s* John Gapper has explained, “the opacity and complexity of credit derivatives . . . let deception, overpricing and ultimately fraud flourish.”³

Long kept secret and immune from contestation, Wall Street’s reputation and search methods created ample opportunities for self-serving and opportunistic behavior in finance. Many contemporary securities are complex; a firm is likely to model their value (as one might model the likely productivity of a worker, or the relevance of a website) on the basis of complex calculations. “From this black box came the bulk of revenues and bonuses” during the financial crisis, Gapper observed.⁴

Hidden conflicts of interest have long haunted Wall Street firms, so it would be foolish to argue that algorithmic methods somehow hijacked or corrupted American finance.⁵ But it would also be a mistake to pass over questions concerning technology in finance, because modeling methods and automation have vastly expanded the sector’s capability to create (and destroy) purchasing power. Algorithmic methods also advance two of the most troubling aspects of contemporary finance: centralization and self-reference.⁶ As Amar Bhide has argued, the idea of “one best way” to rank credit applicants flattened the distributed, varying judgment of local loan officers into the

¹ See CAITLIN ZALOOM, *OUT OF THE PITS: TRADERS AND TECHNOLOGY FROM CHICAGO TO LONDON* (2006).

² See, e.g., DONALD MACKENZIE & JUAN PABLO PARDO-GUERRA, *INSURGENT CAPITALISM: ISLAND, BRICOLAGE AND THE RE-MAKING OF FINANCE* 5, available at http://www.sps.ed.ac.uk/__data/assets/pdf_file/0003/97500/Island34.pdf (“Island exemplified a specific thread within computer programming in the United States: ‘hacker’ culture. This was and is libertarian . . . committed to opening up technologically or socially closed systems, and hostile to over-restrictive forms of intellectual property.”); SCOTT PATTERSON, *DARK POOLS: HIGH SPEED TRADERS, AI BANDITS, AND THE THREAT TO THE GLOBAL FINANCIAL SYSTEM* (2012).

³ John Gapper, *The Price of Wall Street’s Black Box*, *FIN. TIMES*, June 22, 2011, <http://www.ft.com/intl/cms/s/0/fe7aaec6-9d00-11e0-8678-00144feabdc0.html>.

⁴ *Id.*

⁵ For historical accounts of corrupt or conflicted practices, see JOHN K. GALBRAITH, *THE GREAT CRASH OF 1929* (2009); FRED SCHWED, *WHERE ARE THE CUSTOMERS’ YACHTS?* (2006); DOUG HENWOOD, *WALL STREET: HOW IT WORKS AND FOR WHOM* (1988); ROBERT KUTTNER, *A PRESIDENCY IN PERIL* 112, 231 (2010).

⁶ See generally David Golumbia, *High-Frequency Trading: Networks of Wealth and the Concentration of Power*, 24 *SOCIAL SEMIOTICS*, (forthcoming 2013), available at <http://www.uncomputing.org/wp-content/uploads/2012/12/golumbia.high-frequency-trading.pre-pressDec2012.pdf>; AMAR BHIDE, *A CALL FOR JUDGMENT* (2010).

nationwide credit score—a number focused on *persons* rather than *communities*.⁷ Like monocultural farming technology vulnerable to one unanticipated bug,⁸ the converging methods of credit assessment failed spectacularly when macroeconomic conditions changed. The illusion of commensurability and solid valuation provided by the models that mortgage-based securities were based on helped spark a rush for what appeared to be easy returns, exacerbating both boom and bust dynamics.

In finance, algorithmic methods—reducing a given judgment or process to a series of steps—have long been billed as ways of leveling the playing field, and reducing risk. In each of these areas, algorithms of credit scoring, return estimates, and order matching were supposed to replace, displace, or reduce the role of biased or self-serving intermediaries, ranging from mortgage loan officers to “specialist” traders. But all too often, new middlemen arose, finding ways to extract even more from transactions than their predecessors. Computerization may simply accelerate, rather than reform away, traditional pathologies of finance markets.

In this paper, Part II sketches the rise of algorithms to determine consumers’ financial reputations, particularly in regard to credit scoring. Part III examines the twinned functions of models in first advancing, and then deranging, the market for mortgage-backed securities. Part IV examines the logic of algorithmic trading, tracing its evolution from an obvious modernization of antiquated, in-person exchanges, to a growing threat to the stability of financial markets. In each of these areas, algorithms and computerization have increased the speed with which consumers can get loans, investment bankers can package and repackage securities, and traders can buy or sell stocks. Yet it’s by no means clear they have contributed to a more sound economy. Part V suggests that the current regulatory agenda for these three areas of finance—focused on transparency and monitoring—may only intensify the trends it is ostensibly reacting against. Part VI concludes with some reflections on alternative paths in financial reform, designed to promote more substantive goals than disclosure.

⁷ AMAR BHIDE, A CALL TO JUDGMENT (2010); see also Meredith Schramm-Strosser, *The “Not So” Fair Credit Reporting Act: Federal Preemption, Injunctive Relief, and the Need to Return Remedies for Common Law Defamation to the States*, 14 DUQ. BUS. L.J. 165, 169 (2012) (“A consumer’s reputation and credibility is determined not by personal interactions with others in a small community, but by examining credit files in an impersonal global world.”).

⁸ Miguel Altieri, *The Ecological Impacts of Agricultural Biotechnology*, ACTION BIOSCIENCE, <http://www.actionbioscience.org/biotech/altieri.html> (last visited Apr. 25, 2013, 10:15 AM)

II. Algorithmic Reputations: The Rise of Consumer Credit Scoring

Modern societies produce enormous amounts of goods and services.⁹ As surpluses develop—of cars, houses, labor, capital—societies increasingly shift their energies toward another endeavor: deciding who gets to access the surplus (and on what terms), and who is a threat to the order that allows a surplus to accumulate (and how to limit their liberty).¹⁰ Reputational systems have always played some role in economic production and social order.¹¹ But they have proliferated over the past decade, driven by corporate profit opportunities and government security concerns.¹² Indeed, one of the fastest growing parts of our economy combines the two: homeland security contractor budgets have grown so fast that even top intelligence officials can't get a handle on the total amount spent each year.¹³ Having catalyzed innovations like interchangeable parts and the internet, security spending now underwrites a de facto American industrial policy of promoting secret surveillance and risk classification.¹⁴

The cutting edge of reputation management is *scoring systems*, which reduce a welter of details about persons into a score ranking them above or below others.¹⁵ These scoring systems are zealously guarded trade secrets.¹⁶ The most notable one—credit scoring—has developed over at least the past six decades in the United States.¹⁷

⁹ Andrew Abbott, Professor of Psychology, Chicago University, Lecture at the London School of Economics and Political Science: Scarcity, Abundance, Excess: Towards a Social Theory of Too Much, (Mar. 21, 2013), available at <http://www2.lse.ac.uk/management/news-and-events/events/Public-Lectures/130321-Andrew-Abbott.aspx> (observing that the allocation of excess is just as great a problem for social theory as dealing with scarcity).

¹⁰ Economists Bowles and Arjadev have called the latter endeavor “guard labor,” and it takes up a surprising amount of the economy—perhaps as much as 20%. Samuel Bowles & Arjun Arjadev, *Guard Labor: An Essay in Honor of Pranab Bardhan* 21 (Univ. of Massachusetts – Amherst, Economics Dep’t Working Paper Series, No. 63, 2004), available at http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1068&context=econ_workingpaper/.

¹¹ See, generally, Sandeep Gopalan, *Shame Sanctions and Excessive Ceo Pay*, 32 DEL. J. CORP. L. 757 (2007).

¹² Ronald J. Mann, *Information Technology and Non-Legal Sanctions in Financing Transactions*, 54 VAND. L. REV. 1627, 1637–1640 (2001).

¹³ See WILLIAM M. ARKIN & DANA PRIEST, *TOP SECRET AMERICA* (2012).

¹⁴ See VERNON RUTTAN, *IS WAR NECESSARY FOR ECONOMIC GROWTH?* (2006); cf. J. BRADFORD DELONG AND STEPHEN S. COHEN, *THE END OF INFLUENCE* (2010).

¹⁵ Mann, *supra* note 12, at 1638; Hussein A. Abdou & John Pointon, *Credit Scoring, Statistical Techniques and Evaluation Criteria: A Review of the Literature*, 18 INTELLIGENT SYS. IN ACCOUNTING, FIN., & MGMT. 59, 2–3 (2011).

¹⁶ Evan Hendricks, *Credit Reports, Credit Checks, Credit Scores*, 28 GPSOLO 32, 34 (2011) (“Like the recipe for Coca-Cola, the precise formulas used to calculate various kinds of credit scores are well-guarded trade secrets. Nonetheless, FICO has released enough information to give a very general idea of how scores are calculated.”)

¹⁷ Abdou & Pointon, *supra* note 15, at 2.

Credit evaluation reflects larger trends in industrial organization.¹⁸ At the dawn of installment credit schemes, stores would decide on a case-by-case basis whether to offer customers credit.¹⁹ By the 1920s, the large chains centralized evaluative processes and hired experts to make decisions.²⁰ After World War II, specialist finance companies entered the mix.²¹ Bank of America (then the largest bank, and now the largest bank holding company, in the U.S.) and Chase Manhattan were offering “general purpose bank credit cards,” accepted at many retailers, in the late 1950s.²²

Bankers realized that there would be two main sources of profits from credit cards: interest payments from customers, and fees paid by retailers to join their network.²³ They also faced the “chicken and egg” problem of nascent network industries: few customers would want to carry cards only accepted at a few stores, but few stores would accept cards only held by a few consumers.²⁴ Aggressive mail campaigns solved the dilemma, eventually attracting millions of customers.²⁵ By the late 1990s, the US had the world’s largest and oldest credit card market.²⁶

Automation was essential to the massive expansion of loanable funds.²⁷ To assess potential cardholders, credit scorecards developed in the United States in the 1950s.²⁸ Leading the field, William R. Fair and Earl J. Isaac started a firm called Fair, Isaac & Co. (now known as FICO) in 1956.²⁹ Fair, Isaac’s first major marketing initiative

¹⁸ Louis Hyman, *Debtor Nation: The History of America in Red Ink* (2010).

¹⁹ See ROBERT F. MANNING, *CREDIT CARD NATION* (1998); EDWARD M. LEWIS, *AN INTRODUCTION TO CREDIT SCORING* (1994).

²⁰ EVANS CLARK, *FINANCING THE CONSUMER* 1–15, 114–56, 358 (Harper & Brothers, 1930).

²¹ STAN SIENKIEWICZ, *CREDIT CARDS AND PAYMENT EFFICIENCY 3* (discussion paper, 2011), *available at* http://www.philadelphiafed.org/payment-cards-center/publications/discussion-papers/2001/PaymentEfficiency_092001.pdf (“In the early 1900s, oil companies and department stores issued their own proprietary cards.” Such cards were accepted only at the business that issued the card and in limited locations.); *see also* Ben Woolsey & Emily Starbuck Gerson, *The History of Credit Cards*, CREDITCARDS.COM (May 11, 2009), <http://www.creditcards.com/credit-card-news/credit-cards-history-1264.php>.

²² SIENKIEWICZ, *supra* note 22, at 3; Donncha Marron, *Lending by the Numbers: Credit Scoring and the Constitution of Risk within American Consumer Credit*, 36 *ECON. & SOC.* 103, 107 (2007).

²³ Woolsey & Gerson, *supra* note 21.

²⁴ SIENKIEWICZ, *supra* note 22, at 3.

²⁵ *Part 3: The Development of Consumer Credit Evaluation*, MUSEUM OF MONEY & FIN. INST., <http://museumofmoney.org/exhibitions/credit/index.html> (last visited Apr. 25, 2013, 11:13 AM).

²⁶ *See* Alya Guseva & Akos Rona-Tas, *Uncertainty, Risk, and Trust: Russian and American Credit Markets Compared*, 66 *Am. Soc. Rev.* 623 (2001); Rick Ferguson, *Using Private Label Credit Cards as a Loyalty Tool*, 23 *J. CONSUMER MARKETING* 374 (2006).

²⁷ *See* GEORGE M. HALL, *THE AGE OF AUTOMATION* (1995).

²⁸ Kenneth G. Gunter, *Computerized Credit Scoring's Effect on the Lending Industry*, 4 *N.C. BANKING INST.* 443, 445 (2000).

²⁹ Martha Poon, *Scorecards as Market Devices for Consumer Credit*, in *MARKET DEVICES* 288 (Callon, Millo, & Muniesa, eds. 2007).; *Fair, Isaac & Company History*, FUNDINGUNIVERSE (last visited Apr. 20, 2013, 4:17 PM) <http://www.fundinguniverse.com/company-histories/Fair-Isaac-and-Company-Company-History.html>

promoted its services to 50 banks and finance companies.³⁰ Only one responded. However, its business steadily grew over time, and FICO remains powerful, despite efforts of credit bureaus to develop their own scoring systems.³¹ FICO scores are now ubiquitous, used by leading businesses to predict whether given consumers will default on their debts.³²

They also proved very useful in the mortgage market. GSEs like Fannie Mae and Freddie Mac usually had to assure that the overall profile of bundled mortgages would merit the highest assessment that credit rating agencies (CRAs) (like Moody's and Standard and Poor's) could offer.³³ The GSEs first assessed the quality of potential borrowers by checking whether residential mortgage credit reports (RMCRs) conformed to standards.³⁴ They found that the mortgage brokers could easily manipulate RMCRs, which were cobbled together from credit bureau histories and other data.³⁵ John Straka, Director of Consumer Modeling at Freddie Mac at the time, decided to use numerical commercial credit bureau scores instead.³⁶ In 1995, both Fannie and Freddie

³⁰ Poon, *supra* note 29, at 289.

³¹ A court case describes the fight between FICO and credit bureaus over this. *Fair Isaac Corp. v. Experian Info. Solutions Inc.*, 645 F. Supp. 2d 734 (D. Minn. 2009), *aff'd*, 650 F.3d 1139 (8th Cir. 2011) and *aff'd*, 650 F.3d 1139 (8th Cir. 2011). Generally, courts use protective orders in litigation involving trade secrets. *See, e.g.*, *Textured Yarn Co. v. Burkart-Schier Chem. Co.*, 41 F.R.D. 158 (E.D. Tenn. 1966).

³² On predicting "derogatory events," see *The FICO Score*, CREDITSCORING (last visited Apr. 20, 2013, 4:25 PM) (quoting Michael E. Staten, Georgetown University) ("The FICO risk score is derived from a statistical model that uses information on credit use from credit bureau files to predict the likelihood that a consumer will have a serious delinquency, bankruptcy, or other major derogatory event in the next two years.").

³³ Securities law not only required certain ratings, but also required that raters be "Nationally Recognized Statistical Rating Organizations," a regulatory license. *See Nationally Recognized Statistical Ratings Organizations and Investor Protection: Hearing Before the U.S. Comm. on Gov. Affairs*, Sen. Hrg 107-471, at 43 (2002) (testimony of Jonathan R. Macey, Professor of Law, Cornell Law School), available at http://handy.gslsolutions.com/gov/senate/hsgac/public/_archive/032002macey.htm; *see also* Frank Pasquale, *Rating Agencies: Privilege Without Responsibility*, CONCURRING OPINIONS (July 19, 2009, 11:55 AM), <http://www.concurringopinions.com/archives/2009/07/rating-agencies-privilege-without-responsibility.html>.

³⁴ *See* Joe Wallace, *FHA Loans: What is a Residential Mortgage Report?*, FHA NEWS BLOG (Oct. 5, 2011), <http://www.fhanewsblog.com/2011/10/fha-loans-what-is-a-residential-mortgage-credit-report/>.

³⁵ Martha Poon, *From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance*, 34 ACCT., ORG., AND SOC'Y 654, 662 (2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1458545 ("Expected to balance a complex set of objectives – promoting flexible and affordable housing, all while maintaining their reputation for investment quality products, rewarding their shareholders, and adequately controlling risk– the Agencies were facing considerable pressure from all sides to gain consistent knowledge of the quality of loans.").

³⁶ John W. Straka, *A Shift in the Mortgage Landscape: The 1990s Move to Automated Credit Evaluations*, 11 J. of Housing Res., 207, 207–232 (2000). *See also* Poon, *supra* note 35, at 658–59 ("The strength of the bureau scores as risk management aids is that they give competitive lending firms equal access to general snapshots of the consumer that are continuously recalculated as new data is amassed from participating lenders. Such scores are by no means produced from an 'ideal' data set.").

announced that borrowers needed a credit score of at least 660 (on FICO's scale of 300 to 850) in order for loans to "qualify for prime investment."³⁷ Those below 660 were relegated to "subprime" offerings, while those above could enjoy much better rates.³⁸

As Martha Poon has shown, the credit score quickly became a keystone of the mortgage market.³⁹ For CRAs to rate mortgage-backed securities, credit bureaus had to score the consumers who would be the ultimate source of payments.⁴⁰ The late 1990s marked a rapid move toward "risk-based," automated pricing strategies for mortgage firms.⁴¹ Lower computing and storage costs enabled the development of new statistical models, which in turn raised demand for more computational capacities.⁴²

According to Poon, the credit score was part of a "long chain of financial connections that have come to co-ordinate the economic agencies of ordinary US homeowners with those of international capital investors" who were eager to invest in highly rated securities in the mid-2000s.⁴³ When an investor purchases a mortgage-backed security (MBS), it is buying the right to a stream of payments.⁴⁴ The mortgagor (borrower) shifts from paying the original mortgagee (lender) to paying the purchaser of the MBS, usually via a servicer.⁴⁵ As law professor Chris Peterson observes, the new financing schemes were dauntingly complex:

After the Great Depression, most mortgage loans could be characterized as three-party transactions: a borrower, a lender, and a federal government sponsored institution that backstopped the lender by purchasing or guaranteeing the mortgage. In comparison, contemporary asset-backed securities conduits often have eleven or more integral parties: a borrower, a broker, an originator, a seller, an underwriter, a trust, a trustee, multiple servicers, a document custodian (which may be

³⁷ Poon, *supra* note 35, at 662.

³⁸ *Id.* at 664.

³⁹ *Id.* at 664, 670.

⁴⁰ *Id.* at 662.

⁴¹ *Id.* at 667; see also WILLIAM EDELBERG, RISK-BASED PRICING OF INTEREST RATES IN HOUSEHOLD LOAN MARKETS 2 (2003), available at <http://www.federalreserve.gov/pubs/feds/2003/200362/200362pap.pdf> (Federal Reserve Board working paper.)

⁴² Poon, *supra* note 35, at 668.

⁴³ *Id.* at 655.

⁴⁴ Chris Wilson, *What is a Mortgage Backed Security?*, SLATE (Mar. 17, 2008), http://www.slate.com/articles/news_and_politics/explainer/2008/03/what_is_a_mortgagebacked_security.html.

⁴⁵ *Mortgage Backed Securities*, PIMCO (Feb. 2009), <http://www.pimco.com/EN/Education/Pages/MortgageBackedSecurities.aspx> ("The Agency or private entity then sells claims on that cash flow, in the form of securities (bonds), to investors. After the initial sale, MBS trade on the open market . . . Mortgage payments, consisting of interest and principal, are passed through the chain, from the mortgage servicer to the bondholder.").

closely involved in foreclosure proceedings), an external credit enhancer, a securities placement agent, and investors.⁴⁶

The mere personal assessment of a local lender was not enough to reassure the myriad parties critical to contemporary housing finance. The securitization market depended on a common, nationwide metric for assessing credit risk.⁴⁷ Fannie Mae, Freddie Mac, and networks of investors helped promote the score as a “calculative risk management technolog[y].”⁴⁸

At first, banks, retail establishments, and mortgage lenders wanted only to separate the wheat from the chaff, asking Fair Isaac and the credit bureaus that used its algorithm to establish a “cut-off” score below which individuals would be ineligible for credit.⁴⁹ As Poon shows, a simple on/off binary risked missing out on the most lucrative customers.⁵⁰ Offered deals by multiple services, those with high scores could be relatively choosy in seeking out the lowest interest rates.⁵¹ The balance of power started to shift as the stigmatized “subprime” borrowers entered the equation, happy to take on a higher interest rates in exchange for a piece of the American dream.⁵²

Promoted as a road to opportunity, the aspiration to price credit according to scores had a darker side. Abuses quickly piled up, as “some large financial institutions peddled mortgages to people who could not possibly pay the monthly rates.”⁵³ Subprime structured finance generated enormous fees for middlemen and those with

⁴⁶ Christopher L. Peterson, *Subprime Structured Finance*, 28 CARDOZO L. REV. 2185, 2256 (2009).

⁴⁷ See e.g., Alvin C. Harrell, *Commentary: The Subprime Lending Crisis—the Perfect Credit Storm?*, 61 CONSUMER FIN. L.Q. REP. 626, 632 (2007) (arguing that the “increased role of nationwide mortgage lenders and securitization markets cries out for increased uniformity.”).

⁴⁸ Poon, *supra* note 35, at 554, 669 (“[W]hat might look like the spontaneous rise (and fall) of a ‘free’ market divested of direct government intervention, has been thoroughly embedded in the concerted movement of technological apparatuses.”).

⁴⁹ POON, *supra* note 29 at *

⁵⁰ *Id.* at *

⁵¹ *Id.* at *

⁵² Poon, *supra* note 35, at 555 (unscrupulous behavior of lenders was “[c]ompounded by naïve borrowing.”) This was not simply an instance of them being fooled or swept into irrational enthusiasm. As many scholars of wealth have demonstrated, housing ownership has proven to be the most pervasive method of wealth accumulation in the US. See, e.g., Jasmin Sethi, *Another Role for Securities Regulation: Expanding Investor Opportunity*, 16 FORDHAM J. CORP. & FIN. L. 783, 789–90 (2011) (“[P]romoting wealth through the ownership of housing for the middle and lower income classes has long been a mainstay of U.S. social policy . . . home ownership may be the area for which the connection to wealth accumulation has been the most clearly articulated.”); Cheryl I. Harris, *What the Supreme Court Did Not Hear in Grutter and Gratz*, 51 DRAKE L. REV. 697, 709 (2003) (“Most Americans accumulate wealth through home ownership.”).

⁵³ Margaret Atwood, *Our Romance with Debt—We’ll Pay Later*, CNN, <http://www.cnn.com/2008/SHOWBIZ/books/10/07/atwood.debt/> (last visited Apr. 25, 2013, 12:22 PM).

“big short” positions, while delivering financial ruin to many end-purchasers of mortgage-backed securities and millions of homebuyers.⁵⁴

The credit score was crucial to creating this class of borrowers.⁵⁵ It helped move the mortgage industry from “control-by-screening,” which aimed merely to eliminate those who were unlikely to pay back their debts, to “control-by-risk characterized by a segmented accommodation of varying credit qualities.”⁵⁶ As credit scores influenced the mortgage business, they encouraged not merely variable pricing of the interest rates, but also the spread of once-marginal, risky “products,” like adjustable rate mortgages.⁵⁷ As local, individualized, and personal application of rules gave way to national, generalized, and automated scoring, investors felt more comfortable making leveraged bets on the ultimate performance of mortgage-backed securities.⁵⁸

Puzzled Consumers

Long before the housing market collapse, critics were questioning the credit scoring system. A senior research economist at the Federal Reserve Bank of Cleveland has concluded that consumers are “often puzzled by how and why their scores change.”⁵⁹ Responding to the confusion, books, articles, and websites offer copious advice on scoring systems. Amazon offers dozens of self-help books on the topic, each capitalizing on credit scoring’s simultaneously mystifying and meritocratic reputation.⁶⁰ While consumer finance expert Liz Pulliam Weston soberly opines on “your credit score and what’s at stake,”⁶¹ less scrupulous authors make dubious claims.⁶² Hucksters abound in the cottage industry of do it yourself credit repair. Titles blithely offer “Seven Steps to a 720 Credit Score,”⁶³ “The Road to 850,”⁶⁴ or “Insider Secrets to Getting Your Credit Score up to 750.”⁶⁵

⁵⁴ See MICHAEL LEWIS, *THE BIG SHORT* (2011); ROBERT BRENNER, *WHAT’S GOOD FOR GOLDMAN SACHS IS GOOD FOR AMERICA* (2009), available at eScholarship, Univ. of CA, <http://www.escholarship.org/uc/item/0sg0782h>.

⁵⁵ Poon, *supra* note 35, at 657 (“[T]he intensification of high-risk lending has been built out of the GSE’s very own initiatives to wrest calculative control over mortgage finance.”).

⁵⁶ *Id.* at 658.

⁵⁷ William N. Eskridge, Jr. *One Hundred Years of Ineptitude*, 70 Va. L. Rev. 1083, 1184 (1984).

⁵⁸ Several books have detailed the eventual economic calamity. See, e.g., Andrew Lo, *Reading about the Financial Crisis: A 21 Book Review*, 50 J. ECON. LITERATURE 151 (2012).

⁵⁹ Yuliya Demyanyk, *Your Credit Score Is a Ranking, Not a Score*, FEDERAL RESERVE BANK OF CLEVELAND (Nov. 16, 2010), <http://www.clevelandfed.org/research/commentary/2010/2010-16.cfm>.

⁶⁰ See e.g., G. WILLIAM McDONALD, *OWING! 5 LESSONS ON SURVIVING YOUR DEBT LIVING IN A CULTURE OF CREDIT* (2013).

⁶¹ LIZ PULLIAM WESTON, *YOUR CREDIT SCORE, YOUR MONEY AND WHAT’S AT STAKE HOW TO FIX IMPROVE AND PROTECT THE THREE DIGIT NUMBER THAT SHAPES YOUR FINANCIAL FUTURE* (FT Press 2009).

⁶² See, e.g., GEOFF WILLIAMS AND CHRIS BALISH, *LIVING WELL WITH BAD CREDIT: BUY A HOUSE, START A BUSINESS, AND EVEN TAKE A VACATION—NO MATTER HOW LOW YOUR CREDIT SCORE* (2010).

⁶³ PHILIP X. TIRONE & JOCELYN BAKER (2006).

Even more reliable sources tend to be overly complacent about credit scoring. For example, the US Government Services Administration publishes a pamphlet called *Your Credit Score*, as if it were privy to the guts of the scoring system.⁶⁶ *BusinessWeek* has described the “anatomy of a credit score,” detailing factors with numerical precision, but has also published several critical pieces describing both consumer and lender frustration with black box scores.⁶⁷

Both FICO and credit bureaus regularly announce the relative weight of certain categories in their scoring systems.⁶⁸ For example, “credit utilization” (how much of a borrower’s current credit lines are being used) counts for 23% of the score in one model.⁶⁹ But the optimal credit utilization strategy is unclear; no one knows whether, say, using 25% of one’s credit limit is better or worse than using 15%. An ambitious consumer or researcher could try to reverse engineer FICO scores, but the process would be extraordinarily expensive and unreliable, and might even be barred by contract.⁷⁰ Moreover, credit bureaus and other businesses have developed their own scoring systems, and as these alternate rankings proliferate, so, too, do uncertainties about one’s standing.⁷¹

It is misleading to characterize the scores as a perfectly understandable and straightforward when no one outside scoring entity can consistently audit the underlying algorithms.⁷² While promoting their systems as models of fairness, neither

⁶⁴ AL BINGHAM (2007).

⁶⁵ MARGARET ORTIZ (2012). An outfit called *Naked Man Publications* offers “101 power tips for improving your credit score,” perhaps capitalizing on the consumer’s inchoate sense of being digitally ogled by credit scorers. See M. SMITH ET AL., *CREDIT REPAIR BOOK: 101 POWER TIPS FOR IMPROVING YOUR CREDIT SCORE - LEARN HOW TO IMPROVE YOUR CREDIT SCORE FAST* (2010).

⁶⁶ US GOVERNMENT SERVICES ADMINISTRATION, *YOUR CREDIT SCORE* (2008), available at <http://publications.usa.gov/USAPubs.php?PubID=3379>.

⁶⁷ *Compare Anatomy of a Credit Score*, BUSINESS WEEK, Nov. 27, 2005, <http://www.businessweek.com/stories/2005-11-27/anatomy-of-a-credit-score>; with Peter Coy, *Giving Credit Where Credit is Due*, BUSINESS WEEK, Mar. 15, 2006, <http://www.businessweek.com/stories/2006-03-14/giving-credit-where-credit-is-duebusinessweek-business-news-stock-market-and-financial-advice>.

⁶⁸ See e.g., *What’s in My FICO Score?*, FICO, <http://www.myfico.com/CreditEducation/WhatsInYourScore.aspx> (last visited Apr. 25, 2013, 12:48 PM).

⁶⁹ *Achieve Your Financial Goals*, EXPERIAN, <http://www.experian.com/consumer-products/vantage-score.html> (last visited Apr. 25, 2013, 12:52 PM).

⁷⁰ Dean Foust & Aaron Pressman, *Credit Scores: Not-so-Magic Numbers*, BUSINESS WEEK (Feb. 6, 2008), <http://www.businessweek.com/stories/2008-02-06/credit-scores-not-so-magic-numbers> (“We don’t believe it’s possible to reverse-engineer the FICO scoring formula”) (quoting Fair Isaac’s Isaac Greene).

⁷¹ Sue Kirchhoff & Sandra Block, *Alternative Credit Scores Could Open Door for Loans*, USA TODAY (May 16, 2006), http://usatoday30.usatoday.com/money/perfi/credit/2006-05-16-credit-scores-usat_x.htm; see e.g., Nina Fowler, Samwer brothers’ Global Founders Capital co-invests millions in Wonga rival Kreditech, VENTURE VILLAGE (Apr. 22, 2013), <http://venturevillage.eu/oliver-samwers-global-founders-capital-kreditech>.

⁷² See *Fair Isaac Corp. v. Equifax, Inc.*, No. 06-4112, 2007 WL 2791168 (D. Minn. Sept. 25, 2007); see also Public Comment Letter from Greg Fisher of Creditscoring.com to the Board of Governor’s of the Federal

FICO nor the credit bureaus give information about how *much* particular actions affect any of their categories.⁷³ Rather, they peddle bromides. Pay your debts on time. Don't push against the upper bounds of your credit limit. But don't eschew credit entirely; you need to build up some kind of record in order to have a credit history that can be scored.⁷⁴

Scoring is just comprehensible enough to lead most consumers to assume it is a fair game, but opaque enough to provoke attention to the advice of perceived insiders. Improvised internet forums discuss credit card companies' practices and try to reverse engineer scoring decisions based on them.⁷⁵ Like many such discussion boards, the information is of varying quality. A faithful follower of sponsored boards like "FICO Forums"⁷⁶ may discover some useful tips. Nevertheless, even the most conscientious borrower may end up surprised by the consequences of his actions.

Arbitrary Assessments?

During the housing bubble, many banks cut corners on paperwork.⁷⁷ In a rush to bundle individual mortgages into profitable securities, some abandoned long-standing procedures for recording titles to property.⁷⁸ Pressures for fast deals affected every stage of the process, from contracts and mortgage qualifications to appraisals and closings. During the ensuing crisis, a record number of foreclosure filings overwhelmed courts.⁷⁹ Some were completely erroneous, ensnaring homeowners who had always

Reserve (Sep. 17, 2004), *available at* http://www.federalreserve.gov/SECRS/2004/October/20041014/OP-1209/OP-1209_106_1.pdf (Demonstrating multiple efforts to get leading bureaus to reveal methods.). Moreover, the score itself is often merely a base number that different companies can transform (or ask the credit bureau to transform) in various ways; consumers are not usually privy to those transformations.⁷³ *Credit Inquiries*, MYFICO, <http://www.myfico.com/crediteducation/creditinquiries.aspx> (last visited Apr. 25, 2013, 1:05 PM). As also demonstrated with regard to search engines; companies with access to vast data sources are ideally situated to refine scoring models by keeping tabs on how well previous scoring efforts worked.

⁷⁴ *Id.* ("Generally, people with high FICO scores consistently . . . [p]ay bills on time . . . [k]eep balances low on credit cards and other revolving credit products . . . [a]pply for and open new credit accounts only as needed.").

⁷⁵ See Virginia Heffernan, *The Medium Flop*, N.Y. TIMES MAGAZINE, Mar. 6, 2009, http://www.nytimes.com/2009/03/08/magazine/08wwln-medium-t.html?_r=0.

⁷⁶ FICO FORUMS, <http://ficoforums.myfico.com/> (last visited Apr. 25, 2013, 1:07 PM).

⁷⁷ Christopher L. Peterson, *Two Faces: Demystifying the Mortgage Electronic Registration System's Land Title Theory*, 53 WM. & MARY L. REV. 111, 116 (2011).

⁷⁸ *Id.* at 115–16.

⁷⁹ MICHAEL HUDSON, THE MONSTER 272 (2011); see also Ryan McCarthy, *Bank Of America Accused Of Breaking Into Woman's Home, Taking Husband's Ashes*, HUFFINGTON POST (Dec. 22, 2010, 9:46 AM), http://www.huffingtonpost.com/2010/12/22/bank-of-america-breaking-into-homes_n_800111.html

paid on time.⁸⁰ For example, a bank mistakenly broke into a Truckee, California woman's house, taking many possessions, including her late husband's ashes.⁸¹

By 2010, a movement called "Show Me the Note" urged homeowners to demand that servicers prove they had legal rights to mortgage payments.⁸² Given the unprecedented level of foreclosure fraud, sloppy paperwork, and "robo-signed"⁸³ affidavits, many homeowners wanted to know who owned the stream of payments due from their mortgage.⁸⁴ One would think that a sensible credit scoring system would reward those who taken the trouble to demand this information about their mortgage.⁸⁵

Unfortunately, precisely the opposite occurred in at least one case. One homeowner who followed all the instructions on the "Where's the Note" website experienced a "40 point hit" on a credit score.⁸⁶ In the Heisenberg-meets-Kafka world

⁸⁰ Gretchen Morgenson, *Waiting Seven Years for Two Answers*, N.Y. TIMES, Feb. 26, 2011, <http://www.nytimes.com/2011/02/27/business/27gret.html?src=busIn> ("Ms. Green said she would have given up years ago if it weren't for her lawyer. She would have forfeited her two-bedroom home in Decatur to one of the three institutions that have claimed — at the same time, mind you — to hold title to it. 'It's been a big mess for a long time,' she said in a recent interview.").

⁸¹ Andrew Martin, *In a Sign of Foreclose Flaws, Suits Claim Break-ins by Banks*, N.Y. TIMES, Dec. 21, 2010, <http://www.nytimes.com/2010/12/22/business/22lockout.html?pagewanted=1&ref=business> ("In an era when millions of homes have received foreclosure notices nationwide, lawsuits detailing bank break-ins like the one at Ms. Ash's house keep surfacing. And in the wake of the scandal involving shoddy, sometimes illegal paperwork that has buffeted the nation's biggest banks in recent months, critics say these situations reinforce their claims that the foreclosure process is fundamentally flawed.").

⁸² See e.g., Mathew Hector, *Standing, Securitization, and "Show Me The Note"*, SULAIMAN LAW GROUP, <http://www.sulaimanlaw.com/Publications/Standing-Securitization-and-Show-Me-The-Note.shtml> (last visited Apr. 25, 2013, 1:11 PM).

⁸³ Jeff Harrington, *2010 Adds its Own Terminology to Business Lexicon*, TAMPA BAY TIMES, Dec. 23, 2010, <http://www.tampabay.com/news/business/2010-adds-its-own-terminology-to-business-lexicon/1141681> ("Robo-signer: Sounds like a boring sci-fi movie that's light on action. In reality, it's a back-office system of quickly signing off on foreclosure documents like affidavits without actually doing what the affidavits say was done. Also known as cheating and lying.").

⁸⁴ For background on foreclosure fraud, see YVES SMITH, WHISTLEBLOWERS REVEAL HOW BANK OF AMERICA DEFRAUDED HOMEOWNERS AND PAID FOR A COVERUP—ALL WITH THE HELP OF 'REGULATORS' (2013), available at <http://www.scribd.com/doc/134192424/Naked-Capitalism-Whistleblower-Report-on-Bank-of-America-Foreclosure-Reviews>.

⁸⁵ See Deltafreq, Comment to *Where's the Note? Leads BAC to Ding Credit Score*, THE BIG PICTURE (Dec. 14, 2010, 11:03 AM), <http://www.ritholtz.com/blog/2010/12/note-bac-credit-score/>. ("I need to know who owns my mortgage. Within sixty days, I would like to know the name, address, and phone number of the bank or investor that owns my mortgage. Furthermore, in light of the recent allegations of foreclosure fraud, I demand to see the original mortgage note proving ownership over my home loan. If you fail to produce a mortgage note proving that you have a right to collect my mortgage payments, I will be forced to consider all options available to me to ensure that my family and my home are protected."). This request was based on the rights of mortgagors provided for in the Real Estate Settlement and Procedures Act, and related legislation and regulation.

⁸⁶ *Id.*

of credit scoring, merely trying to figure out possible effects on one's score can reduce it.

It is easy to dismiss this particular case as an outlier, an isolated complaint by one unfortunate. But over the past 20 years, a critical mass of complaints about credit scoring has emerged.⁸⁷ What was supposed to be an objective aggregation of data has been attacked as discriminatory, arbitrary, and inaccurate. We'll explore all these complaints below. But at their root, they all come back to the same problem: the secrecy of credit scoring algorithms and their growing influence as a reputational metric.

Three credit bureaus routinely score millions of individuals.⁸⁸ Wide dispersion of these scores suggests arbitrary assessments.⁸⁹ In one study of 500,000 files, "twenty-nine percent of consumers [had] credit scores that differ by at least fifty points between credit bureaus."⁹⁰ Barring some undisclosed, divergent aims of the different bureaus, these variations suggest a substantial proportion of arbitrary assessments. Consumer advocates have also claimed that credit scoring penalizes responsible decisions made by cardholders.⁹¹ For example, a consumer may think he is just limiting the risk of fraud on a card if he reduces his credit limit on it. But that might not be a wise move, since it also increases the card's "debt-to-limit ratio."⁹² Scorers have tended to favor those who use a smaller proportion of their existing credit over those who use more.⁹³

⁸⁷ See, e.g., Kevin Simpson, *Insurers' Use of Credit Reports Rankles Many*, THE DENVER POST, Aug. 20, 2003, <http://www.accessmylibrary.com/article-1G1-119802458/insurers-use-credit-reports.html> ("Credit-scoring has been one of the components responsible for an "alarming trend" of increased complaints to regulators over the past three years."); *Credit Score Insurance Screening under Review, Alward Says*, CBC NEWS (Apr. 17, 2013), <http://www.cbc.ca/news/canada/new-brunswick/story/2013/04/17/nb-insurance-credit-score-alward.html?autoplay=true>; *Regulators, Congress Can Hear Your Opinions*, USA TODAY, Mar. 29, 2002, at 3b.

⁸⁸ *Credit Bureaus and Credit Reporting*, USA.GOV (Apr. 11, 2013), <http://www.usa.gov/topics/money/credit/credit-reports/bureaus-scoring.shtml>.

⁸⁹ Carolyn Carter et al., *The Credit Card Market and Regulation: In Need of Repair*, 10 N.C. BANKING INST. 23, 41 (2006) ("A review of over 500,000 consumer credit files by the Consumer Federation of America and the National Credit Reporting Association found that twenty-nine percent of consumers have credit scores that differ by at least fifty points between credit bureaus, while four percent have scores that differ by at least 100 points. Other studies have found that between fifty to seventy percent of credit reports contain inaccurate information."); Peter Coy, *supra* note 67 ("It has been highly frustrating to lenders—and to borrowers—that the same person could get drastically different credit scores from different bureaus."). Even after bureaus adopted the advanced "VantageScore" system, "70% of the dispersion remains." *Id.*

⁹⁰ Carter, *supra* note 89, at 41.

⁹¹ See, e.g., Consumer Reports, *The Secret Score Behind Your Auto Insurance*, MSN, <http://editorial.autos.msn.com/article.aspx?cp-documentid=435604> (last visited Apr. 25, 2013, 1:51 PM) ("insurance scores can penalize consumers who use credit reasonably").

⁹² See M. Beddingfield, *How Important is Your Debt to Limit Ratio?*, SAVING ADVICE (Oct. 11, 2008), http://www.savingadvice.com/articles/2008/10/11/102973_debt-to-limi-ratio.html.

⁹³ Robert Pregulman, *Credit Scoring Highly Unfair*, SEATTLEPI (Jan. 28, 2002, 10:00 PM) ("In fact, you could have paid every insurance bill you ever received on time and never filed an insurance claim, and you could still have a bad credit score that would either make you pay significantly more for insurance or prevent an

Credit bureaus routinely deny requests for details on their scoring systems.⁹⁴ Bureau employees have admitted that in many cases, consumers cannot determine optimal credit behavior, or even what to do to avoid a hit on their scores.⁹⁵ Many home sales contracts include contingency clauses that could lead to the forfeiture of a buyer's entire deposit after a credit denial due to a credit score decline between the time of the initial contract and the time of closing.⁹⁶ But buyers can't be assured that any course of behavior will protect them from such a scenario.

The lower stakes world of ordinary consumer finance can also be exasperating. "Reason codes"⁹⁷ for adverse action can be relatively straightforward; for example, it's easy to imagine why a lender may not want to deal with someone who has "payments due on accounts."⁹⁸ Delinquencies, derogatory public records, or filed collection actions are not desirable characteristics for borrowers. But other "reasons" for adverse action are not so clear. One can have both too few and too many "revolving accounts."⁹⁹ Someone with too few accounts may open a new account to buttress their score, only to find that "time since most recent account opening is too short."¹⁰⁰ One investigator had an amusing exchange with a credit bureau executive as he tried to figure out what it would take to get a "perfect score:"

insurance company from offering you insurance coverage."); cf. Dierdre Cummings, *Testimony in Favor of an Act Banning the Use of Socio-Economic Factors for Insurance Underwriting and Rating of Motor Vehicle Liability Insurance*, MASSPIRG (Oct. 18, 2011), <http://www.masspirg.org/blogs/blog/map/testimony-favor-favor-act-banning-use-socio-economic-factors-insurance-underwriting>.

⁹⁴ See *Index of Letters*, CREDITSCORING, <http://www.creditscoring.com/letters/> (last visited Apr. 21, 2013) (detailing series of letter requests and stonewalling responses). Note repeated efforts by the bureaus to resist mandatory disclosure, or even filing the models with states. See, e.g.,

FCRA Renewal: The next Privacy Battleground?, Wiley Rein (Aug. 2002), <http://www.wileyrein.com/publications.cfm?sp=articles&newsletter=4&id=3756> ("Despite considerable popular and Congressional support, privacy legislation has often foundered due to coordinated opposition and the lack of an imperative for Congressional action.") On the general resistance of firms to mandatory disclosure, see Anil R. Doshi et al., *How Firms Respond to Mandatory Disclosure* (Harvard Business School, Working Paper No. 12-001, July 4, 2011), available at <http://ideas.repec.org/p/hbs/wpaper/12-001.html>.

⁹⁵ Phone Call Between Greg Fisher and William Gastel, Equifax (Nov. 19, 1997), available at <http://www.creditscoring.com/letters/equifax.htm>.

⁹⁶ See Susan Stellan, *Five Ways for Buyers to Outsmart the Market*, N.Y. Times, May 21, 2010, <http://www.nytimes.com/2010/05/23/realestate/23cov.html?adxnnl=1&pagewanted=all&adxnnlx=1366584103-cktAN2LdHVUSP1NrCuy4oQ&r=0> ("Most contracts now have a clause making the deal contingent upon the buyer's getting a mortgage.").

⁹⁷ US FICO Risk Score Reason Codes, FICO.COM, http://www.fico.com/en/firesourceslibrary/fico_risk_score_reason_codes_1424ps.pdf (last visited Apr. 21, 2013, 9:00 PM).

⁹⁸ *Id.* (identifying the FICO Next-Gen Code for "payments due on account" as "X0", and the Experian/Fair Isaac Code for the same as "46.").

⁹⁹ See Public Comment Letter from Greg Fisher, *supra* note 72.

¹⁰⁰ The FICO Next-Gen Code for "time since most recent account opening is too short" is "K4." See *US FICO Risk Score Reason Codes*, *supra* note 97.

Investigator: If you have reason codes at the bottom of a credit report, and one of them says that I have too many "bank revolving accounts" . . . how do I know what action to take to correct those problems?

Equifax Vice President of Consumer Affairs: (long pause) Well, I-I think that answer would be somewhat obvious. I mean if it's saying you have too manythat would be a reason for risk if anyone chose to grant you further credit. . . .

Investigator: If it says "too few," do I add one?

Equifax Vice President of Consumer Affairs: No[,] there's no right [answer] . . . I mean, I don't know your report, so I cannot sit here and tell you "here's how to adjust your score." . . . [Y]ou change one field in the calculation and it'll have an impact on the weight of another.¹⁰¹

After a number of similar exchanges, the flustered Equifax executive suggested that the investigator was on a wild goose chase,¹⁰² since lenders' divergent responses to scores may well be a greater source of arbitrariness than scores themselves—apparently, someone with too high a score may actually scare off lenders. But those are outlier cases. With so much riding on a high credit score, individuals are demanding more transparency from the credit industry.

Horror stories also abound regarding the bureaus' data management practices. *Sixty Minutes* reporter Steve Kroft exposed some of their deeper causes by documenting an abandonment of basic principles of due process. Interviewing attorneys who achieved some rare legal victories against credit bureaus, he found a strikingly cavalier attitude toward data integrity:

Steve Kroft: So all these people who take the time to meticulously document a case that the bill isn't theirs or the bill has been paid — that is never seen by anybody?

Len Bennett: It's not seen by anyone who considers it in determining whether or not information will be removed from a credit report.

Steve Kroft: It's not forwarded onto the person who has the complaint with you?

Len Bennett: No. It is never forwarded on, never forwarded onto the creditor.

Sylvia Goldsmith: We can get a jury verdict for \$1 million. That's chump change to some of these bureaus [given that they dominate a \$4 billion a year industry]. They would rather pay a verdict in \$1 million than to actually go in and change

¹⁰¹ Transcript of Phone Call Between Greg Fisher and Robert Cutrone (Nov. 7, 1997), *available at* <http://www.creditscoring.com/letters/equifax.htm>.

¹⁰² Phone Call Between Greg Fisher and William Gastel, *supra* note 95.

the policies and procedures that they have, because that's much more expensive to them.¹⁰³

Later Kroft talks to someone who actually worked in one of the bureaus' dispute resolution centers:

Steve Kroft: If there was a difference of opinion between the creditor and the person who was filing the complaint, how was it usually resolved in the— in favor of the creditor?

Enzo Valdivia: Yeah. The creditor was always right.¹⁰⁴

The negative consequences of this slapdash system are legion. As Kroft narrates:

Every day, [Ohio Attorney General Mike] DeWine's office fields calls from desperate constituents who can't get the credit reporting agencies to answer their questions or correct mistakes on their report like paid bills listed as delinquent, closed accounts listed as open, and bad debts that belong to other people with similar names or social security numbers.¹⁰⁵

Once an error occurs, one can only pray that someone in authority within the bureaucracy happens to respond to it. One thing is certain: the higher ups are more than happy to continue flouting the law as long as the cost of breaking it is less than reforms that would make their system even minimally more responsive.

Consumer advocates have long criticized credit bureaus for unresponsive "customer service" and mysterious scoring practices.¹⁰⁶ Many allege the scores burden already disadvantaged groups.¹⁰⁷ Law was supposed to make credit decisions more transparent, but weak enforcement has assured a race to the bottom. "Dispute agents" on Kroft's program said they had to review 90 cases a day.¹⁰⁸ Even assuming a 9 hour work day, that's 6 minutes a case, on average. Even if they took more time to try to get to the bottom of things, they appear to have no power to resolve the matter in favor of the consumer. It's Potemkin dispute resolution.

Data driven analytics have promised a more scientific approach to credit allocation and marketing than narrative histories or one-dimensional scoring. But they can only be as good as the data they are based on. Garbage in, garbage out—and we are subject to yet another misapplication of natural science methods to the social realm. As long as credit bureaus are so careless and cavalier about responding to

¹⁰³ Steve Kroft, *40 Million Mistakes: Is Your Credit Report Accurate?*, CBS NEWS (Feb. 10, 2013, 7:04 PM), http://www.cbsnews.com/2102-18560_162-57567957.html.

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ See e.g., Chi Chi Wu, *Automated Injustice: How A Mechanized Dispute System Frustrates Consumers Seeking to Fix Errors in Their Credit Reports*, 14 N.C. BANKING INST. 139 (2010).

¹⁰⁷ See discussion *infra* p. 19 "Disparate Impacts."

¹⁰⁸ Kroft, *supra* note 103.

customer disputes, their evaluative methods will remain an opaque and troubling form of social sorting.

Disparate Impact

Race and gender discrimination have long plagued consumer finance and mortgage lending.¹⁰⁹ Credit history and credit scoring were both supposed to shift decisionmakers' attention from stereotypes to a careful assessment of a would-be borrower's actual record of handling credit.¹¹⁰ On this logic, the more objective data was at a lender's disposal, the less likely it was to base a decision on ascriptive characteristics like race or sex. Unfortunately, it increasingly appears credit scoring algorithms are only as unbiased as the data fed into them.¹¹¹ Far from eliminating extant discriminatory practices, credit evaluation may be granting them an imprimatur, systematizing them in hidden ways.¹¹²

There is evidence that credit scoring has negative, disparate impacts on minorities and low income neighborhoods.¹¹³ Representatives of the Consumers Union have concluded that "[e]ven though credit information can be 'race and income neutral' on its face, [it] can function as a proxy for race and income."¹¹⁴ Since African Americans and Latinos tend to have lower credit scores than whites, concerns about disparate

¹⁰⁹ See *Credit Discrimination: Hearing on H.R. 14856 and 14908 Before the H. Subcommittee on Consumer Affairs*, 93rd Cong. 498–99 (summary of findings) (“With respect to sex discrimination in the field of consumer credit, testimony presented at the hearings can be summarized as follows Single women have more trouble obtaining credit than single men Creditors generally require a woman upon marriage to reapply for credit, usually in her husband's name Creditors are often unwilling to extend credit to a married woman in her own name Creditors are often unwilling to count the wife's income when a married couple applies for credit Women who are divorced or widowed have trouble re-establishing credit.”).

¹¹⁰ Lewis, *supra* note 19, at 14 (“Since scoring is a consistent and demonstrable process, many credit grantors were motivated to adopt scoring in part as a defense against a charge of discrimination.”).

¹¹¹ SHAWN FREMSTAD & AMY TRAUB, *DISCREDITING AMERICA* 11 (2011), available at http://www.demos.org/sites/default/files/publications/Discrediting_America_Demos.pdf. (“[D]isparities in the credit reporting system mirror American society's larger racial and economic inequalities. As we discuss below, a large body of research indicates that Americans with low incomes, and especially African Americans and Latinos, are disproportionately likely to have low credit scores.”).

¹¹² See *Credit Discrimination Hearing*, *supra* note 109. The EEOC, in a lawsuit filed against Kaplan, claimed that use of credit history would have a disparate, negative impact against minority job applicants because of the lower average credit score of these groups. Press Release, Equal Employment Opportunity Commission, EEOC Files Nationwide Hiring Discrimination Lawsuit Against Kaplan Higher Education Corp. (Dec. 21, 2010), available at <http://www.eeoc.gov/eeoc/newsroom/release/12-21-10a.cfm>.

¹¹³ BIRNY BIRNBAUM, *INSURERS' USE OF CREDIT SCORING FOR HOMEOWNERS INSURANCE IN OHIO: A REPORT TO THE OHIO CIVIL RIGHTS COMMISSION* 2 (2003) (“Based upon all the available information, it is our opinion that insurers' use of insurance credit scoring for underwriting, rating, marketing and/or payment plan eligibility very likely has a disparate impact on poor and minority populations in Ohio.”).

¹¹⁴ NORMA P. GARCIA, *SCORE WARS: CONSUMERS CAUGHT IN THE CROSSFIRE. THE CASE FOR BANNING THE USE OF CREDIT INFORMATION IN INSURANCE* 3 (2006), available at <http://www.consumersunion.org/wp-content/uploads/2013/04/ScoreWars.pdf>.

impact have led many states to regulate the use of credit scores in insurance underwriting.¹¹⁵ The National Fair Housing Alliance has criticized credit scores for “disadvantag[ing] protected classes,” including women and minorities, arguing that the “industry’s lack of transparency creates fair housing concerns.”¹¹⁶

As subprime mortgages became widespread, community advocates complained that the mortgage lending process as a whole treated minority neighborhoods unfairly.¹¹⁷ Banks and their affiliates responded that they were merely trying to extend opportunity to historically underserved neighborhoods, as the Community Reinvestment Act (CRA) directed.¹¹⁸ Scores merely indicated that credit should be more expensive there. The intersection of credit history, credit scoring, and race has become extraordinarily controversial in the US, with some conservative commentators blaming the entire credit crisis on the CRA and other policies promoting homeownership for low income and minority households.¹¹⁹

Others counter that “data driven” lending practices hit marginal communities the hardest. An attorney at the Neighborhood Economic Development Advocacy Project called subprime lending a systematic “equity stripping” targeted at longtime minority homeowners who were lured into refinancing (and ultimately losing) their homes.¹²⁰ African-Americans were four times more likely to take on subprime

¹¹⁵ *NAMIC’s State Laws and Legislative Trends: State Laws Governing Insurance Scoring Practices*, NAMIC (Dec. 7, 2004), <http://www.namic.org/reports/credithistory/credithistory.asp>; see, e.g., HAW. REV. STAT. ANN. § 431:10C-207 (West 2010) (“No insurer shall base any standard or rating plan, in whole or in part, directly or indirectly, upon a person’s race, creed, ethnic extraction, age, sex, length of driving experience, credit bureau rating, marital status, or physical handicap.”).

¹¹⁶ *Future of Housing Finance: The Role of Private Mortgage Insurance: Before the Subcomm. on Capital Markets, Insurance and Government Sponsored Enterprises of the H. Comm. on Fin. Servs.*, 111th Cong. 6 (2010) (testimony of Deborah Goldberg, National Fair Housing Alliance), available at <http://financialservices.house.gov/media/file/hearings/111/printed%20hearings/111-149.pdf>; see also BIRNBAUM, *supra* note 113, at 2 (“[D]ata and information strongly suggest insurers’ use of credit has a disparate impact on poor and minority populations”). The NFHA has also expressed concern that “the use of credit scores tends to disadvantage people of color, women, and others whose scores are often lower than those of white borrowers.” *Congressional Documents and Publications*, Insurance News (Aug. 2, 2010), <http://insurancenewsnet.com/article.aspx?id=212863>. The NFHA also notes “growing concern about how useful credit scores are for predicting loan performance and whether the financial sector is placing too much reliance on credit scores rather than other risk factors such as loan terms.” *Id.*

¹¹⁷ See Manny Fernandez, *Study Finds Mortgage Disparities by Race*, N.Y. TIMES, Oct. 15, 2007, <http://www.nytimes.com/2007/10/15/nyregion/15subprime.html?ex=1350187200&en=a9978e04a9864642&ei=5088&partner=rssnyt&emc=rss&r=0> (“It’s almost as if subprime lenders put a circle around neighborhoods of color and say, ‘This is where we’re going to do our thing,’”) (quoting Robert Stroup).

¹¹⁸ See Thomas J. DiLorenzo, *The Government-Created Subprime Mortgage Meltdown*, LEW ROCKWELL (Sept. 6, 2007), <http://www.lewrockwell.com/dilorenzo/dilorenzo125.html>.

¹¹⁹ See generally PETER J. WALLISON, DISSENT FROM THE MAJORITY REPORT OF THE FINANCIAL CRISIS INQUIRY COMMISSION (2011), available at <http://www.aei.org/files/2011/01/26/Wallisondissent.pdf>.

¹²⁰ Interview by Doug Henwood of Behind the News with Sarah Ludwig, NEDAP Attorney, on Behind the News Radio (Aug. 30, 2007), available at <http://www.leftbusinessobserver.com/Radio.html>.

mortgages than similarly situated whites.¹²¹ After reviewing several national studies, “controlling for risk factors like income and/or credit score,” law professor Linda Fisher concludes that there is a “strong correlation between race and subprime lending.”¹²²

To prove the discriminatory practices of lenders, scholars like Fisher use the credit score as an objective benchmark for assessing whether minorities were offered loans at a fair price (interest rate and terms).¹²³ But if the discriminatory practices they are discerning were at all prevalent in the past, the situation is even worse than they charge. The credit score is itself composed from data that may well reflect past discriminatory practices.¹²⁴ If subtle but persistent racism, arising out of implicit bias or other factors, influences the terms of credit, its victims will find it more difficult to pay their bills.¹²⁵ Their late payments are, in turn, fed into credit scoring models as neutral, objective, non-racial indicia of reliability and creditworthiness.¹²⁶ Far from liberating individuals to be judged on the content of their character rather than the color of their skin, credit bureaus may merely be laundering past practices of discrimination into a blackboxed score, immune from scrutiny.¹²⁷ The very benchmark against which we now measure discriminatory practices may itself have been influenced by discriminatory practices.

Regulation was supposed to have dispelled these concerns. Credit bureaus are required to disclose credit histories.¹²⁸ The FCRA requires credit bureaus to permit

¹²¹ AMERICAN CASINO (Table Rock Films 2009).

¹²² Linda Fisher, *Target Marketing Of Subprime Loans: Racialized Consumer Fraud & Reverse Redlining* 18 J.L. & POL'Y 121, 126 (2009) (“Unsurprisingly, minority borrowers were significantly more likely than white borrowers both to work with mortgage brokers and to take out high-cost subprime loans. This correlation itself suggests discrimination under either disparate treatment or disparate impact theories; that is, African-Americans and Latinos were either intentionally singled out for the worst loans or have suffered disproportionately from the effects of facially neutral lending policies. The phenomenon of singling out minorities for predatory loans has been dubbed ‘reverse redlining.’”).

¹²³ *Id.*

¹²⁴ See, e.g., Gunter, *supra* note 28, at 451–52 (“On the surface, these variables may appear objective, but in reality they may still reflect racial bias. For example, a credit-scoring system may place a low score on occupations such as migratory work or low paying service jobs. While this action alone may have no discriminatory intent, if a majority of these workers in the geographic area are racial minorities, this job classification can have an unfair effect upon that consumer’s loan application decision.”).

¹²⁵ See generally JERRY KANG, IMPLICIT BIAS (2009), available at <http://wp.jerrykang.net.s110363.gridserver.com/wp-content/uploads/2010/10/kang-Implicit-Bias-Primer-for-courts-09.pdf>.

¹²⁶ Cf. Loic Wacquant, *The Punitive Regulation of Poverty in the Neoliberal Age*, OPENDEMOCRACY (Aug. 1, 2011), <http://www.opendemocracy.net/5050/lo%C3%AFc-wacquant/punitive-regulation-of-poverty-in-neoliberal-age>; see generally, BERNARD E. HARCOURT, AGAINST PREDICTION (2006).

¹²⁷ Cf. Robert E. Goodin, *Laundering Preferences*, in FOUNDATIONS OF SOCIAL CHOICE THEORY 75 (Jon Elster & Aanund Hylland eds., 1989).

¹²⁸ See 15 U.S.C. § 1681g(1) (2012). (“All information in the consumer’s file at the time of the request, except that nothing in this paragraph shall be construed to require a consumer reporting agency to disclose to a consumer any information concerning credit scores or any other risk scores or predictors

individuals to dispute negative information on their credit reports and to give their own side of the story on disputed information in reports generated for potential creditors, insurers, and employers.¹²⁹ It also requires that consumers receive some account of why their credit reports might have led to a denial of credit.¹³⁰ Unconvincing reasons may be pretextual, and thus are supposed to help consumers detect discrimination.

Courts and regulators have struggled to define exactly how much of a “reason” must be given.¹³¹ There are so many vague or conflicting reason codes that it is possible to rationalize virtually any decision.¹³² I have yet to find a case where litigation led to an auditing process that *actually demonstrated* that the listed reasons were, in fact, the most important determinants of a bad credit score.¹³³

The paucity of enforcement activity also makes it hard to assess the effectiveness of the Equal Credit Opportunity Act (ECOA), which prohibits discrimination in lending, and Regulation B, which applies ECOA to credit scoring systems.¹³⁴

relating to the consumer.”).

¹²⁹ See 15 U.S.C. § 1681i (2012).

¹³⁰ Under the FCRA, whenever a creditor takes an “adverse action” against a consumer, that creditor is required to provide the consumer with a notice explaining that action. 15 U.S.C. § 1681m(a) (2012). In the credit context, an “adverse action” under the FCRA is:

a denial or revocation of credit, a change in terms of an existing credit arrangement, or a refusal to grant credit in substantially the amount or on substantially the terms requested. Such term does not include a refusal to extend additional credit under an existing credit arrangement where the applicant is delinquent or otherwise in default, or where such additional credit would exceed a previously established credit limit. 15 U.S.C. § 1681a(k) (2012).

An adverse action might also include a denial, cancellation, increased charge, reduction, or change in insurance or an adverse employment decision. § 1681a(k); see also Julie J.R. Huygen, *After the Deal is Done: Debt Collection and Credit Reporting*, 47 A.F.L. REV. 89, 102–03 (1999). In *Safeco Insurance Company of America v. Burr*, the U.S. Supreme Court, considering insurance rates, determined that the term “adverse action” in the FCRA “speaks to a disadvantageous rate even with no prior dealing; the term reaches initial rates for new applicants.” 551 U.S. 47, 63 (2007).

¹³¹ For the general problem in law, see Henry Friendly, *Some Kind of Hearing*, 123 U. PA. L. REV. 1267 (1975).

¹³² In 2006, the Eastern District Court of Pennsylvania, in *Pettineo v. Harleysville National Bank and Trust Company*, introduced the “general transparency test” to determine if the creditor’s language in a rejection is adequate. The court stated, “notice provisions of the ECOA and its implementing regulations do not require that the notification letter be narrowly tailored to fit the specific instance of a denied application. *Pettineo v. Harleysville National Bank and Trust Co.*, No. Civ.A. 05-4138, 2006 WL 241243, at *3 (E.D.Pa. Jan. 31, 2006). And in *Aikens v. Northwestern Dodge, Inc.*, the court reached a similar decision. No. 03-C-7956, 2006 WL 59408 (N.D.Ill. Jan. 5, 2006). In *Higgins v. JC Penney, Inc.*, plaintiff argued that rejection on the basis of “type of bank accounts” and the “type of credit references” were not specific enough. The *Higgins* court reasoned that the statements were not ambiguous because they resembled some of those listed in the regulation. 630 F. Supp. 722, 725 (E.D. Mo. 1986).

¹³³ Both legislation and regulation shaped the rise of the reason codes, by effectively determining that release of the *top four* factors affecting a credit score in the case of adverse action would generate enough “reason-giving” to make discriminatory action evident. 15 U.S.C. § 1681g(f)(1)(c) (2012).

¹³⁴ Lewis, *supra* note 19, at 14. Regulation B sets forth specific data that cannot be used in a credit scoring system, such as: public assistance status, likelihood that any person will bear or rear children, telephone

Regulation B requires that specific reasons for denial of credit/lending be related to and accurately describe the factors actually considered or scored by the creditor.¹³⁵ Cases are rare, as litigation costs usually exceed the discounted present value of the monetary stakes involved.¹³⁶ Fines and penalties are not large enough to deter troubling practices.¹³⁷ There are several evidentiary burdens that low-income plaintiffs likely cannot meet.¹³⁸

Insurers' use of credit scores has come under more scrutiny. For example, after years of litigation, Allstate agreed to a multimillion dollar settlement over "deficiencies in Allstate's credit scoring procedure which plaintiffs say resulted in discriminatory action against approximately 5 million African-American and Hispanic customers."¹³⁹ Allstate also allowed plaintiffs' experts to critique and refine future scoring models.¹⁴⁰ Think tanks like Demos are now articulating innovative ways to regulate the scoring systems used in the finance, insurance, and real estate (FIRE) industries, and have even called for the adoption of a "public option" in credit scoring.¹⁴¹

The Law of Credit Scoring and Reporting

Contemporary credit controversies echo older concerns about unreliable or irrelevant credit histories. The files of early credit bureaus did not inspire confidence. Innuendo and worse could easily percolate into reports filed by untrained "investigators."¹⁴² They reported on habits like messy housekeeping, poorly kept yards, or effeminate gestures.¹⁴³ Alarmed by news reports about the industry, Congress eventually passed the Fair Credit Reporting Act (FCRA)¹⁴⁴ in 1970.

listing, income because of a prohibited basis, inaccurate credit histories, and different standards for married and unmarried persons, race, color, religion, national origin, and sex. 12 C.F.R. § 202.5 (2011).

¹³⁵ 12 C.F.R. § 202.9(b)(2) (2011). Furthermore, no factor that was a principal reason for adverse action may be excluded from the disclosure. *Id.*

¹³⁶ See Scott Ilgenfritz, *The Failure of Private Actions As an Ecoa Enforcement Tool: A Call for Active Governmental Enforcement and Statutory Reform*, 36 U. FLA. L. REV. 447, 449 (1984) ("Despite congressional intent and the liberal relief provisions of the ECOA, there has been a relative dearth of private actions brought under the Act.").

¹³⁷ *Id.*

¹³⁸ *Powell v. Am. Gen.Fin., Inc.*, 310 F. Supp.2d 481 (2004).

¹³⁹ *Dehoyos v. Allstate*, 240 F.R.D. 269, 275 (2007). The settlement came about after the Fifth Circuit decided that federal civil rights law was not reverse preempted by the McCarran-Ferguson Act's allocation of insurance regulatory authority to states. See case cited *infra* note 153. ECOA, which regulates lending practices, does not preempt state laws which are more strict than ECOA. See discussion *infra* note 153.

¹⁴⁰ *Dehoyos*, 240 F.R.D. at 276.

¹⁴¹ *FREMSTAD & TRAUB*, *supra* note 111, at 24; see also Pasquale, *supra* note 33.

¹⁴² ROBERT ELLIS SMITH, *BEN FRANKLIN'S WEBSITE* 319–320 (2004).

¹⁴³ *Id.* at 318–320.

¹⁴⁴ 15 U.S.C. § 1681 *et seq.* (2012).

FCRA has been called the “first information privacy legislation in the United States.”¹⁴⁵ It aspired to require credit bureaus (and all other “consumer reporting agencies”) to make their dossiers accurate and relevant.¹⁴⁶ Consumers had the right to inspect their records, to demand corrections, and to annotate records when a dispute with the relevant furnisher of information could not be resolved.¹⁴⁷ The bureaus’ files, once a black box, were opened for scrutiny. However, as the legislative process unfolded, the industry extracted a major concession: immunity from defamation law.¹⁴⁸ By sharply limiting the possible penalties for reputational injuries, the FCRA opened the door to epic tactics of stalling, obstinacy, and obfuscation by the credit bureaus.¹⁴⁹

For example, after federal law required credit bureaus to release a free copy of credit histories to consumers annually, credit bureaus created a number of websites with names like “freecreditreport.com” which ultimately charged for the report, or only

¹⁴⁵ PRISCILLA REGAN, *LEGISLATING PRIVACY* 101 (2009).

¹⁴⁶ 15 U.S.C. § 1681a(f) (2012) (“The term ‘consumer reporting agency’ means any person which, for monetary fees, dues, or on a cooperative nonprofit basis, regularly engages in whole or in part in the practice of assembling or evaluating consumer credit information or other information on consumers for the purpose of furnishing consumer reports to third parties, and which uses any means or facility of interstate commerce for the purpose of preparing or furnishing consumer reports.”).

¹⁴⁷ See 15 U.S.C. § 1681i (2012) (“Procedure in Case of Disputed Accuracy.”) Though FCRA does not contain a definition for “furnisher,” a furnisher is understood as a person or entity that furnishes information to a consumer reporting agency. See 15 USC § 1681s–2 (2012) (describing the duties of furnishers when transferring information to consumer reporting agencies.”)

¹⁴⁸ Smith, *supra* note 142, at 320 (“Consumers would be barred from suing a credit bureau or consumer investigating company for libel or invasion of privacy over inaccuracies they discover in their files. This provision remains in the law today.”). Note, though, that the FCRA has been encrusted with many exceptions, exceptions to exceptions, and interactions with state law. *E.g.*, Earl Phillips, *A Word About Preemption of State Laws by the FCRA and Other Federal Statutes*, FINANCIAL SERVICES LAW AND COMPLIANCE EXPERT (Oct. 1, 2010, 12:00 PM), <http://www.wallstreetreform.org/2010/10/15/a-word-about-preemption-of-state-laws-by-the-fcra-and-other-federal-statutes/> (“As a general rule, the Fair Credit Reporting Act (FCRA) preempts no state law dealing with the collection, distribution, or use of information about consumers except to the extent the state law is inconsistent with the federal act The FCRA, nevertheless, lists a number of exceptions to the general rule in which a state law is preempted although it is perfectly consistent with the FCRA Then there are exceptions to the exceptions.”).

¹⁴⁹ See Schramm-Strosser, *supra* note 7, at 170–171 (“What started out as an improvement over how the common law dealt with credit-reporting issues has evolved into a regulatory scheme that tends to favor the credit reporting industry. Individual consumers can no longer rely on the FCRA to protect their credit interests and reputations because the credit reporting industry lords more power over individual consumers’ lives than ever One example of the FCRA’s overly broad preemptive scope is the prohibition of injunctive relief for consumers who bring common law defamation claims against CRAs”) In 1997, amendments explicitly relieved bureaus from an obligation to reveal credit scores, or factors related to them. 15 U.S.C. §1681g(1) (2012) (“All information in the consumer’s file at the time of the request, except that nothing in this paragraph shall be construed to require a consumer reporting agency to disclose to a consumer any information concerning credit scores or any other risk scores or predictors relating to the consumer.”). Later, consumers were given a right to see their scores, for a price—but as soon as this became effective, it was soon thereafter revealed that scores could be tweaked or altered or different clients of the scoring firm.

released it when the requestor bought other services.¹⁵⁰ Forced to establish the site www.annualcreditreport.com to release credit histories, the bureaus “blocked web links from reputable consumer sites such as Privacy Rights Clearinghouse, and Consumers Union, and from mainstream news web sites.”¹⁵¹ Enforcers at the Federal Trade Commission had to intervene, and sued when bureaus made their call centers difficult to reach.¹⁵² If the bureaus’ bad behavior allowed them to avoid employing dozens of customer service representatives for a few years, the fine was merely a small cost of a lucrative business.¹⁵³

FCRA has been amended many times over the years.¹⁵⁴ In 2003, the Fair and Accurate Credit Transactions Act required credit bureaus to disclose credit scores to scored individuals, in exchange for a fee capped by the FTC. The law did not “require a consumer reporting agency to disclose to a consumer any information concerning credit scores or any other risk scores or predictors relating to the consumer,”¹⁵⁵ except for the four most important “key factors” involved in credit decision.¹⁵⁶ The current version of

¹⁵⁰ Dan Solove, *The ChoicePoint Settlement*, CONCURRING OPINIONS (Jan. 30, 2006), http://www.concurringopinions.com/archives/2006/01/the_choicepoint_1.html.

¹⁵¹ See Letter from Chris Jay Hoofnagle et al. to Joel Winston, Federal Trade Commission (Dec. 7, 2004), available at <http://epic.org/privacy/fcra/freereportltr.html>.

¹⁵² *Id.*

¹⁵³ With respect to insurance companies, the McCarran-Ferguson Act prevents federal laws from interfering with state insurance laws by declaring that such state laws are not preempted unless Congress passes an act specifically regulating business insurance. 15 U.S.C. § 1012(b) (2012); see *Dehoyos v. Allstate Corp.*, 345 F.3d 290 (5th Cir. 2003) (holding that federal civil rights statutes, as invoked to challenge credit-scoring system as racially biased, were not reverse preempted by the McCarran-Ferguson Act.). Thus, the McCarran-Ferguson deters preemption of state insurance laws. Moreover, there is a long history of slaps on the wrist from the Federal Trade Commission. EDWARD FINCH COX ET AL., *THE NADER REPORT ON THE FEDERAL TRADE COMMISSION* (1969).

¹⁵⁴ See Consumer Credit Reporting Reform Act of 1996, Pub. L. No. 104-208, Title II, Sub. D, Ch. 1, 110 Stat. 3009 (1996); The Intelligence Authorization for Fiscal Year 1998, Pub. L. No. 105-107, § 311, 111 Stat. 2248 (1997); Consumer Reporting Employment Clarification Act of 1998, Pub. L. No. 105-347, 112 Stat. 3208 (1998); Gramm-LeachBliley Act, Pub. L. 106-102, § 506, 113 Stat. 1338 (1999); Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act), Pub. L. 107-56, § 358(g), § 505(c), 115 Stat. 272 (2001); The Fair and Accurate Credit Transactions Act of 2003 (FACT Act), Pub. L. 108-159, 117 Stat. 1972 (2003). The most recent change came in the Dodd-Frank Act of 2010. See *Report on the Dodd-Frank Act*, NATIONAL CONSUMER LAW CENTER REPORTS (2010), available at <http://www.nclc.org/dodd-frank/nclc-rpts-ccu-jul-aug-2010-web.pdf> (“Dodd-Frank amends the FCRA to require, effective on the transfer date, that creditors, insurers, and other users of consumer reports provide in an adverse action or risk-based pricing notice the actual credit score used in making the decision. However, the definition of credit score is limited to scores for ‘predicting credit behaviors,’ making it unclear whether the specialized scores used by insurers and others must be disclosed. This new credit score provision is codified at FCRA § 1681m, which many courts have found to lack a private right of action due to a ‘scrivener’s error.’”).

¹⁵⁵ 15 U.S.C. § 1681g(a)(1)(B) (2012).

¹⁵⁶ 15 U.S.C. § 1681g(f)(c) (2012). The FACT Act of 2003 added section 15 U.S.C. §1681g(f), which provides for disclosure of credit scores and key factors adversely affecting the credit scores. “The term ‘key factors’ means all relevant elements or reasons adversely affecting the credit score for the particular

the FRCA requires up to four key factors adversely affecting a consumer's credit score to be disclosed in the scoring report.¹⁵⁷

Yet revealing "reason codes" for a given score or action often does not do much to explain how it came about. Phrases like "type of bank accounts" and "type of credit references" are etiolated symbols, more suited for machine-to-machine interaction than personal explanation.¹⁵⁸ Factors such as "too many revolving accounts" and "late payment" are a commonplace even for those with high credit scores.¹⁵⁹ The law does not require credit scorers to tell individuals *how much* any given factor mattered to a particular score.¹⁶⁰ Moreover, looking forward, a consumer has no idea whether, say, paying off a debt that is 60 days past due will raise her score. The industry remains highly opaque, with scored individuals unable to determine the exact consequences of their decisions.

Of course, credit bureaus need some flexibility to assess a rapidly changing financial environment. Any given score may be based on hundreds of shifting variables; a default may be much less stigmatizing in a year of mass foreclosures than in flush times.¹⁶¹ Credit bureaus may not be capable of predicting exactly how any given action will be scored in a week, a month, or a year. Nevertheless, they could easily "run the numbers" in old versions of the scoring software, letting an applicant know how a given decision would have affected her score on, say, three different dates in the past. Yet they refuse to make this utility available, creating anxiety for a broad swathe of debtors, and fears of real harm to some groups.

The Trouble with Trade Secrecy

Although the FCRA offers individuals a chance to dispute items on their credit *history*, it does not require credit bureaus to reveal the way in which they convert a

individual, listed in the order of their importance based on their effect on the credit score." § 1681g(f)(2)(B). Any consumer, not just consumers that have a less than perfect credit score, may obtain a copy of their credit report, including key factors for adverse action, from either the credit rating agency (for requests for credit scores) or anyone who uses the consumer credit score for loan purposes. § 1681g(f)(1) et seq. and § 1681(g)(1) et seq.

¹⁵⁷ § 1681g(f)(1)(C). ("[A]ll of the key factors that adversely affected the credit score of the consumer in the model used, the total number of which shall not exceed 4, subject to paragraph (9).") There is yet another exception here: if one of the "key factors" is "number of enquiries" (either by the consumer or others), that must be listed, as well as the other four key factors. § 1681g(f).

¹⁵⁸ *FICO Reason Codes*, *supra* note 97.

¹⁵⁹ *Id.*

¹⁶⁰ *Cf.* Philip Morris v. Reilly, 312 F.3d 24 (1st Cir. 2002) (holding that the state could require revelation of ingredients, but not how much of each was in the cigarettes). Interestingly, the tobacco company in *Reilly* successfully raised a constitutional challenge, alleging the "taking" of a trade secret. *Id.*

¹⁶¹ *Demyanyk*, *supra* note 59.

history into a score.¹⁶² That is a trade secret, a designation that offers powerful legal protections to companies that want to keep their business practices a secret.¹⁶³ Credit bureaus argue that individuals would “game the system” if scoring algorithms were public.¹⁶⁴ Incidental indicators of good credit can become much less powerful predictors if everyone learns about them. If it were to become widely known that, say, the optimal number of credit accounts is four, those desperate for a loan may be most likely to alter their financial status in order to conform with this norm. In the worst case scenario, the disclosed signal becomes more an indicator of desperation for financing than a badge of creditworthiness.

Is innovation in credit evaluation valuable enough to merit hiding it from the people it affects? Innovation is not good in itself.¹⁶⁵ If it needlessly complicates the social world, lends a patina of objectivity to dangerous investment practices, or encodes discriminatory practices in impenetrable algorithms, credit scoring can leave us worse off.¹⁶⁶ Unfortunately, the very secrecy of credit scoring impedes definitive statements about its social role. But we can draw some conclusions about the black box society that credit scoring is creating, and the legal rules that could help us better understand its role while protecting the intellectual property of the developers of scoring technology.

¹⁶² Credit histories appear on “consumer reports,” as defined by the FCRA. 15 U.S.C. § 1681a(d) (2012); see also Plaintiff’s Expert Witness Report, *Ellis, v. Grant*, No. CV-04-2007-CAS, 2006 WL 3338624 (C.D. Cal. 2005) (“[I]t is very important that the trier of fact have clear and accurate understanding of the nature and purpose of consumer reports, how to read and comprehend them and the secret industry that generates them. . . . A consumer report, many times referred to as a credit report, contains highly sensitive and personal information, a compilation of a consumer’s current and past credit relationships, their credit history/payment pattern, who they owe money to, and the amount, their employment history, estimated income and personal identifying information, such as name, address, phone numbers, drivers license number, spouses name, date of birth, and social security number (SSN)).”).

¹⁶³ See Hendricks, *supra* note 16 (“Like the recipe for Coca-Cola, the precise formulas used to calculate various kinds of credit scores are well-guarded trade secrets.”).

¹⁶⁴ Odysseas Papadimitriou, *Occupy Wall Street & Credit Score Reform*, WALLET BLOG (Mar. 21, 2012), <http://www.walletblog.com/2012/03/credit-score-reform/> (“the Occupiers are off-base in suggesting that we centralize credit scoring and make the underlying formulas public. This would only make it easier for people to game the system, which would make existing credit scores less useful to banks and lead more of them to create their own proprietary scores that consumers would have no way of accessing.”). But bureaus may have more “economic” incentives to keep their methods hidden. See Eric Pitter, *The Law of Unintended Consequences: The Credit Scoring Implications of the Amended Bankruptcy Code-and How Bankruptcy Lawyers Can Help*, 61 CONSUMER FIN. L.Q. REP. 61, 65 (2007) (“CRAs have refused to disclose their credit scoring formula to anyone, even the Federal Reserve Board. The CRAs’ full exclusivity of their credit scoring model protects their niche and their unique role in the credit markets.”).

¹⁶⁵ See, e.g., *Innovating Our Way to Oblivion*, DOORS OF PERCEPTION (June 16, 2008), <http://www.doorsofperception.com/food-systems-design/innovating-our-way-to-oblivion/>.

¹⁶⁶ Amar Bhidé, *The Hidden Costs of Debt Market Liquidity* 17–19 (Center on Capitalism and Society, Columbia University, Working Paper No. 79, 2013),

There is a rich literature on the relative merits of various forms of legal protection for innovation. Patent law offers an exclusive (but time-limited) right for a patentee to control the patented process, in exchange for a full and public description of it.¹⁶⁷ Trade secrecy law has focused on promoting "commercial ethics" in markets, rather than patent law's project of defining intellectual property.¹⁶⁸ The central goal of trade secret protections is to avoid wasteful, unfair, or unethical competition.¹⁶⁹ For example, rather than only sharing a business practice with the closest of confidantes, a trade secret owner can bind employees, customers, and others not to misappropriate or disclose valuable processes and products.¹⁷⁰ A legal entitlement to trade secrecy cuts down the costs that would be incurred by zealous pursuit of "real secrecy."

On first glance, trade secret law is a better fit than patent law for dynamic fields where technology assesses social behavior.¹⁷¹ Patents are slow to issue, and claims must be rigidly defined.¹⁷² Patents may under-protect small, incremental improvements in scoring, and can unfairly channel innovation by giving patentees the right to twenty years of exclusive use of a scoring system that might well have been discovered independently by others.¹⁷³ While property rights in trade secrets last as long as the process they protect is kept secret, they only stop the *illicit acquisition* of an innovation, permitting others to reverse engineer a method or develop it from scratch.

Yet trade secrecy creates other costs. It can impede incremental innovation: how can outsiders develop better scoring systems if they have no way of accessing current ones?¹⁷⁴ Secrecy can also harm society. For example, a firm might prevent health and safety regulators from adequately investigating its practices or products by

¹⁶⁷ See e.g., Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 545 (2009).

¹⁶⁸ See e.g., Harry Wingo, *Dumpster Diving and the Ethical Blindspot of Trade Secret Law*, 16 YALE L. & POL'Y REV. 195, 195–96 (1997) ("[T]hroughout its development, trade secret law has consistently promoted minimum standards of commercial ethics.").

¹⁶⁹ RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 39 (1995) ("A trade secret is any information that can be used in the operation of a business or other enterprise and that is sufficiently valuable and secret to afford an actual or potential economic advantage over others.").

¹⁷⁰ Ian C. Ballon, *Non-Disclosure Agreements (NDAs)*, 2 E-COMMERCE AND INTERNET LAW 10.04[3] (West 2013) ("A nondisclosure or confidentiality agreement typically is the vehicle used by trade secret owners to bind third parties to secrecy.").

¹⁷¹ Cf. Mark A. Lemley, *The Surprising Virtues of Treating Trade Secrets as IP Rights*, 61 STAN. L. REV. 311, 338 (2008).

¹⁷² J.H. Reichman, *Legal Hybrids Between the Patent and Copyright Paradigms*, 94 COLUM. L. REV. 2432, 2460 (1994) ("the patent process has proved too rigid, slow, and costly for the fast-moving, short-lived products of mass consumption, and too strict in excluding the bulk of all commercial designs on grounds of obviousness.").

¹⁷³ Mimi C. Goller, *Is A Padlock Better Than A Patent? Trade Secrets vs. Patents*, 71 WIS. LAW. 20, 22 (1998) ("Patent protection is exclusive during the entire life of the patent, which now is 20 years from the date of filing the patent application.").

¹⁷⁴ See generally, Charles Tait Graves & James A. Diboise, *Do Strict Trade Secret and Non-Competition Laws Obstruct Innovation?*, 1 ENTREPRENEURIAL BUS. L.J. 323 (2007).

using trade secrecy protections to deflect investigations.¹⁷⁵ Secret credit scoring can also undermine the public good, since opaque methods of scoring make it difficult for those who feel (and quite possibly are) wronged to press their case.

Choose Your Own Credit Adventure

Sociologist Charles Tilly’s book *Why?* clarifies dynamics at play here.¹⁷⁶ Tilly develops a typology of reason-giving in contexts ranging from personal relationships to peer-reviewed historical scholarship. He observes that the “greater the professionalization of knowledge in any social setting, the greater the predominance of codes and technical accounts,” allowing reason givers who offer specialized explanations to “claim superiority” or distance from those affected by their decisions.¹⁷⁷ In response, those dissatisfied by the reasons given often demand more accessible cause-effect accounts.¹⁷⁸ Scored consumers can feel particularly aggrieved, since they are merely offered conventions (“you should have used credit more responsibly”) in the guise of the actual code or technical account that determined their fate.¹⁷⁹ However complex a credit bureau’s model and data, it could at least disclose it to some trusted third-party expert, which could confirm the validity of the calculations it performed.¹⁸⁰

Of course, that solution would leave the consumer dependent on an expert agent to assess the situation. Another approach would give consumers the chance to see what happens to their score upon different hypothetical alterations of their credit

¹⁷⁵ See Mary L. Lyndon, *Secrecy and Access in an Innovation Intensive Economy: Reordering Information Privileges in Environmental, Health, and Safety Law*, 78 U. COLO. L. REV. 465 (2007); Mike Adams, *Toxic Corexit Dispersant Chemicals Remained Secret as Feds Colluded with Big Business*, NATURAL NEWS (June 11, 2010), http://www.naturalnews.com/028974_Corexit_dispersants.html; Letter from David S. Levine et al. to Alaska Oil & Gas Commission Concerning Fracking (Apr. 1, 2013), *available at* <http://cyberlaw.stanford.edu/publications/law-professors-challenge-secrecy-fracking>.

¹⁷⁶ CHARLES TILLY, *WHY?* (2008).

¹⁷⁷ *Id.* at 25, 174.

¹⁷⁸ *Id.*

¹⁷⁹ See sources cited *supra* note 74; TILLY, *supra* note 177, at 15, 19. A convention is a “conventionally accepted reason[] for dereliction, deviation, distinction, or good reason,” while a code is a formally worked out set of rules or “criteria of appropriateness,” and a technical account is a professional’s effort to trace out “causal processes.” Tilly offers the following typology:

| | Popular | Specialized |
|------------------------------|----------------|--------------------|
| Formulas | Conventions | Codes |
| Cause-Effect Accounts | Stories | Technical Accounts |

¹⁸⁰ See Frank Pasquale, *Beyond Innovation and Competition: The Need for Qualified Transparency in Internet Intermediaries*, 104 Nw. U. L. REV. 105, 162 (2010); Dan L. Burk & Julie E. Cohen, *Fair Use Infrastructure for Rights Management Systems*, 15 HARV. J.L. & TECH. 41, 62 (2001).

histories. Imagine an interface where each aspect of a person's credit history is represented on a wiki.¹⁸¹ To make it more concrete, picture a consumer who is facing a dilemma. She already sees on her credit report that she has a bill that is 30 days overdue. She can secure a payday loan to pay the bill, but will face a usurious interest rate if she takes that option. She can probably earn enough money working overtime to pay the bill herself in 40 days. Software could give her an idea of the relative merits of either course. If her score dropped by 100 points when a bill went unpaid for a total of 60 days, she would be much more likely to opt for the payday loan than if a mere five points were deducted for that term of delinquency.

Just as the authors of the children's *Choose Your Own Adventure* series helped pave the way to the cornucopia of interactive entertainment now on offer today,¹⁸² so, too, might creative customer relations demystify the credit scoring process. Interactive modeling, known as "feedback and control," has been successfully deployed in other technical contexts by a "values in design" movement.¹⁸³ It has promoted automated systems that give individuals more of a sense of how future decisions will affect their evaluation.¹⁸⁴ For example, Canada's Immigration Bureau lets individuals enter various scenarios into a preliminary "test" for citizenship qualification.¹⁸⁵ The digital interface allows users to estimate how different decisions will affect their potential to become a Canadian citizen. Learning French or earning a graduate degree can be a great help to those in their 30s; on the other hand, some over 60 can do "everything right" and still end up with too few points to apply successfully. The public scorecard does not guarantee anyone admittance, and could be revised over time. Nevertheless, it provides a rough outline of what matters to the scoring process, and how much.

¹⁸¹ For general information on wikis, see Daniel Nations, *What is a Wiki?*, ABOUT, http://webtrends.about.com/od/wiki/a/what_is_a_wiki.htm (last visited Apr. 25, 4:29 PM).

¹⁸² Grady Hendrix, *Choose Your Own Adventure Books*, SLATE (Feb. 18, 2011, 7:08 AM), <http://www.slate.com/id/2282786/>

¹⁸³ *Multistakeholder Process To Develop Consumer Data Privacy Codes of Conduct: Before the Department of Commerce National Telecommunications and Information Administration*, at *11, No. 120214135-2135-01 (May 18, 2012) (comments of Dierdre K. Mulligan and Nicholas P. Doty), available at <http://vublst.files.wordpress.com/2011/11/contextual-privacy-and-the-proliferation-of-location-data3.pdf>; see also, generally H. NISSENBAUM, *PRIVACY IN CONTEXT: TECHNOLOGY, POLICY, AND THE INTEGRITY OF SOCIAL LIFE* (2010); MIREILLE HILDEBRANDT, *PROFILING THE EUROPEAN CITIZEN* 67 (2008).

¹⁸⁴ HILDEBRANDT, *supra* note 183; NISSENBAUM, *supra* note 183..

¹⁸⁵ *Skilled Worker Online Self-Assessment*, CITIZENSHIP AND IMMIGRATION CANADA, <http://www.cic.gc.ca/english/immigrate/skilled/assess/Education.asp>.

“Just Give Us More Data”

Credit card purchase records are a data geek’s dream. “Quants” promiscuously correlate various forms of behavior to uncover hidden relationships.¹⁸⁶ Billing data may identify buying patterns that associate with profitable customers. One company determined that buyers of cheap automotive oil were worse risks than those who paid for a brand-name oil.¹⁸⁷ Drinking beer at a sketchy bar, installing showy “chrome thrusters” on your car, or subscribing to *Soldier of Fortune* magazine—all might lead to higher interest rates or lower credit limits.¹⁸⁸ One researcher bragged that his firm considers over 300 characteristics to pinpoint delinquency risks.¹⁸⁹

Credit analysts aim to overcome some problems of credit scoring. Think back to the example of the “responsible consumer” mentioned above, who was chagrined to find that algorithms could mechanistically reduce his score once he reduced his credit limit. Why should he be lumped in with the majority of individuals whose higher debt-to-limit ratios indicate more problems with repaying their debt? Credit analysts agree, arguing that inaccurate or unfair decisions merely reflect incomplete implementation of the scoring concept.¹⁹⁰ More immediate access to larger stores of data about consumers might allow them to identify our hypothetical consumer’s behavior as an indicator of responsibility, rather than desperation. A critical mass of additional variables in a profile (say, “donates over \$200 to non-radical political parties,” “pays Parent Teacher Association dues,” “always buys his wife flowers on their anniversary”) could flip the valence of the reduced credit limit entirely. With a more complete profile,

¹⁸⁶ See SCOTT PATTERSON, *THE QUANTS: HOW A NEW BREED OF MATH WHIZZES CONQUERED WALL STREET AND NEARLY DESTROYED IT* (2010). Credit analytics is an emerging lender practice that mirrors secret reputation assessment in other fields. See, e.g., FREMSTAD & AMY TRAUB, *supra* note 111, at 20; IAN AYRES, *SUPERCRUNCHERS* 130–32 (2008) (discussing algorithmic system used to analyze sex offenders); STEPHEN BAKER, *THE NUMERATI* (2009).

¹⁸⁷ Charles Duhigg, *What Does Your Credit-Card Company Know About You?*, N.Y. TIMES, May 12, 2009, <http://www.nytimes.com/2009/05/17/magazine/17credit-t.html?pagewanted=all>.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*

¹⁹⁰ See, e.g., Gregg B. Brelsford, *Why Lawyers Can’t Help Challenge Credit Scores*, GPSOLO MAGAZINE (Apr./May 2005), http://www.americanbar.org/newsletter/publications/gp_solo_magazine_home/gp_solo_magazine_index/creditscores.html (“Despite the decisive impact that credit scores have in meeting critical needs in a contemporary consumer’s life, the credit files that underlie them contain a staggering number of errors.”); Robert B. Avery et al., *Consumer Credit Scoring: Do Situational Circumstances Matter?*, at 12 (Bank for International Settlements Working Papers, Paper No. 146, 2004), available at http://www.ecri.eu/new/system/files/40+bis_working_paper.pdf (“The failure, however, of credit history scoring models to consider situational information relating to the economic and personal circumstances of individuals raises important statistical issues that may affect the ability of such scoring systems to accurately quantify the credit risk of individuals.”).

the argument goes, credit analysts could model the reduced credit limit as a *positive* influence on creditworthiness.¹⁹¹

Credit analytics exposes a faultline in contemporary concerns about privacy and reputation, a contrast I deem “anonymity vs. accuratism.” Traditionally, privacy has been interpreted as a right to conceal, to keep others from knowing details about one’s life, opinions, or preferences.¹⁹² But laws like FCRA defend a different value: that of being fairly and accurately assessed. Taken to a logical extreme, an “accuratist” approach to reputation would insist that any threats occasioned by loss of privacy can be defused once a decisionmaker has a fuller picture of the object of surveillance. To paraphrase the old French proverb, to explain all is to forgive all. Or, to put it more darkly: why care about privacy if you’ve got nothing to hide?¹⁹³

The accuratist mindset has a certain pragmatic appeal, especially when framed as a source of bonuses rather than penalties. Purchases of carbon monoxide detectors or floor protectors might correlate with meticulous attention to personal finances. Perhaps those who care enough to maintain their linoleum should enjoy a boost at the bank. But as we shall see in the next section, accuratism can fail to respect human dignity if it does not disclose (or allow contestation of) the algorithms it deploys.

Toward a True (or at Least Fair) Science of Credit Evaluation

Compared with more obvious injustices, the cat-and-mouse game of contemporary credit analytics may seem like a trivial problem. Lenders try to find their most valuable customers; consumers search for the best deals. Credit card lending can be as much a curse as a blessing, and we may want to cut lenders some slack as they explore new technologies of social sorting.¹⁹⁴ Reduced credit limits might be more a

¹⁹¹ Appearing too frugal, too anxious, too spendthrift—all might lead to higher interest rates or lower credit limits. By sweeping millions of transactions into secret profiling of customers, today’s “data-driven decisionmaking” threatens to become just as intrusive and judgmental as pre-FCRA credit bureau files. See Frank Pasquale, *Online Health Data in Employers’ and Insurers’ Predictive Analytics*, CONCURRING OPINIONS (Nov. 19, 2010), <http://www.concurringopinions.com/archives/2010/11/online-health-data-in-employers-and-insurers-predictive-analytics.html#more-36624>.

¹⁹² Helen Nissenbaum, *Privacy as Contextual Integrity*, 79 WASH. L. REV. 119, 155 (2004) (according to the theory of privacy as contextual integrity, “whether a particular action is determined a violation of privacy is a function of several variables, including the nature of the situation, or context; the nature of the information in relation to that context; the roles of agents receiving information; their relationships to information subjects; on what terms the information is shared by the subject; and the terms of further dissemination.”)

¹⁹³ For a taxonomy of concerns expressed in the “I’ve got nothing to hide” argument against privacy, see DANIEL J. SOLOVE, *I’VE GOT NOTHING TO HIDE (AND OTHER MISUNDERSTANDINGS OF PRIVACY)* (2010).

¹⁹⁴ See generally Oscar Gandy, *The Panoptic Sort* (1993).

service than a burden if marital difficulties, mental health concerns, or cheap liquor reliably forecast financial challenges.¹⁹⁵

Risk-based interest rates are a permanent feature of banking, but they should not be based on opaque assessments that are impossible for outsiders to verify, let alone challenge. Nevertheless, individuals are right to demand some detailed account of how and why they are being categorized.¹⁹⁶ Powerful companies should not be able to sort people into “wheat” and “chaff,” “prime” and “subprime” borrowers, without explaining how they do so.¹⁹⁷

Moreover, if scores are self-fulfilling prophecies, creating the financial distress they claim merely to indicate, something far more troubling than neutral prediction of future behavior is going on.¹⁹⁸ The very act of designating a certain person a likely failure raises their cost of future financing, thus increasing the likelihood of eventual insolvency.¹⁹⁹ When a categorization can take on a life of its own, contributing to the situation it claims merely to predict, it becomes a *normative* matter, requiring some moral justification and rationale.²⁰⁰

¹⁹⁵ Credit limits may actually help those affected by a negative score. See Press Release, FICO, Study Finds Little Impact to Most Consumers' FICO Credit Scores When Lenders Lower Spending Limits on Credit Cards (Aug. 20, 2009), available at <http://www.fico.com/en/Company/News/Pages/08-20-2009.aspx> (“The study found that while U.S. lenders have made substantially deeper cuts into consumer credit card lines, their targeted approach has had minimal impact on the FICO credit scores of most card customers. *The study also found that credit scores fare best when consumers keep balances low on their credit card accounts.*”) (emphasis added). However, the same is not as true of higher rates, which, while deterring lending, also constitute a penalty. See, e.g., Alison Vekshin, *Fed to Bar Loan Penalties that Deter Refinancing*, Bloomberg, July 12, 2008, <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=axD1nVft5dN0>.

¹⁹⁶ Cathy O’Neil, *Let Them Game the Model*, MathBabe (Feb. 3, 2012), <http://mathbabe.org/2012/02/03/let-them-game-the-model/>; Klint Finley, 3 Data Rights We Must Demand from Companies, READWRITE (Apr. 30, 2011), <http://readwrite.com/2011/04/30/quantified-self-data-portabili>. A growing number of companies with an internet presence are now demanding such explanations from the internet giants who control their access to customers and users. E.g., *Beware the Hype over Big Data Analytics*, SEEKING ALPHA (Mar. 19, 2012), <http://seekingalpha.com/article/441171-beware-the-hype-over-big-data-analytics> (“Usually, when an IT system is put in place, a return on investment analysis is done The real reason for the dissatisfaction that one often encounters, when talking to executives at many companies, is that they have been promised 'Moneyball' type results from data analytics, but have not gotten it.”).

¹⁹⁷ For an argument against opacity, see O’Neil, *supra* note 196.

¹⁹⁸ See Michael Aleo & Pablo Svirsky, *Foreclosure Fallout: The Banking Industry's Attack On Disparate Impact Race Discrimination Claims Under The Fair Housing Act And The Equal Credit Opportunity Act*, 18 BOSTON UNIV. PUB. INTEREST L. J. 1, 5 (2008) (“Ironically, because these borrowers are more likely to default on their loans, the banks, to compensate for that increased risk, issue these borrowers loans that feature more onerous financial obligations, thus increasing the likelihood of default.”).

¹⁹⁹ *Id.*

²⁰⁰ This is part of a larger critique of economic thought. See DONALD MACKENZIE, AN ENGINE, NOT A CAMERA: HOW FINANCIAL MODELS SHAPE MARKETS (Cambridge, MA: MIT Press, 2006) (describing how economic theorists of finance helped create modern derivative markets); Joel Isaac, *Tangled Loops: Theory, History, and the Human Sciences in Modern America*, 6 MODERN INTELLECTUAL HISTORY 397–424 (2009) (“scholars are

Credit scoring reflects a resurgent interest in studying human behavior as scientists might examine physical phenomena. In the popular book *Supercrunchers: Why Thinking by Numbers is the New Way to be Smart*, Ian Ayres has celebrated the "cutting edge organizations [which] are already crunching increasingly larger data sets to find the unseen connections among seemingly unconnected things to predict human behavior with staggeringly accurate results."²⁰¹ For example, Hollywood advisor Epagogix creates databases that map proposed movie scripts onto past scripts; it claims to forecast a project's success based on the words of the script alone.²⁰² Perhaps past movies that used the words "kumquat" and "clandestine" were box office smashes; why not include them in today's script to provoke some stereotyped positive response in the audience? Walmart gives applicants a 400-question psychological test; it claims their answers to questions like "I have never stolen anything in my life: true or false?" can predict whether they are likely to be good employees.²⁰³ Like the credit scorers, both Walmart and Epagogix keep these business techniques under wraps; journalists have only discovered a few tantalizing details of the models they use.

These techniques reflect the rise of a pragmatic behaviorism among managers besotted with statistical technique. For behaviorists, human beings' minds are something of a black box.²⁰⁴ Managers can't understand what goes on among trillions of brain synapses, and don't want to spend on the personnel necessary to parse thousands of subjective narratives. What we can do is condition objects of our attention to engage in certain actions and avoid others. Behaviorism was once a merely positivist project, eschewing advocacy of any optimal modes of action. But once combined with fashionable Darwinism and utilitarianism, it can be billed as a theory of society. Those who persist in acting in disfavored ways would gradually be unable to compete with the better resourced individuals who were rewarded. For Ayres's "supercrunchers," life and business become a project of maximizing rewards and minimizing punishments.

rejecting the traditional notion that economics attempts to create freestanding representations of market processes (which economic sociologists must then insist leaves out power, or cultural context, or the fullness of human agency). Advocates of the performative approach 'recognize economics not as a (misguided) science of capitalism but as its technology, that is, as one of the active ingredients in the production and reproduction of the market order.'" (quoting Marion Fourcade, *Theories of Markets and Theories of Society*, 50(4) AMERICAN BEHAVIORAL SCIENTIST 1025 (2008)).

²⁰¹ IAN AYRES, *SUPERCRUNCHERS* (2008).

²⁰² *Id.* at 159.

²⁰³ *Id.* at 29.

²⁰⁴ BRENT D. SLIFE, *WHAT'S BEHIND THE RESEARCH?* 39 (1995) ("For behaviorism, human beings are *black boxes*—that is, what happens inside the mind is of little importance in predicting and understanding human behavior.")

It is tempting for managers to try to extend the successes of natural science to the social world.²⁰⁵ Advances in biology, chemistry, and physics have laid the groundwork for great achievements in engineering. Progress in medicine has nearly doubled human lifespans in the developed world over the past 150 years. If the bacteria, flora, and fauna of the natural world can be submitted to human will via technological progress grounded in natural science, imagine what good this scientific approach can do in the social world. Credit evaluation is part of a much larger worldview: to predict and control consumer behavior by optimizing the distribution of scarce loanable funds.

Yet people are not as predictable as plants and atoms: they have free will. Moreover, even if the law of large numbers²⁰⁶ makes well-tracked behavior more amenable to analysis, credit scoring is done in secret, and lacks the norms of replication and openness that are a hallmark of solid science. Even the vaunted efficiency gains of credit scoring have been called into question after mortgage-based securities morphed into “toxic assets.”²⁰⁷ Before the crisis, few worried about the soundness of the underlying data, the extrapolability of old records to later scenarios, or the ways in which macroeconomic reversals could render the future radically unlike the past. Aspirations for prediction, control, and quantification ultimately contributed to their

²⁰⁵ Another tradition in social science, phenomenology, has taken individuals' subjective perspective as a foundation for further inquiry. See generally Myron Orleans, *Encyclopedia of Phenomenology*, FULLERTON, <http://hss.fullerton.edu/sociology/orleans/phenomenology.htm> (last visited Apr. 23, 9:17 PM). The rivalry between these objective and subjective perspectives affected much of social science throughout the 20th century. Paul Diesing, *Objectivism v. Subjectivism in the Social Sciences*, 33 PHILOSOPHY OF SCIENCE 124 (1966); see also Carlos Barros, *Common Paradigm of the 20th Century Historians*, H-DEBATE, http://www.h-debate.com/cbarros/spanish/p_comun_ing.htm (last visited Apr. 23, 9:20 PM). The phenomenological perspective still informs anthropology, interpretive social science, and some philosophy. JOHN FAHY, PHENOMENOLOGY: THE FATE OF A PHILOSOPHICAL GIFT IN ANTHROPOLOGY, available at http://www.academia.edu/2860409/Phenomenology_The_Fate_of_a_Philosophical_Gift_in_Anthropology; Barros, *supra*. An uneasy truce permits both approaches to persist in the social sciences academy. However, within the business world, behaviorism has clearly won out. See generally, PATTERSON, *supra* note 186. Quantification, influence, and manipulation are key business strategies. *Id.*

²⁰⁶ “The law of large numbers puts into words the human intuition to trust larger sample sizes over smaller sample sizes.” Thomas Berghman, *A Market Under(Writing) the Weather: A Recommendation to Increase Insurer Capacity*, 2013 U. ILL. L. REV. 221, 233 (2013).

²⁰⁷ Compare Brenda Reddix-Small, *Credit Scoring and Trade Secrecy: An Algorithmic Quagmire or How the Lack of Transparency in Complex Financial Models Scuttled the Finance Market*, 12 U.C. DAVIS BUS. L.J. 87, 114 (2011) (“the accuracy and efficiency of the credit scoring model as a predictive risk have not been sufficiently analyzed as pertaining to a particular product, the borrower has no means of determining whether the credit score is predictive of his or her risk of repayment or ability to repay. Therefore, current models are inefficient in their primary purpose”) (post-2008 crisis) with Kathleen C. Engel & Patricia A. McCoy, *A Tale of Three Markets: The Law and Economics of Predatory Lending*, 80 TEX. L. REV. 1255, 1366 n. 160 (2002) (“The increased availability of historical data on subprime loans and more sophisticated underwriting models should lead to more cost-effective and accurate risk assessment throughout the home-mortgage market.”) (pre-2008 crisis).

opposites: a freakish housing meltdown, uncontrolled chain reactions of defaults, and inestimable losses.²⁰⁸

Consultants frequently tell academics that they should become more “corporate” in outlook—to pay more attention to the bottom line and to develop more proprietary products and services.²⁰⁹ These pressures are particularly intense in fields with immediate commercial relevance. However, certain principles of openness derived from traditional science and academic life might end up serving the long-term economic interests of American industries.²¹⁰ While the university can learn from the for-profit corporation, governments regulating intermediaries should also learn from the openness principles of universities. Statistician Victoria Stodden has argued that, in the case of computational scientific research, “results should be independently replicable;” otherwise, science cannot progress.²¹¹ Similarly, sequential innovation in the private sector relies on later “improvers” being able to stand on the shoulders of earlier innovators.²¹² Trade secrecy threatens to nip that process in the bud, siloing innovation in the first movers whose extant stores of credit data given them an insurmountable lead over rivals.

Credit bureaus make or break the economic fates of millions of individuals. As *New York Times* business reporter Joe Nocera observes, while a “credit score is derived after an information-gathering process that is anything but rigorous,” it “has become the only thing that matters anymore to the banks and other institutions that underwrite mortgages.”²¹³ When a private entity grows important enough, it should be subject to transparency requirements that reflect its centrality.²¹⁴ Leading firms’ critical decisions

²⁰⁸ Amar Bhide has complained that contemporary finance uses tools like credit scores to create illusions of risk-management in situations that are inevitably fraught with uncertainty Bhide, *supra* note 7, at 282.

²⁰⁹ See JAMES C. GARLAND, *SAVING ALMA MATER: A RESCUE PLAN FOR AMERICA’S PUBLIC UNIVERSITIES* 199–200 (2009) (claiming that universities need to become more efficient and should be “deregulated,” with revenues tied to “performance”); GAYE TUCHMAN, *WANNABE U: INSIDE THE CORPORATE UNIVERSITY* (2009) (observing and critiquing trends toward academic corporatization).

²¹⁰ See, e.g., Victoria Stodden, *Enabling Reproducible Research: Licensing for Scientific Innovation*, INT’L J. COMM. L. & POL’Y 2, 2 (2009) (“[P]revailing scientific norms . . . provide both that results be replicated before accepted as knowledge, and that scientific understanding be built upon previous discoveries for which authorship recognition is given.”). Patent law’s disclosure requirement reflects such scientific standards; trade secrecy dispenses with them. See also Victoria Stodden et al., *Reproducible Research*, 12 COMPUTING SCI. & ENGINEERING 8, 8 (2010) (I was a contributing author for this proposal).

²¹¹ Stodden, *supra* note 210, at 8. As she notes in the article, the OECD’s Istanbul Declaration “call[ed] for governments to make their data freely available online as a ‘public good.’” *Id.* Given extensive government support for the finance and health care industries, it is appropriate for public authorities to impose openness requirements on firms in many situations as a condition for future support.

²¹² SUZANNE COTCHMER, *INNOVATION AND INCENTIVES* 156 (2006) (“When innovation is cumulative, an important incentive problem is to ensure that each innovator is rewarded enough to take account of the benefits conferred on future innovators. The future innovators may, in fact, be the original innovator’s rivals.”).

²¹³ Joe Nocera, *Credit Score is the Tyrant in Lending*, N.Y. TIMES, July 24, 2010, at B1.

²¹⁴ The Freedom of Information Act only applies to the government, but given private companies’

should be understood not merely by their own engineers and mathematicians, but also by risk managers and regulators. However well an “invisible hand” coordinates economic activity generally, markets depend on reliable information about the practices of core firms that finance, rank, and rate consumers.²¹⁵ Brandishing quasi-governmental authority to determine which individuals are worthy of financial backing, they need to be held to a higher standard than the average firm.

II. Models and the Financial Crisis: Finding or Faking Value?

Smoke, mirrors, and razzle-dazzle are a familiar feature of marketing. Sellers can entice buyers by making their wares seem a little more outstanding than they actually are. The law of contracts even recognizes and accepts this self-serving bias when it comes in the form of “puffery.”²¹⁶ Services are even harder to value than products. They are akin to “experience” goods, which the customer can only assess the service’s value after experiencing it.²¹⁷ There are also “credence goods,” whose value a consumer will have difficulty evaluating even after consuming it.²¹⁸ Think, for instance, of a doctor assessing whether a lump is a benign tumor or metastatic cancer. Patients will sometimes seek a “second opinion” because they cannot themselves assess whether the diagnosis was accurate.

As complex and contestable a service like medicine is, the consumer of finance is even more susceptible to being misled (or worse). Whereas there usually is an objectively correct diagnosis of a patient’s state, financial positions often boil down to

increasingly governmental role in today’s society, it is time to consider applying some of its strictures to key private sector entities. *See, e.g.,* ALASDAIR ROBERTS, *BLACKED OUT: GOVERNMENT SECRECY IN THE INFORMATION AGE* 158 (2006) (discussing interaction of privatization and FOIA); Craig D. Feiser, *Privatization and the Freedom of Information Act: An Analysis of Public Access to Private Entities Under Federal Law*, 52 *FED. COMM. L.J.* 21 (1999).

²¹⁵ See source cited *supra* note **Error! Bookmark not defined.**, at 1008 (“The integrity of the markets depends on accurate credit ratings provided in good faith.”).

²¹⁶ See generally Ward Farnsworth, *The Legal Regulation of Self-Serving Bias*, 37 *U.C. DAVIS L. REV.* 567 (2003); David A. Hoffman, *The Best Puffery Article Ever*, 91 *IOWA L. REV.* 1395 (2006).

²¹⁷ “Experience goods . . . must actually be used by the consumer before he acquires an understanding of their characteristics.” Ethan Fenn, *An Economic View of Campaign Finance Spending Under the First Amendment*, 8 *U. CHI. L. SCH. ROUNDTABLE* 173, 178 (2001)

²¹⁸ See George A. Akerlof, *The Market for Lemons: Quality Uncertainty and the Market Mechanism*, 84 *Q. J. ECON.* 488 (1970) (discussing economic models involving trust and uncertain quality); Kenneth J. Arrow, *Uncertainty and the Welfare Economics of Medical Care*, 53 *AM. ECON. REV.* 941, 947, 965–66 (1963) (discussing behaviors influenced by information inequality in a medical context); Michael R. Darby & Edi Karni, *Free Competition and the Optimal Amount of Fraud*, 16 *J.L. & ECON.* 67, 68–72 (1973) (exploring credence goods where quality cannot be evaluated through normal use but only at additional cost).

bets on the future.²¹⁹ Whereas Las Vegas casinos' cards and roulette wheels are routinely inspected for bias, it can be hard to even define illicit "stacking of the deck" in securities trading.²²⁰

What we do know is that computerization supercharged Wall Street's ability to slice and dice value in some complex securities, in ways that ultimately proved destabilizing and even disastrous for the larger economy.²²¹ While public intellectuals like Richard Posner assure us that nobody could have foreseen the financial crisis,²²² the statement is only true in the sense that people who warned about problems were all too often dismissed as "nobodies" without the technological expertise or breadth of vision to appreciate the natural evolution of markets.²²³ Many voices had called for the types of sensible regulation that may well have prevented it.²²⁴ The FBI spotted rapid

²¹⁹ Derivatives in particular have been characterized as "aleatory contracts." Unlike usual contracts, where the parties are trying to set the terms of exchange in a mutually expected situation, in many derivative contracts the parties to the contract expect different (and often opposing) results. See Timothy E. Lynch, *Derivatives: A Twenty-First Century Understanding*, 43 *LOY. U. CHI. L.J.* 1, 14 ("So what exactly is a derivative? At the risk of oversimplifying, all derivatives are contracts between two counterparties⁵⁰ in which the payoffs to and from each counterparty depend on the outcome of one or more extrinsic, future, uncertain events or metrics. This means that they are 'aleatory contracts' . . .").

²²⁰ For a comparison of the regulation of investing and gambling, see Christine Hurt, *Regulating Public Morals and Private Markets: Online Securities Trading, Internet Gambling and the Speculation Paradox*, at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=797825 ("Regulators characterize investing as an enterprise of skill in which those who are assiduous and diligent may earn deserved rewards. Conversely, gambling is an enterprise of chance that encourages the lazy and untalented to divert useful capital into a chaotic system whereby an undeserving few reap ill-gotten gains while the vast majority foolishly lose.").

²²¹ See e.g., Matt Prewitt, *High Frequency Trading: Should Regulators do More?*, 19 *MICH. TELECOMM. & TECH. L. REV.* 131, 147 (describing how increasing speeds of high frequency trading have resulted in market manipulation.)

²²² Richard Posner, *The Financial Crisis: Why Were Warnings Ignored?*, *THE BECKER-POSNER BLOG* (Oct. 12, 2008), <http://www.becker-posner-blog.com/2008/10/the-financial-crisis-why-were-warnings-ignored--posner.html> (describing the idea that the financial crisis was not foreseen as the "biggest mystery," even though it was in fact foreseen by many.) See *infra* note 223.

²²³ Examples of Cassandras include Paul Krugman, Dean Baker, and Roubini Rajan. Gary Karz, *Who Predicted the Global Financial Crisis?*, *INVESTORHOME*, <http://investorhome.com/predicted.htm> (last visited Apr. 22, 2013, 5:45 PM).

²²⁴ One prominent example of such a voice is Brooksley Born, who was honored at the John F. Kennedy Presidential Library with a Profile in Courage Award. These awards are given to "to one or more public officials who took a stand that took a lot of integrity and nerve." Robert Kuttner, *Profiles in Financial Courage*, *CHELSEAGREEN* (May 18, 2009), <http://chelseagreen.com/blogs/robertkuttner/2009/05/18/profiles-in-financial-courage/>. Here is Born's citation:

In 1998, as chair of the Commodity Futures Trading Commission (CFTC), Brooksley Born unsuccessfully tried to bring over-the-counter financial derivatives under the regulatory control of the CFTC. Her efforts brought fierce opposition from Wall Street and from Administration officials who believed deregulation was essential to the extraordinary economic growth that was

growth in mortgage fraud by 2003, and warned of dire consequences if it continued.²²⁵ Law professor Lynn Stout predicted disruptive losses because “gamblers and derivatives traders [are] tempted to try to exercise control over the future by manipulating the fate of the things they were betting on.”²²⁶ She foresaw chain reactions of failures as a natural consequence of radical deregulation.²²⁷ Like Brooksely Born, the Chair of the CFTC who tried merely to launch an official study of derivative regulation, Stout ended up a Cassandra, her work ignored as official Washington deferred to the “expertise” of financiers (and the think tanks and academics they supported).²²⁸

Yet it would be too simplistic to blame mere shoddy regulation for the crisis. Bankers were adopting complexly structured finance that hid their risk-taking from the last backdrop of restraint: the market.²²⁹ Obligations would remain on balance sheets for some purposes, and off them for others.²³⁰ The ultimate “value at risk”²³¹ was

then in full bloom. Her adversaries eventually passed legislation prohibiting the CFTC from any oversight of financial derivatives during her term. *Id.*

²²⁵ *Examining Lending Discrimination Practices and Foreclosure Abuses: Before Senate Committee on the Judiciary* 38 (Mar. 7, 2012) (Prepared Testimony of William K. Black), available at <http://www.judiciary.senate.gov/pdf/12-3-7BlackTestimony.pdf>; see also Kenneth Harney, *FBI Cracks Down on Growing Mortgage Fraud*, UTSANDIEGO, July 31, 2005, http://www.utsandiego.com/uniontrib/20050731/news_1h31harney.html.

²²⁶ Lynn A. Stout, *The Legal Origin of the 2008 Credit Crisis* 11 (UCLA School of Law, Law-Econ Research Paper No. 11-05, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1770082.

²²⁷ *Id.* at 2–3 (“[T]he crisis was the direct, foreseeable, and in fact foreseen (by the author and others) consequence of . . . removal of centuries-old legal constraints on speculative trading in over-the-counter (OTC) derivatives.”) For another example of a similar event, see John Lanchester, *Once Greece Goes . . .*, 33 LONDON REV. OF BOOKS 3 (2011), available at <http://www.lrb.co.uk/v33/n14/john-lanchester/once-greece-goes> (“The collapse of Lehman Brothers in September 2008 was one of these ‘credit events’. It is in their nature that they are chaotic and unpredictable, and all the more so because the fundamentals of the economic order, as constituted in 2008, are still intact. Who owns that Greek debt? As I’ve said, mainly French and German banks. Yes, but banks insure their debt via the use of complex financial instruments. Insure it with whom? Don’t know: some of it is insured with British banks as counter-parties to the risk, but that risk will be insured in its turn, so that the identity of the person holding the parcel when its last layer of wrapping comes off is a mystery. That mysteriousness was the thing that made Lehman’s collapse turn instantly into a systemic crisis.”). Astonishingly enough, the same chains of risk are forming again. See discussion *infra* Part IV (high frequency trading a potential cause for systemic risk, as shown by the Flash Crash of 2010). And we cannot even know if preparation has been done because, according to some experts, that would tip policymakers hands to the markets and undo its intended effects.

²²⁸ As Frank Partnoy has said, “History already has shown that [Alan] Greenspan was wrong about virtually everything, and Brooksely was right . . . I think she has been entirely vindicated. . . . If there is one person we should have listened to, it was Brooksely.” Rick Schmitt, *Prophet and Loss*, Stanford Magazine, Mar./Apr. 2009, http://alumni.stanford.edu/get/page/magazine/article/?article_id=30885.

²²⁹ See Yves Smith & Tom Adams, *FCIC Report Misses Central Issue: Why Was There Demand for Bad Mortgage Loans?*, NakedCapitalism (Jan. 31, 2011), <http://www.nakedcapitalism.com/2011/01/fcic-report-misses-central-issue-why-was-there-demand-for-bad-mortgage-loans.html>.

²³⁰ E.g., FINANCIAL CRISIS INQUIRY COMM’N, THE FINANCIAL CRISIS INQUIRY REPORT 65 (2011), available at http://fcic-static.law.stanford.edu/cdn_media/fcic-reports/fcic_final_report_full.pdf (“Citigroup’s [leverage]

modeled by some computer, somewhere—CEOs didn’t want to bother with details. Byzantine sale-and-repurchase agreements obscured who would be left holding the bag when a “credit event,” triggering massive payment obligations, occurred.²³²

The iconoclastic investor Nassim Taleb came to prominence by calling the financial crisis a “black swan,” a freakish event both unpredicted and unpredictable.²³³ But as more details emerge, it becomes apparent that it was less an unpredictable outcome of an unforeseen confluence of events, than it was the natural consequence of black box algorithms and information practices in the finance system. Even conscientious buyers of what turned out to be “toxic assets” couldn’t understand their true nature. In case after case, complex computerized models and valuation algorithms proved crucial to the murkiness of the risks they ostensibly quantified.²³⁴

Modeling and Marketing Mortgage-Backed Securities

Consider the investment process that fueled the housing bubble: securitization of mortgage pools.²³⁵ While investors may not be particularly interested in any one particular mortgagor’s stream of payments, an aggregation of such payments can be marketed as a far more stable and secure income source than, say, any one loan. These mortgage-backed securities (MBSs) combine and redistribute interest income (and claims to principal).²³⁶ In the first step toward creating an MBS, mortgage lenders would make hundreds of loans.²³⁷ Then, investment banks bundle the mortgages and securitize²³⁸ them—that is, combine net payments into a series of bonds.²³⁹ To be

increased from 18:1 to 22:1, then shot up to 32:1 by the end of 2007 when Citi brought off-balance sheet assets onto the balance sheet.”).

²³¹ *Id.* at 44.

²³² See Jennifer S. Taub Guest Post, *A Whiff of 105*, THEBASELINE SCENARIO (Mar. 16, 2010), <http://baselinescenario.com/2010/03/16/a-whiff-of-repo-105/>; Jane D’Arista, *Reregulating and Restructuring the Financial System* 4 n.4 (Political Economy Research Institute, Working Paper No. 272, 2011).

²³³ NASSIM NICHOLAS TALEB, *THE BLACK SWAN: THE IMPACT OF THE HIGHLY IMPROBABLE* (2010).

²³⁴ Whether such murkiness was intentional, an aspect of fraud, or merely the wishful thinking or self-delusion of those involved, is not my concern here. One of the greatest dangers of complex models in the financial field is their ability to obscure that distinction, which is crucial to both criminal culpability and civil liability.

²³⁵ Nestor M. Davidson & Rashmi Dyal-Chand, *Property in Crisis*, 78 *FORDHAM L. REV.* 1607, 1634 (2010) (the “proliferation of subprime residential mortgage-backed securities and the downstream financial structures . . . fueled, and were fueled by, a housing bubble.”)

²³⁶ See Kathryn Judge, *Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk*, 64 *STAN. L. REV.* 657, 670–677 (2012).

²³⁷ Peterson, *supra* note 46, at 2209.

²³⁸ “In a securitization transaction, a firm sells its rights to receive certain future monies (receivables) to an entity (the “pool”). The pool’s assets consist almost entirely of the receivables. The receivables often, but

purchased by investors, the bonds would throw off interest payments and eventually return principal.²⁴⁰

The highest rated bonds (AAA) had to be paid first from whatever money came in to the MBS.²⁴¹ Mid-rated bonds (also known as the mezzanine tranche, or slice) would next be paid. The lowest rated bonds (rated BBB, BB-, or unrated) were often known as an “equity layer;” they would be paid last, and were vulnerable to lose much or all of their value if some borrowers defaulted.²⁴²

The MBS was only the first stage of an alchemical process of combining loans. Each MBS could itself serve as an asset, to be included in another Asset Backed Security (ABS).²⁴³ A special purpose vehicle (SPV) could collect ABSs into a “collateralized debt obligation” (CDO).²⁴⁴ The CDO would segment (or tranche) cash flows based on the credit rating of the underlying ABS behind them. Senior tranches were paid before junior ones; AAA rated ones had priority over AA, AA over A, etc.²⁴⁵ The following diagram, from an account by Tom Adams and Yves Smith on the demand for subprime, illustrates how a hypothetical set of subprime mortgage bonds could have spawned sets of CDOs.²⁴⁶

not always, have similar terms, maturities, and other salient characteristics.” Claire A. Hill, *Securitization: A Low-Cost Sweetener for Lemons*, 74 WASH. U. L.Q. 1061, 1067 (1996).

²³⁹ Christopher E. Ware & Laura Gramling Perez, *Main Street Meets Wall Street: The Mortgage Meltdown*, 80 WIS. LAW. 8, 10 (2007)

²⁴⁰ *Id.*

²⁴¹ See Peter H. Hamner, *The Credit Crisis and Subprime Litigation: How Fraud Without Motive ‘Makes Little Economic Sense’*, 1 U. PUERTO RICO BUS. L.J. 103, 109 (2010).

²⁴² *Id.*

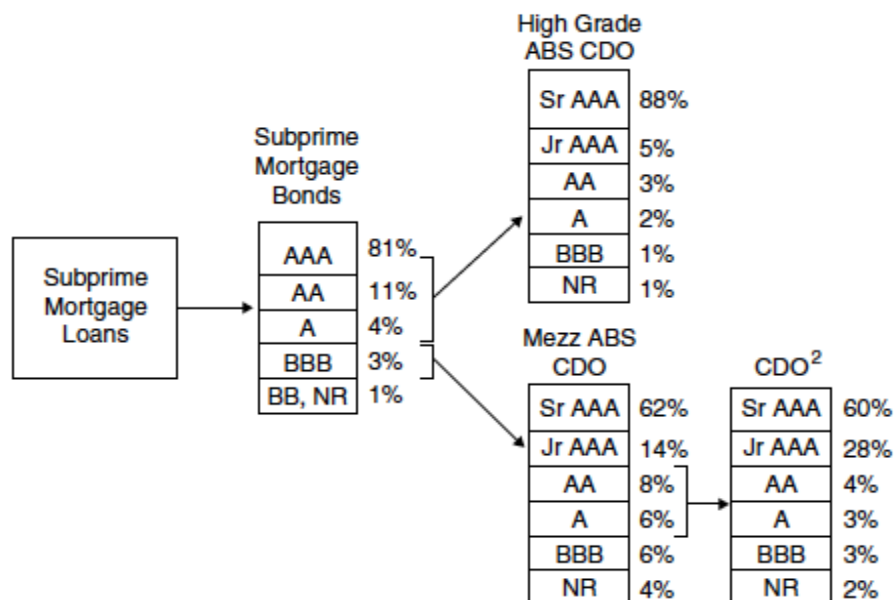
²⁴³ *Id.* at 108 (“Securitization is important because it can transform previously untradeable assets into tradable asset-backed securities (“ABS”). MBS are a type of ABS whereby mortgage loans are pooled and sold as a debt obligation for the claim to the future payments on the mortgage loans by the home owner.”).

²⁴⁴ Peterson, *supra* note 46, at 2209; Eamonn K. Moran, *Wall Street Meets Main Street: Understanding the Financial Crisis*, 13 N.C. BANKING INST. 5, 38-39 (2009) (CDOs are “used to purchase asset-backed instruments, such as MBSs or CMOs with various ratings and projected returns. CDOs, an unregulated type of asset-backed security and structured credit product, are constructed from a portfolio of hundreds or thousands of fixed-income assets, such as actual loans or bonds.”)

²⁴⁵ Hamner, *supra* note 241, at 110–111.

²⁴⁶ Smith & Adams, *supra* note 229. (“So let us say a CDO pays Libor + 50 basis points. You as Eurobank can fund at Libor – 20. So in theory, you have 70 basis points of income over your funding costs. You buy protection on the CDO. That’s 30 basis points. You have 40 basis points of income post hedge....This mechanism played a direct role in the blowup of the financial system. That alone makes a compelling case for clawbacks and restrictions on Wall Street pay. This is THE crisis mechanism.”).

Figure 1



In this case, the vast majority of the subprime loans were rated AAA initially.²⁴⁷ The top tranches of an MBS could be inserted into a high grade Asset-Based Security, which was overwhelmingly tranching into AAA grade bonds.²⁴⁸ The “mezzanine” tranches (so named because they were between very secure AAA and junk status) were parceled into a “Mezzanine ABS CDO.”²⁴⁹ Working with credit rating agencies, the packagers of such CDOs alchemically re-rated debt that had been rated A or BBB, finding that in fact a high percentage of it deserved AAA status.²⁵⁰ The miracle of tranching was compounded by mathematical modeling. The sell-side would even combine parts of CDOs into a CDO² (CDO-squared), which once again applied probability models to project a new level of value onto re-organized cash flows.²⁵¹

The prospectus for a complex MBS might run, say, 100 pages.²⁵² That prospectus might, in turn, refer to the prospectuses of five other investments, which themselves each refer to five others. Assuming they are all the same length, that is over 2,600

²⁴⁷ See fig. 1, *supra* p. 37.

²⁴⁸ Hamner, *supra* note 241, at 109–110.

²⁴⁹ See Houman B. Shadab, *Credit Risk Transfer Governance: The Good, the Bad, and the Savvy*, 42 SETON HALL L. REV. 1009, 1072 (2012).

²⁵⁰ Hamner, *supra* note 241, at 109–110 (“mezzanine and subordinate subprime tranches are tranching to be thick enough to absorb collateral losses to ensure that the senior bonds have a probability of loss sufficiently low to justify a triple-A rating.”) (internal quotation removed).

²⁵¹ Shadab, *supra* note 249, at 1072.

²⁵² See, e.g., *Prospectuses & Related Documents*, FANNIEMAE (Feb. 27, 2013), <http://www.fanniemae.com/mbs/documents/mbs/prospectus/>.

pages of complicated contractual language to process.²⁵³ Moreover, if the 26 prospectuses refer to each other in conflicting ways, unavoidable ambiguities emerge. One problem should immediately come to mind for lawyers considering such complex arrangements: A might promise to pay off B if C defaults; C may have promised to pay D before it defaults; and A may be counting on a stream of funding from D to pay off B. Does B get its money if C defaults?²⁵⁴

The world of finance offers many examples of complexity that lead to obscurity or outright opacity. In the case of MBS's, a "computer language for defining deals' intricate cash flow rules" has developed, complete with a "computerized "library" of the parameters of the underlying asset pools and the cash flow rules of more than 20,000 deals."²⁵⁵ As Donald MacKenzie reported for the *Financial Times*, Intex costs \$1.5 million per year to license, and has become an essential system for those dealing in structured securities.²⁵⁶ MacKenzie observes that the system can make complexity seem extraordinarily tractable:

The rules governing a deal can occupy hundreds of pages of impenetrable legal prose, and the economic value of the deal's tranches depends on three complex characteristics of the underlying mortgage pool: the rate at which borrowers prepay (redeem their mortgages early), their propensity to default, and the loss severity (the proportion of the debt that cannot be recovered if a borrower defaults).

In July a friendly banker showed me Intex in action. He chose a particular mortgage-backed security, entered its price and a figure for each of prepayment speed, default rate, and loss severity. In less than 30 seconds, back came not just the yield of the security, but the month-by-month future interest payments and principal repayments, including whether and when shortfalls and losses would be incurred. The psychological effect was striking: for the first time, I felt I could understand mortgage-backed securities. Of course, my new-found confidence was spurious. The reliability of Intex's output depends entirely on the validity of the user's assumptions about prepayment, default and severity.²⁵⁷

²⁵³ For an entertaining example of the pitfalls here, see Stephen Neary et al., *Planet Money's Toxic Asset Special Series*, NATIONAL PUBLIC RADIO, available at <http://www.npr.org/series/124587240/planet-money-s-toxic-asset>.

²⁵⁴ This has long been a vexing problem for law. Grant Gilmore, *Circular Priority Systems*, 71 Yale L.J. 53 (1961).

²⁵⁵ Donald MacKenzie, *Unlocking the Language of Structured Securities*, FINANCIAL TIMES, Aug. 19, 2010.

²⁵⁶ *Id.*

²⁵⁷ *Id.*

The program cannot anticipate how banks, servicers, and judges ruling on foreclosure actions respond to a sudden fall in the price of homes, or whether legislators will alter bankruptcy rules in the wake of a crash.²⁵⁸ And as various “shorts,” perhaps inspired by Hyman Minsky, realized, a feedback loop developed between lower home prices, reduced willingness of lenders to loan funds in return for collateral of reduced value, and thus less purchasing power to prop up the price of homes.²⁵⁹

Scenarios like these, overlapping and cascading throughout the financial system, were at the root of the last financial crisis. And rather than letting the chips fall where they may, or consigning the mess to a massive bankruptcy proceeding, governments are prone to enter the mix with “bailouts” and “liquidity facilities,” adding a whole other layer of complexity to an already byzantine scenario.²⁶⁰ Once again, it’s difficult to imagine how, even in principle, a modeling program could simulate or reduce to algorithms these complexities, especially now that new and untested provisions of the Dodd-Frank Act (like Orderly Liquidation Authority) add yet another source of uncertainty to the mix.²⁶¹ And yet the larger market for asset-backed securities steams along, in part thanks to software that claims to render tractable an ever less predictable reality.

Statistical Legitimacy

The financial institutions brokering the deals between sellers and buyers of CDOs often acted as middlemen, or “market makers.”²⁶² They made money no matter what happened to the securities they sold. But why would the buyers of these mortgage-backed bonds purchase them so readily, given their complex and novel structure? Why would government allow widespread distribution of securities that rapidly morphed into

²⁵⁸ It even appears to have difficulty with CDOs that “included tranches of other ABS CDOs in their pools;” according to Mackenzie, running the numbers on such securities can cause “the layered Intex models to run

very slowly.” Mackenzie, *The Credit Crisis as a Problem in the Sociology of Knowledge*, 116 *AMERICAN JOURNAL OF SOCIOLOGY* 1778, 1817 (2011).

²⁵⁹ LEWIS, *supra* note 54; Hyman P. Minsky, *The Financial Instability Hypothesis 7* (The Jerome Levy Economics Institute of Bard College, Working Paper No. 74, 1992) (on speculative and Ponzi finance).

²⁶⁰ *E.g.* William K. Sjostrom, Jr., *The AIG Bailout*, 66 *WASH. & LEE L. REV.* 943 (2009).

²⁶¹ *See e.g.*, Stephen J. Lubben, *Resolution, Orderly and Otherwise: B of A in OLA* (Seton Hall Public Law Research Paper No. 2037915), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2037915.

²⁶² John F. Gould & Allan W. Kleidon, *Market Maker Activity on Nasdaq: Implications for Trading Volume*, 1 *STAN. J.L. BUS. & FIN.* 11, 12 (1994) (market makers “function is to facilitate market liquidity by standing ready to buy from and sell to the public.”).

“toxic assets?” The seal of approval of an entity known as a “rating agency” proved critical.²⁶³

There is a delicate balance between government and the market in America’s investment landscape. After the Great Crash of 1929, the federal government intervened to ban many suspect practices.²⁶⁴ The agencies created during the Great Depression wanted to assure that investors understood exactly how much risk they had taken on. Certain laws require institutions like pension funds to allocate money to “investment grade” securities.²⁶⁵ As financial journalist Roger Loewenstein has noted, “Over the ’80s and ’90s, a latticework of such rules redefined credit markets. Many classes of investors were now forbidden to buy noninvestment-grade bonds at all.”²⁶⁶

The government itself did not want to be in the business of rating and ranking investments.²⁶⁷ The SEC effectively delegated this task to private entities, allowing them to determine what investments were super-safe AAA, and which were more speculative.²⁶⁸ Instead of evaluating individual securities, the government would certify private companies to do so, as Nationally Recognized Statistical Rating Organizations, or NRSROs.²⁶⁹ The Credit Rating Agencies (CRAs) Moody’s, Fitch, and S&P became the leading NRSROs.²⁷⁰

Note the ostensible basis of the legitimacy of these NRSRO’s: *national recognition*, and *statistical rating*.²⁷¹ In the classic tripartite division of law, science, and politics as bases of legitimation, popularity and a certain kind of mathematical analysis

²⁶³ Indeed, as one longtime finance reporter puts it, “the ratings agencies . . . [whose] triple-A rating could compensate for the complexity of the products emerging from the CDO-creation pipeline. . . proved even more flawed in their ability to serve as some kind of guardian of the health of the financial system than the accountants who had blithely overlooked years of financial misstatements by the likes of Enron and WorldCom.” SUZANNE MCGEE, CHASING GOLDMAN SACHS 285 (2010).

²⁶⁴ Elizabeth Devine, *The Collapse of an Empire? Rating Agency Reform in the Wake of the 2007 Financial Crisis*, 16 FORDHAM J. CORP. & FIN. L. 177 (2011)

²⁶⁵ Acts like the Secondary Mortgage Market Enhancement Act of 1984 and the Investment Company Act of 1940, and agencies like the National Credit Union Administration mandate the use of raters’ products. For a full list, see TIMOTHY SINCLAIR, THE NEW MASTERS OF CAPITAL (producing chart on the rating agencies which shows when AAA-only is investment grade, and when AA is investment grade).

²⁶⁶ Frank Pasquale, *Party at Moody’s*, Concurring Opinions (May 13, 2008, 8:28 AM) http://www.concurringopinions.com/archives/2008/05/party_at_moody.html.

²⁶⁷ Devine, *supra* note 264, at 181–85.

²⁶⁸ *Id.* at 181.

²⁶⁹ *Id.* at 181.

²⁷⁰ *Id.*

²⁷¹ Other factors do play a role. For example, in rejecting the Chinese CRA Dagong’s application to be an NRSRO in the United States, the SEC focused heavily on its inability to meet the Exchange Act’s document access and production requirements. Dagong Global Credit Rating Co., SEC Order Denying NRSRO Status, Admin. Proc. File No. 3-13860 (Sept. 22, 2010), *available at* <http://www.sec.gov/litigation/opinions/2010/34-62968.pdf>.

are rapidly displacing formal processes and authority.²⁷² Legal procedure—specifically, the strictures of administrative due process and the United States’s non-delegation doctrine—falls by the wayside. Rather than determining the meaning of “investment grade” in a public and transparent notice and comment rulemaking process (or ongoing adjudication and licensing of particular securities),²⁷³ the SEC licensed private, for-profit companies (credit rating agencies, or CRAs) to make such judgments.²⁷⁴

This “outsourcing” of regulation saved the government some money and headaches, so long as the CRAs maintained a reputation for integrity and competence. But it created vast problems once the CRAs’ ostensibly statistical, objective analyses were warped by the businesses which paid for ratings.²⁷⁵

Before 2005, only about 1% of AAA-rated investments incurred a default.²⁷⁶ In the mid-2000s, a AAA rating was a particularly prized asset; only a few of the most stable publicly traded companies had the designation. However, a Senate report found that just one of the rating agencies (Moody’s) “rated nearly 45,000 mortgage-related securities as triple-A” between 2000 and 2007.²⁷⁷ According to the report, “90% of the AAA ratings given to subprime residential mortgage-backed securities originated in 2006 and 2007 were later downgraded by the credit rating agencies to junk status.”²⁷⁸

Why did the rating agencies fail to assess the risks inherent in these securities? They were competing to please the very entities they were rating. CDO paperwork was often staggeringly complex, but rating agencies were paid handsomely to evaluate them as quickly as possible. Impatient dealers could threaten to pull their business

²⁷² See generally, Peter H. Schuck, *Multiculturalism Redux: Science, Law, and Politics*, 11 YALE L. & POL’Y REV. 1 (1993).

²⁷³ For mainstream law & economics scholars endorsement of something like a licensing scheme, see Eric Posner and E. Glen Weyl, *An FDA for Financial Innovation: Applying the Insurable Interest Doctrine to 21st Century Financial Markets*, 107 NW. U. L. REV. (forthcoming, 2013), at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2010606 (“We propose that when firms invent new financial products, they be forbidden to sell them until they receive approval from a government agency designed along the lines of the FDA, which screens pharmaceutical innovations. The agency would approve financial products if they satisfy a test for social utility that focuses on whether the product will likely be used more often for insurance than for gambling. Other factors may be addressed if the answer is ambiguous.”).

²⁷⁴ Devine, *supra* note 264, at 181.

²⁷⁵ John Quiggin has cataloged other problems with rating agencies, particularly an apparent bias toward private (and against public) investment. John Quiggin, *Discredited*, CrookedTimber (Oct. 20, 2008), <http://crookedtimber.org/2008/10/20/discredited/>.

²⁷⁶ US SENATE SUBCOMMITTEE ON INVESTIGATIONS, COMMITTEE ON HOMELAND SECURITY AND GOVERNMENT AFFAIRS, WALL STREET AND THE FINANCIAL CRISIS: ANATOMY OF A FINANCIAL COLLAPSE 6 (Apr. 13, 2011), available at http://hsgac.senate.gov/public/_files/Financial_Crisis/FinancialCrisisReport.pdf.

²⁷⁷ FINANCIAL CRISIS INQUIRY COMM’N, THE FINANCIAL CRISIS INQUIRY REPORT xxv (2011), available at http://fcic-static.law.stanford.edu/cdn_media/fcic-reports/fcic_final_report_full.pdf.

²⁷⁸ US SENATE SUBCOMMITTEE ON INVESTIGATIONS, *supra* note 278, at 6.

altogether, bringing it to a more pliable rater. Thus the “gatekeepers” had a clear, and open, conflict of interest as they evaluated the securities.²⁷⁹

Still, CRAs needed some rationale for rubber-stamping AAAs on CDOs. For those who paid the bills, there was a way. According to its website, “The foundation of Moody’s culture is based on our Mission: ‘To be the world’s most respected authority serving credit and risk-sensitive markets.’ This requires that we have an analytical, data-driven culture that rewards intellectual rigor and innovative thinking.”²⁸⁰ Innovation is certainly in evidence in various media accounts and lawsuits examining how CRA’s got the crisis so disastrously wrong. Forced to evaluate a pool of mortgages in less than 24 hours, an analyst was concerned that 43% of borrowers failed to “provide written verification of their incomes,” three-quarters opted for adjustable rate mortgages (whose payments would rise, sometimes dramatically, after a few years), and 12% of the mortgages were concentrated in a single California county.²⁸¹ However, executives said, the analyst must have been comforted by the fact that most of the loans were for primary residences, since people fight to remain in their homes even if they’re in trouble.²⁸² “You’ll give up your ski chalet first,” she said, offering a helpful heuristic.²⁸³

Moody’s rated that MBS in June, 2006. Its analyst forecast that only 4.9% of the underlying pool of mortgages would suffer losses. Given this imprimatur, tranches of it sold briskly. But in less than a year, 13% were delinquent, and by early 2008, 27% were delinquent.²⁸⁴ One financial writer estimates that the deal could have netted the company \$200,000 for very little work.²⁸⁵

In a recent lawsuit against another CRA, S&P, the Department of Justice alleges that the NRSRO was “bending the model to suit business needs,” because “considerations regarding fees, market share, and relationships with issuers improperly

²⁷⁹ A catalog of these conflicts was compiled by Aaron Lucchetti. See Aaron Lucchetti, *As Housing Boomed, Moody’s Opened Up*, WALL STREET J., Apr. 11, 2008 (“[By 2006, Moody’s] became willing, on occasion, to switch analysts if clients complained. An executive overseeing mortgage ratings went skydiving with a client. . . . [Profits at Moody’s] rose 375 percent in six years. The share price quintupled. . . . As Moody’s staff grew to accommodate the surging mortgage market, [a top executive] arranged off-site meetings for employees to get to know each other better. At one, he sung as a Blues Brother, while at another, two Moody’s executives entertained by wrestling in fat suits.”).

²⁸⁰ *Our Culture*, MOODY’S, <http://www.moody.com/Pages/car005.aspx> (last visited Apr. 26, 11:39 AM).

²⁸¹ Roger Lowenstein, *Triple-A Failure*, N.Y. TIMES, Apr. 27, 2008, www.nytimes.com/2008/04/27/magazine/27Credit-t.html?pagewanted=all&_r=0. The pool included “2,393 mortgages with a total face value of \$430 million.” *Id.* A nonbank lender had made the loans, and took the pool to a New York investment bank, which asked Moody’s to rate it. *Id.*

²⁸² *Id.*

²⁸³ *Id.*

²⁸⁴ *Id.*

²⁸⁵ *Id.*

influenced S&P's rating criteria and models."²⁸⁶ Analysts openly joked about how rotten the fundamentals were, "singing and dancing" satirical songs about the impending implosion of MBS's they had called AAA.²⁸⁷ Inadvertently released emails and instant messages indicated that some analysts had misgivings about the business they were doing. They also shed light on why rating agencies were so reticent to disclose the underlying data their ratings were based on. For example, internal communications at one CRA included these two gems from harried workers:

1. Internal Email: "rating agencies continue to create [an] even bigger monster – the CDO [collateralized debt obligation] market. Let's hope we are all wealthy and retired by the time this house of cards falters."
2. Instant Message: "It could be structured by cows and we would rate it."²⁸⁸

As the market heated up, the three ratings agency CEOs earned \$80 million between 2002 and 2008, far higher compensation than they had ever made previously.²⁸⁹ A "race to the bottom" had ensued.²⁹⁰ One firm made it clear to some clients that it could switch analysts if, say, one of its workers seemed unduly demanding.²⁹¹ Profits increased by nearly 400% as the housing bubble inflated, and Moody's shares became five times more valuable.²⁹² According to one *Wall Street Journal* report, the once-staid analysts celebrated their good fortune in style. At one off-site meeting, a top executive sang "as a Blues Brother, while at another, two Moody's executives entertained by wrestling in fat suits."²⁹³ This was not an environment conducive to sober second looks at CDO models (or even thorough "first looks").²⁹⁴

In theory, the SEC could supervise the rating agencies from afar, melding the best of the public and private sector in their performance. In practice, it was easy for

²⁸⁶ Complaint and Demand for Jury Trial at 39, 55, *United States v. McGraw-Hill Companies*, No. CV13-00779 (C.D. Ca. Feb. 4, 2013).

²⁸⁷ *Id.* at ¶ 233j, 233i (describing analyst's composition of a song "Bringing Down the House" to the tune of David Byrne's "Burning Down the House," and "singing and dancing" the first verse of the song).

²⁸⁸ John Cassidy, *Burning Down the House of S&P*, *THE NEW YORKER* (Feb. 5, 2013), www.newyorker.com/online/blogs/johncassidy/2013/02/burning-down-the-house-of-s-p.html; Lorraine Woellert & Dawn Kopecki, *Moody's, S&P Employees Doubled Ratings, E-Mails Say*, *BLOOMBERG*, Oct. 22, 2008, <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a2EMIP5s7iM0>.

²⁸⁹ *Credit Rating Agencies & the Financial Crisis: Hearing Before the Committee on Oversight and Reform*, 110th Cong. (Oct. 22, 2008) (statement of Chairman Waxman).

²⁹⁰ *Id.* (statement of Mr. Lynch)

²⁹¹ See Lucchetti, *supra* note 279.

²⁹² *Id.*

²⁹³ Lucchetti, *supra* note 279.

²⁹⁴ See also Fabius Maximus, *Brad DeLong Asks Is America Democracy Really Broken?*, *FABIUS MAXIMUS BLOG* (May 12, 2012), <http://fabiusmaximus.wordpress.com/2012/05/12/38684/>.

fraudulent or careless actors to evade the agency’s poorly enforced safeguards. A rule required the rating agencies to make public certain internal documents public, including procedures and methodologies they use to determine credit ratings.²⁹⁵ But none of the rating agencies had specific procedures for collateralized debt obligations, despite the fact that they were giving AAA ratings to an unprecedented number of them.

Convenient Modeling at GSEs and CRAs

Just as the government outsourced decisions about “investment grade” ratings to private firms, it also offloaded responsibility for mortgage loan guarantees to Fannie Mae and Freddie Mac by the 1970s. The two entities’ history is deeply intertwined with that of housing finance, and the shadowy web of practices, perceptions, and models that have sustained the thirty-year mortgage as a cornerstone of the U.S. housing market.²⁹⁶

In the 1920s, most mortgages were short term; they were paid off by the borrower (or assumed by another lender) at the end of a term of less than 10 years.²⁹⁷ In flush times, it was relatively easy to “roll over” loans, but the market froze during the Great Depression.²⁹⁸ To revitalize lending, the Federal Housing Administration (FHA) was established in 1934 to insure mortgages.²⁹⁹ In 1938, the Federal National Mortgage Association (FNMA, or Fannie Mae) further supported home lending.³⁰⁰

The two agencies helped millions of Americans buy homes through the mid-20th century.³⁰¹ In part to blunt its budgetary impact, President Johnson and Congress in the late 1960s “privatized” Fannie Mae into a “government sponsored entity” (GSE).³⁰²

²⁹⁵ STAFF OF THE SEC, SUMMARY REPORT OF ISSUES IDENTIFIED IN THE COMMISSION STAFF’S EXAMINATIONS OF SELECT CREDIT RATING AGENCIES 4 (2008).

²⁹⁶ BETHANY MCLEAN & JOE NOCERA, ALL THE DEVILS ARE HERE CH. 1 (2011); e.g., GRETCHEN MORGENSTERN, RECKLESS ENDANGERMENT 185 (2012).

²⁹⁷ MCLEAN, *supra* note 296; Kristopher Gerardi et al., *Revisiting Real Estate Revisionism*, FED. RESERVE B. OF ATLANTA (Dec. 21, 2010), realestateresearch.frbatlanta.org/rer/2010/12/revisiting-real-estate-revisionism.html (“Short-term balloon mortgages were more common in the 1920s and 1930s than they are today.”).

²⁹⁸ John M. Quigley, *Book Review: Foreclosed*, 10 Ent. & Soc’y 847, 847 (2009) (“The collapse of the economy in 1929 led to a calamity in the housing market, as credit dried up and many homeowners were unable to roll over their short-term mortgages”); see also DEPT. OF THE TREASURY & U.S. DEPT. OF HOUSING AND URBAN DEV., 112TH CONG., REFORMING AMERICA’S FINANCIAL MARKETS 4 (2011), available at www.treasury.gov/initiatives/Documents/Reforming%20America's%20Housing%20Finance%20Market.pdf.

²⁹⁹ James L. Butkiewicz, *Fixing the Housing Crisis (of the 1930s, that is)*, FORBES (Apr. 30, 2009), www.forbes.com/2009/04/30/1930s-mortgage-reform-business-butkiewicz.html.

³⁰⁰ *Id.*

³⁰¹ DEPT. OF THE TREASURY REPORT, *supra* note 298, at 4.

³⁰² MCLEAN, *supra* note 296; Ronald D. Utt, *Time to Reform Fannie Mae and Freddie Mac*, HERITAGE FOUNDATION (June 20, 2005), www.heritage.org/research/reports/2005/06/time-to-reform-fannie-mae-

The 1968 decision to “privatize” the firms set in motion a series of convenient assumptions for both the government and a burgeoning mortgage securitization market.³⁰³ The government did not need to budget for the liabilities the GSEs were accumulating. But investors assumed that federal authorities would ultimately back Fannie and Freddie in a crisis.³⁰⁴ That assumption proved correct, as a massive taxpayer bailout saved the two entities.

The “privatization” of Fannie and Freddie served not only budgetary purposes—it also served ideological ones.³⁰⁵ Rather than having the government directly sponsor the housing market, it appeared to merely support a private firm that met market demand for such backing. Instead of publicly airing the decisionmaking processes about how risky loans should be, such calculations could be hidden away in an ostensibly private firm (which in turn outsourced critical powers of assessment to credit bureaus, which contracted with the FICO Corporation to devise scoring methods). As with the rating agencies, the government essentially outsourced critical responsibility for evaluating creditworthiness and investment safety to for-profit entities, which in turn legitimized themselves by emphasizing the sophistication of their models and analytics.³⁰⁶

As post-crisis investigations accumulate, both the GSEs and the rating agencies emerge as deeply conflicted and political firms. Had their essentially public functions been performed by administrative agencies subject to a baseline of disclosure obligations, the speculative frenzy around mortgage backed securities might not have been so intense and destabilizing. But the algorithmic logics behind both consumer credit scoring and MBS credit rating served an almost talismanic function, providing a mathematical imprimatur for the growing treatment of MBS’s as “can’t lose” propositions.

and-freddie-mac; The “privatization” lasted until 2008, when the government saved the GSEs from bankruptcy. Russell Roberts, *Gambling with Other People’s Money* 13 (Mercatus Center, George Mason University, Apr. 28, 2010), available at <http://mercatus.org/publication/gambling-other-peoples-money>. Gains were privatized; losses were socialized. YVES SMITH, *ECONNED* (2011); Anthony Sanders, *Leaving Fannie Mae, Freddie Mac As Is Risks Another Mortgage Bubble*, U.S. NEWS (May 15, 2012), www.usnews.com/opinion/blogs/economic-intelligence/2012/05/15/leaving-fannie-mae-freddie-mac-as-is-risks-another-housing-bubble; see also WALLISON, *supra* note 119.

³⁰³ Roberts, *supra* note 302, at 24; see generally Kenneth C. Kettering, *Securitization and its Discontents: The Dynamics of Financial Product Development*, 29 CARDOZO L. REV. 1553 (2008).

³⁰⁴ Roberts, *supra* note 302, at 24.

³⁰⁵ See JANICE VAN CLEVE, *AMERICA: COURSE CORRECTION* 55 (2011).

³⁰⁶ Devine, *supra* note 264, at 181.

Tempting Illusions of Quantified Risk

Before subprime became a punchline, the industry made many people rich. The CEO of AmeriQuest, one of the biggest subprime lenders, made over \$3 billion.³⁰⁷ Some hedge fund managers also pocketed billions. Many subprime brokers and managers earned millions of dollars for only a few years of work.³⁰⁸

More than a few of these real estate tycoons have been faulted for misleading borrowers, investors, and regulators. Stories about abusive practices at subprime lenders like Ameriquest emerged throughout the run-up in house prices.³⁰⁹ Why didn't they set off any alarm bells among the *funders* of subprime loans, or those who bought bonds backed by them? Where were the managers, regulators, and counterparties? Why didn't they find out more details? And why weren't deals blocked when they seemed too risky?

In testimony before the Financial Crisis Inquiry Commission, Henry Paulson (Treasury Secretary from 2006 to 2009) provided part of the answer: "securitization separated originators from the risk of the products they originated."³¹⁰ As mortgage payments moved into RMBSs and CDOs, each link in the chain washed its hands of the assets it was selling. Moreover, as in a game of "telephone," information about the underlying mortgagors tended to be lost as the debt was repackaged.³¹¹

³⁰⁷ HUDSON, *supra* note 79, at 87. Roland Arnall, the now-deceased businessman behind Ameriquest, cut his teeth as a banker during the savings and loan crisis. *Id.* at 11. His thrift, Long Beach, manipulated its books to escape scrutiny from regulators. *Id.* at 66. The federal Office of Thrift Supervision also suspected it of discriminating against women, minorities, and older borrowers referring its investigation to the Civil Rights Division of the Justice Department. During the investigation, one salesman frankly disclosed his attitude toward customer service: "When you've got an elderly black woman, you can pretty much sell them anything you want." *Id.* at 87–88.

³⁰⁸ See, e.g., *Fresh Air: How a Few Made Millions Betting Against the Market*, National Public Radio (Mar. 16, 2010), available at <http://www.npr.org/templates/story/story.php?storyId=124690424>.

³⁰⁹ See, e.g., Christopher Conkey, *Politics & Economics: States Shelter Risky Borrowers --- Legislatures Battle Predatory Lenders as Washington Debates Issue*, WALL STREET JOURNAL, March 31, 2006, at A4 (describing 2006 settlement between 49 state attorneys general and Ameriquest regarding abusive lending practices).

³¹⁰ *Testimony by Henry M. Paulson, Jr.: Before the Financial Crisis Inquiry Committee 2* (2010), available at fcic-static.law.stanford.edu/cdn_media/fcic-testimony/2010-0506-Paulson.pdf.

³¹¹ Kathryn Judge, *Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk*, 64 STAN. L. REV. 657, 690 (2012) ("In any securities offering, the issuer selling the securities has more information about the value of the securities offered than the potential investors do. The acts of conveying information (by the seller) and processing information (by the investor) are resource intensive. While a seller must be able to convey sufficient information to a potential investor to convince the investor that the expected returns justify the price being asked, the cost to both parties of this information exchange ensures that the buyer will never know quite as much as the seller. As a result, some information is lost in every transaction.").

Competitive pressures primed the agents of investors to want to believe stories about outsized returns. Imagine two pension fund managers in 2003: cautious Carl, and ambitious Allen. Each is managing a large fund, which estimates future benefits based on an assumed annual return of 8% per year. In the 1990s, each could invest in 10-year Treasury Bills and make about 6-7% in interest,³¹² with the principal returned at the end of the decade-long term. However, by 2003, the return on 10-year T-bills was down to near 4%,³¹³ as the Fed tried to revive an economy still in shock from 9/11 and the tech bubble's bursting. Real returns on such investments (earnings adjusted for inflation) may well have been negative. Money invested at 7% interest doubles in about 10.3 years; at 4%, doubling takes about 18 years. Given the time horizons of most retirees, both Carl and Allen felt pressure to invest in bonds that offered a higher, nearly "risk free" rate of return.³¹⁴

Enter the investment banks. Such banks pride themselves on connecting investors to those who need capital. They were marketing bonds that were based on payments from "subprime" borrowers, who paid a higher rate of interest than prime borrowers.³¹⁵ Allen would be sorely tempted to invest in those bonds. Moreover, even Carl might be interested, given two relatively recent developments in the financial world. "Financial engineers" were quantifying risks in ever more precise ways.³¹⁶ Alternative forms of insurance were rising in popularity, promising to "cover" any risk

³¹² *100 Years of Treasury Bond Interest Rate History*, OBSERVATIONS AND NOTES (Nov. 17, 2010), <http://observationsandnotes.blogspot.com/2010/11/100-years-of-bond-interest-rate-history.html>

³¹³ *Id.*

³¹⁴ These rates may sound outlandish in our current "Age of ZIRP (zero interest rate policy)", but some state pension funds still statutorily assume even higher rates of return. See generally Debra Brubaker Burns, *Too Big to Fail and Too Big to Pay: States, Their Public-Pension Bills, and the Constitution*, 39 HASTINGS CONST. L.Q. 253, 295 n.4 (2011) ("Historically, pension funds have invested in diversified stock and bond portfolios that have earned average rates of return higher than the riskless rate of a Treasury rate.").

³¹⁵ Kurt Eggert, *The Great Collapse: How Securitization Caused the Subprime Meltdown*, 41 CONN. L. REV. 1257, 1272, 1275 (2009) ("Subprime loans are typically more prone to default than prime, resulting in the generally higher interest rates and fees that subprime borrowers pay One way for brokers or sales agents to maximize their commission, often based on loan amount, is to push borrowers to obtain the largest loan possible. This upselling of amount is combined with upselling of interest rates, as yield spread premiums encourage brokers to entice borrowers into paying higher interest rates.

³¹⁶ Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 134 (2009). Note that the real characterization of potential losses here was *uncertain*, to use Frank Knight's term for risk that cannot be assessed probabilistically. See generally FRANK H. KNIGHT, *RISK, UNCERTAINTY AND PROFIT* (Dover 2006). Or, in Donald Rumsfeld's terms, "unknown unknowns" could affect the results. Daniel Kurtzman, *Donald Rumsfeld Quotes*, About.Com, politicalhumor.about.com/cs/quotethis/a/rumsfeldquotes.htm (last visited Apr. 23, 12:20 PM).

that remained once the quants had estimated it.³¹⁷ Quantification and insurance proved mutually reinforcing, almost irresistible forces.

Gifted mathematicians, physicists, and engineers were getting a foothold on Wall Street by the 1970s, gaining power and prominence as computing technology advanced in the 1980s and 90s and more data became available.³¹⁸ These quantitative analysts, or “quants,” aspired to apply models developed in the natural world to predict the behavior of the financial world.³¹⁹ They offered extremely precise estimates of the risks involved in the products they developed. Confronted with Carl’s caution, they might estimate that, “Based on our proprietary models, this CDO has only a 1% likelihood of defaulting.” Ninety-nine times out of one hundred, Carl’s clients would be richly rewarded for his savvy move to lend to less than prime borrowers.

During the frenzy of the bubble, few wanted to acknowledge three problematic aspects of the models. First, few of the scientists developing complex mathematical simulations of digitized representations of past market behavior had spent much time reading about (or experiencing) historical market dynamics.³²⁰ The “best and the brightest” may have been brilliant in the classroom, but were pliable to the demands of higher-ups who wanted quantitative validation of their positions.³²¹ Meanwhile, many managers who relied on models did not comprehend their underlying dynamics. The technical skills involved were beyond them.

Finally, even if the modelers and managers had vastly greater skills, models themselves can undermine the very premises they are based on.³²² Historical data may well have shown that housing prices very rarely dropped significantly throughout the US at the same time.³²³ But as that fact becomes a premise for those who finance houses, it leads to the very overconfidence and speculation that can render the future radically

³¹⁷ PATTERSON, *supra* note 186, at 8, 93–94 (describing derivate contracts as insurance policies against poor bets.)

³¹⁸ *Id.* at 3.

³¹⁹ *Id.*

³²⁰ *Id.* at 3.

³²¹ *Id.* These three layers of miscommunication (or plausible deniability) are developed in Joseph Fuller, *The Terminator Comes to Wall Street*, THE AMERICAN SCHOLAR (2009), <http://theamericanscholar.org/the-terminator-comes-to-wall-street/>; see also PABLO TRIANA, LECTURING BIRDS ON FLYING (2009). Fuller by and large presumes good faith among the participants; while others do not. See, e.g., Cathy O’Neil, *Nate Silver is not just Wrong, But Maliciously Wrong*, NakedCapitalism (Dec. 20, 2012), <http://www.nakedcapitalism.com/2012/12/cathy-oneil-why-nate-silver-is-not-just-wrong-but-maliciously-wrong.html> (characterizing “failed” models as “successes” at achieving their true purpose—the enrichment of insiders); see also, generally WILLIAM K. BLACK, THE BEST WAY TO ROB A BANK IS TO OWN ONE (2005).

³²² See PATTERSON, *supra* note 186, at 290 (“In their desire for mathematical order and elegant models . . . the economic establishment played down the role of bad behavior . . . and flat-out bursts of irrationality.”) (quoting Jeremy Grantham, market strategist). Most models were based on rational market behavior, and were undone by failures to account for irrationality.

³²³ See, e.g., *Id.* at 204.

unlike the past. Unlike the natural sciences, where a good theory remains applicable however widely it is known and applied, accurate prediction and control in the human sciences may well be premised on *secretive* modeling. This is one more way in which the physicists on Wall Street, skilled in discerning the mysteries of nature, could not apply their skills to human affairs without risking massive errors. As Donald MacKenzie concluded in his book, *An Engine, Not a Camera*, financial theory and models can do more to *create* financial reality than to *reflect* it.³²⁴

Unfortunately, the average trader rarely ponders such dilemmas. The goal is simply to develop a profitable position and find some base of evidence for it. Keynes once noted that “a sound banker, alas, is not one who foresees danger and avoids it, but one who, when he is ruined, is ruined in a conventional and orthodox way with his fellows, so that no-one can really blame him.”³²⁵ Digital risk modeling provided an ostensibly scientific way of rationalizing that herd behavior. Cooler heads might have pointed to the dangers of “momentum” trades, which were amply in evidence during the tech stock bubble of the late 1990s.³²⁶ However, compensation was based on annual performance, not on long-term results.³²⁷ CEOs motivated by quarterly earnings statements and employees counting on annual bonuses had no incentive to question the bubble dynamics. As CEO Chuck Prince said, evoking the game of musical chairs, as long as the music is playing, you have to dance.³²⁸

Faking Insurance

As briefly mentioned above, a form of insurance made investment in CDOs even more of a “no-brainer.” Firms were offering contracts that insured against the risk of default on debt-backed instruments.³²⁹ These “credit default swaps” would cover any losses.³³⁰ If you could get a higher interest rate on your savings, and could use some

³²⁴ DONALD MACKENZIE, *AN ENGINE, NOT A CAMERA* (2008).

³²⁵ Forrest Christian, *Keynes on Why Bankers Didn't Avoid Danger*, MANASCLERK (Nov. 6, 2008), <http://www.manasclerk.com/blog/2008/11/06/keynes-on-why-bankers-didnt-avoid-danger/> (quoting Keynes).

³²⁶ Paul Woolley, 3: *Why Are Financial Markets So Inefficient and Exploitative – and a Suggested Remedy* 126–129, in *THE FUTURE OF FINANCE* (London School of Economics and Political Science, 2010), available at harr123et.files.wordpress.com/2010/07/futureoffinance-chapter31.pdf.

³²⁷ LARRY MITCHELL, *THE SPECULATION ECONOMY* (2008) (epilogue); RAKESH KHURANA, *FROM HIGHER AIMS TO HIRED HANDS* 6 (2010).

³²⁸ Donald C. Langevoort, *Chasing the Greased Pig Down Wall Street*, 96 CORNELL L. REV. 1209, 1224 (2011).

³²⁹ PATTERSON, *supra* note 186, at 8, 93–94.

³³⁰ Note that the some experts in financial law resist the characterization of CDS as insurance. William K. Sjostrom, Jr., *The AIG Bailout*, 66 WASH. & LEE L. REV. 943, 987-88 (2009) (“The basic definition of insurance is ‘[a] contract by which one party (the insurer) undertakes to indemnify another party (the insured) against risk of loss, damage, or liability arising from the occurrence of some specified contingency.’ A CDS [credit default swap] certainly appears to fall within this definition given that the protection seller

part of those gains to insure against the possibility that the bank paying interest would fold, wouldn't you opt for that arrangement? It appears to be "free money."

In 2004, the American International Group (AIG) was one of only 6 U.S. corporations to earn a AAA credit rating from all three leading U.S. rating agencies.³³¹ By 2008, AIG had amassed a credit default swap portfolio of about \$500 billion.³³² It hid that risk by discounting it, assuming that the chance it would actually have to pay out was slim to none.³³³ As in the case of the CDO defaults, there were plenty of "quants" happy to model payouts as "once in a million years" events. Meanwhile, those who had bought such insurance from AIG confidently registered on their own balance sheets a guarantee that any lost revenue would be made up by AIG's credit default swaps.³³⁴ The type of insurance offered by federal agencies like the FDIC to ordinary depositors was starting to turbocharge high finance, but without the social purpose or explicit funding sources that government guarantees had.

Whenever a firm amasses such a large position in any type of contract, it raises questions among investors. Isn't that a great deal of risk? AIG responded to such queries with aplomb. One of its leading managers called the credit default swaps "gold" and "free money."³³⁵ In 2007, he assured investors that "[i]t is hard for us, without being flippant, to even see a scenario within any kind of realm of reason that would see us losing one dollar in any of those transactions."³³⁶ By the fall of 2008, the firm needed a capital infusion of over \$100 billion from the U.S. government.³³⁷ Without that intervention, it would have been bankrupt, and would likely have brought down America's leading financial firms with it.

Even if regulators had scrupulously reviewed all of AIG's documents, they may not have been able to discover exactly what its liabilities were. For AIG's bespoke CDS

contractually agrees to compensate the protection buyer following the occurrence of a credit event. Notwithstanding their insurance-like characteristics, CDSs generally have not been considered insurance for purposes of state insurance regulations and, therefore, have not been subject to these regulations.") (first alteration in original) (footnotes omitted) (quoting Black's Law Dictionary 870 (9th ed. 2009)).

³³¹ FINANCIAL CRISIS INQUIRY COMM'N, *Press Event on the Release of the Final Report of the Comm'n* 5 (Jan. 27, 2010), *transcript available at* http://fcic-static.law.stanford.edu/cdn_media/fcic-news/2011-01-27-FCIC-Press-Conference-Transcript.pdf.

³³² Sjostrom, *supra* note 330, at 955.

³³³ Sjostrom, *supra* note 330, at 957 ("AIGFP's risk models indicated that the underlying securities would never go into default.").

³³⁴ *Id.* at 955–958. Thus insured, they could free up capital to begin the leverage process again.

³³⁵ *Id.* at 957.

³³⁶ Gretchen Morgenson, *Behind Biggest Insurer's Crisis, Blind Eye to a Web of Risk*, N.Y. TIMES, Sept. 28, 2008, at A1; AIG, 2006 Annual Report (Form 10-K) 94 (Mar. 1, 2007), *available at* http://www.aig.com/Chartis/internet/US/en/2006-10k_tcm3171-440889.pdf ("[T]he likelihood of any payment obligation by AIGFP under each [CDS] transaction is remote, even in severe recessionary market scenarios.").

³³⁷ Sjostrom, *supra* note 330, at 963.

contracts, replete with arcane standards for credit events and collateral calls, it may have been impossible, even in principle, to determine the true extent of the firm's exposure.³³⁸ The contractual positions were not sold in an open exchange, and could not be priced on a real market. Rather than basing calculations on current market prices for their assets (mark to market accounting), AIG "marked to model," assigning them the value that complex calculations estimated they *should* have, assuming normal conditions.³³⁹ Mark to model accounting can obscure a firm's true financial situation as much as it reveals it.³⁴⁰ Moreover, it creates uncertainty generally—whereas there are usually one or a few open market prices for a product, there are countless models.

Given the reassurances of the quants, and credit default swaps that seemed to neutralize the risk of nonpayment (rationalized by the quants at firms like AIG), CDOs were a very attractive investment.³⁴¹ Money managers were hard-pressed to avoid them. With evaluations often based on yearly or even quarterly returns, they had to show results. If fund managers were doing well by investing in bonds that were riskier than T-Bills, their colleagues risked losing bonuses (or even their jobs) by hanging back. When even the "patient money" in the financial system faces short-term benchmarking and incentives, there should be no surprise when money herds into investments touted as both "riskless" and offering payments substantially higher than the baseline rates of US sovereign debt.

Bankers recursively shuffled ownership to avoid legal liability while maximizing short term gains. For example, a Pulitzer Prize winning report described how "A CDO

³³⁸ This is a broader problem in finance. See generally JARON LANIER, *YOU ARE NOT A GADGET* (2011) (calling for a common system of notation of financial transactions); DO TANK, <http://dotank.nyls.edu/> (last visited Apr. 23, 2013, 1:00 PM); *Theresa Pardo Profile*, CENTER FOR TECHNOLOGY IN GOVERNMENT, <http://www.ctg.albany.edu/about/about?sub=people§ion=theresa> (last visited Apr. 23, 2013, 1:00 PM) (Theresa Pardo's work in government and technology).

³³⁹ *FASB: Here Comes Mark To Fantasy Accounting!*, SOCIO-ECONOMICS HISTORY BLOG (Apr. 3, 2009), <http://socioecohistory.wordpress.com/2009/04/03/fasb-here-comes-mark-to-fantasy-accounting/>. *Fatal Risk* gives the "tick tock" details, chronicling the deepening unease of AIG's auditors as the mark-to-fantasy approach of its subsidiary AIGFP became clear. See generally RODDY BOYD, *FATAL RISK* (2011).

³⁴⁰ Ordinary financial products are "marked to market;" they can be valued by accountants as worth as much as they would be paid for them on an open exchange. *Mark to Market*, INVESTOPEDIA, <http://www.investopedia.com/terms/m/marktomarket.asp?ModPagespeed=noscript> (last visited Apr. 23, 10:14 PM) (defining "market to market"). Derivatives sold "over the counter" (not on an open exchange), such as AIG's credit default swap, are custom made. *Over-the-Counter*, INVESTOPEDIA, <http://www.investopedia.com/terms/o/otc.asp?ModPagespeed=noscript>. Many trade rarely, if at all.

³⁴¹ See, e.g., PATTERSON, *supra* note 186, at 259; Douglas B. Levene, *Credit Default Swaps and Insider Trading*, 7 VA. L. & BUS. REV. 231, 252–53 (2012) ("Entering into a credit default swap contract is an attractive alternative to selling a loan or a bond, because, among other reasons, keeping the credit on the bank's books has benefits for managing the bank's overall relationship with the client. In addition, entering into a credit default swap contract avoids any necessity to obtain the borrower's consent to the assignment of a loan. Finally, purchasing a credit default swap is attractive to some banks because it frees up regulatory capital.").

called Octonion bought some of Adams Square Funding II,” then “Adams Square II bought a piece of Octonion,” and then further iterations occurred.³⁴² Like Enron’s imaginatively named off-balance-sheet-entities, the CDO shuffles permitted investment activity to become ever more unmoored from the real economy it is supposed to reflect, and even from the corporate balance sheets that employees are supposed to protect.³⁴³

Surely, there must have been someone who objected to such deals? There was: a Merrill trader who refused to go along “was sidelined and eventually fired.”³⁴⁴ That trader was not alone—another would-be whistleblower, Richard Bowen at Citigroup, went from supervising 220 employees to supervising two after he expressed concerns about risks.³⁴⁵ Risk managers were also swept aside at Lehman.³⁴⁶ The power in the firm was held by those who could make quick money in big deals. Those who stood in the way were seen less as guardians of the firm’s integrity than as pesky paper pushers.

Accounting for Self (and Others’) Delusion

Accounting rules compound the difficulties, allowing certain deals to be quarantined from the rest of the bank’s financial status. For example, since a “simple fixed/ floating interest-rate swap contract . . . has zero value at the start,” it “is considered neither an asset nor a liability, but is an ‘off-balance-sheet’ item.”³⁴⁷ It is up to the firm to accurately record changes in the value of such an item. As one financial writer has observed, “information-age tools allowed Lehman Brothers to assemble and manage a portfolio that contained 930,000 derivative transactions at the time of its

³⁴² Jake Bernstein & Jesse Eisinger, *Banks’ Self-Dealing Supercharged Financial Crisis*, PROPUBLICA (Aug. 26, 2010).

³⁴³ MALCOM S. SALTER, ENRON: INNOVATION CORRUPTED 8 (2008).

³⁴⁴ Jake Bernstein & Jesse Eisinger, *The ‘Subsidy’: How a Handful of Merrill Lynch Bankers Helped Blow Up Their Own Firm*, PROPUBLICA (Dec. 22, 2010), <http://www.propublica.org/article/the-subsidy-how-merrill-lynch-traders-helped-blow-up-their-own-firm>.

³⁴⁵ *Hearing on Subprime Lending and Securitization and Government Sponsored Entities: Before the Financial Crisis Inquiry Committee* (2010) (Testimony by Richard M. Bowen, III), available at http://fcic-static.law.stanford.edu/cdn_media/fcic-testimony/2010-0407-Bowen.pdf.

³⁴⁶ Hudson, *supra* note 79, at .254.

³⁴⁷ *Hedge Funds, Systemic Risk, and the Financial Crisis of 2007-2008: Hearing on Hedge Funds Before the House Committee on Oversight and Government Reform* 24 (2010) (written testimony of Andrew W. Lo), available at www.scribd.com/doc/17363186/Hedge-Funds-Systemic-Risk-And-the-Financial-Crisis-of-20072008; See also Carol J. Loomis, *Derivatives: The Risk That Still Won’t Go Away*, CNN MONEY (May 20, 2012), <http://features.blogs.fortune.cnn.com/2012/05/20/derivatives-the-risk-that-still-wont-go-away-fortune-2009/> (of the 900,000 or so derivatives contracts: at bankruptcy, “[t]he great bulk of them have been “terminated” by derivatives counterparties which under industry protocols had the right to immediately “net” their accounts with Lehman in the event it declared bankruptcy. A handful – the last reported number was 18,000 – are still open.”)

bankruptcy.”³⁴⁸ Lehman had \$738 billion in derivative contracts labeled as “off balance sheet arrangements” in its 2007 accounts.³⁴⁹ In many derivatives contracts (as in bets), each side is expecting an opposing outcome, and each can base its accounting on some degree of wishful thinking.

That last point—that both parties could simultaneously claim a gain on what had to be zero-sum arrangements—is critical to understanding the risks posed by black box finance. It amplified the pie-in-the-sky modeling enabled by credit default swaps and the implicit guarantee of Fannie and Freddie, leaving both the “insured” and the “insurers” capable of assuming away risk whenever it was convenient to do so.³⁵⁰ Opportunistic modeling and accounting also explains why deal complexity is often pursued for its own sake, and not for a genuine economic or investment purpose. Technologist Jaron Lanier puts the matter starkly:

The wave of financial calamities that took place in 2008 were significantly cloud-based. No one in the pre-digital-cloud era had the mental capacity to lie to himself in the way we are routinely able to now. The limitations of organic human memory and calculation put a cap on the intricacies of self-delusion.³⁵¹

Webs of credit and debt become a smokescreen for institutions rendered vulnerable (both individually and collectively) so that privileged parties within them can

³⁴⁸ Bill Davidow, *Why the Internet Makes it Impossible to Stop Giant Wall Street Losses*, THE ATLANTIC (May 18, 2012), <http://www.theatlantic.com/business/archive/2012/05/why-the-internet-makes-it-impossible-to-stop-giant-wall-street-losses/257356/>

³⁴⁹ Nils Pratley, *Wall Street Crisis: Is this the Death Knell for Derivatives?*, THE GUARDIAN (Sept. 15, 2008), <http://www.guardian.co.uk/business/2008/sep/15/lehmanbrothers.wallstreet>. See also Loomis, *supra* note 347 (On the 18,000 still open: “Each of these contracts has a ‘fair value’ – an amount that one side owes the other. . . . While sometimes the fair value of a derivative can be precisely determined, at other times it must be derived from murky markets and models that leave considerable room for interpretation. That gives the holders of derivatives a lot of bookkeeping discretion, which is troubling because changes in fair value flow through earnings — every day, every quarter, every year — and alter the carrying amounts of receivables and payables on the balance sheet. . . . The subjectivity involved in derivatives accounting also means that the counterparties in a contract may come up with very different values for it. Indeed, you will be forgiven if you immediately suspect that each party to a derivatives contract could simultaneously claim a gain on it — which should be a mathematical impossibility. In fact, we have a weird tale, gleaned from court documents, supporting that suspicion. It involves Lehman, Bank of America, and J.P. Morgan, and suggests how far some of those ‘terminated’ contracts are from being truly settled.”).

³⁵⁰ “We’ll never need to pay,” insurers told themselves, and their creditors; “We’ll always be paid,” said the insured to themselves, and their creditors.

³⁵¹ LANIER, *supra* 338, at 96 (“In finance, the rise of computer-assisted hedge funds and similar operations has turned capitalism into a search engine. You tend the engine in the corporate cloud and it searches for money.”).

use leverage to multiply potential upside gains. The corporation absorbs losses (and, in the worst case scenarios, bankruptcy or bailouts). Its leading managers and traders take a large share of the gains. Murky accounting lets a mountain of leverage and misallocated capital accumulate. Algorithms play a critical role in such short-termism by purporting to model day-by-day (or hour by hour, or minute by minute) the value of investment strategies whose actual value will only be manifest after years (or, in the case of mortgages, decades).³⁵²

IV. Algorithmic Trading: War Gaming Finance

Some of America's greatest economists spent World War II devising formulas for optimal bombing.³⁵³ Milton Friedman, for instance, had to determine whether an anti-aircraft shell should burst into 600 small pieces or 20 big pieces in order to best accomplish a mission.³⁵⁴ Many translated their work into finance's portfolio selection theory, which was "all about balancing risk and return."³⁵⁵ As Friedman said, "[t]he logical character of the problem was the same. . . . How much power do you want to sacrifice in order to have a greater probability of hitting? [Finance theory involves] exactly the same thing: How much return do you want to sacrifice in order to increase the probability that you will get what you planned for?"³⁵⁶

Today's finance theorists probably have not spent much time on the battlefield. But they can still have fun with ballistics trajectories, in touchscreen video games like Angry Birds.³⁵⁷ To play, one uses a virtual slingshot to launch squawking birds at pigs holed up in encampments made of glass, wood, and stone. The virtual materials in the game don't act much like real structures; that's not the point (who really cares whether a real vaulted bluebird would displace a girder)? Rather, one gradually learns from the game itself the strategies that cause optimal destruction, blissfully unmoored from the messiness of actual materials science.

³⁵² Note the accounting scandals at Enron followed a similar pattern—booking as gains the discounted present value of long-term income streams. See generally William W. Bratton, *Enron and the Dark Side of Shareholder Value*, 76 TUL. L. REV. 1275 (2002).

³⁵³ JUSTIN FOX, THE MYTH OF THE RATIONAL MARKET 47–48 (2009). Philip Mirowski has a much more extensive account of how "many of the major preoccupations and much of the theoretical machinery that now dominates economics can be traced to military research carried out in cold war think tanks, especially the RAND organization." See Kieran Healy, *Philip Mirowski's Machine Dreams*, KIERAN HEALY BLOG (July 17, 2002), <http://www.kieranhealy.org/blog/archives/2002/07/17/philip-mirowskis-machine-dreams/>.

³⁵⁴ FOX, *supra* note 353, at 47.

³⁵⁵ *Id.* at 48.

³⁵⁶ *Id.*

³⁵⁷ For a general description of the Angry Birds game, see *Angry Birds*, WIKIPEDIA, http://en.wikipedia.org/wiki/Angry_Birds_%28video_game%29 (last visited Apr. 26, 2:45 PM).

Important new forms of stock trading now appear to be similarly deracinated, concerned less with the real economy (for example, questions like “which company makes the best cars” or “makes cars that customers will want”) than with windows of opportunity for sudden arbitrage (for example, “how do we buy thousands of Apple stocks milliseconds before a major pension fund buys them and drives up their price?”). The majority of shares traded now do so via computer-to-computer transactions, in deals driven by algorithm.³⁵⁸

The Need for Speed

There are a range of algorithmic trading strategies; high-frequency trading (HFT) describes one subset of these strategies.³⁵⁹ This section will focus on HFT, for the same reasons David Golumbia offers in his recent piece on computerization in finance:

There are any number of uses of computerized trading, many of which do not need to rely on the high-speed techniques characteristic of HFT; nevertheless, what is absolutely clear is that the rise of HFT precisely tracks and is in fact much the same phenomenon as computerized and network trading in general, that HFT would be unthinkable without networked computers, and that rather than simply existing as one flavor of computerized trading, HFT may be better understood as the name for the suite of effects that computerization has had on the worlds of securities trading.³⁶⁰

HFT often involves “very high order amounts; rapid order cancellation; a flat position at the end of the trading day; extracting very low margins per trade; and trading at ultra-fast speeds.”³⁶¹ These tactics are in the service of classic trading strategies, which Matt Prewitt helpfully summarizes as “market making, momentum or event trading, liquidity detection, and arbitrage.”³⁶² In market making, the HFTs essentially act as “a faster version of traditional market makers who buy and sell securities in order to profit from

³⁵⁸ Algorithmic trading refers to the use of computers to place orders on equities markets while using algorithmic codes to decide the specific aspects of the order, such as the timing, price, and quantity, all without any human intervention. Nathan D. Brown, *The Rise of High Frequency Trading: The Role Algorithms, and the Lack of Regulations, Play in Today's Stock Market*, 11 APPALACHIAN J. L. 209 (2012). Algorithmic codes are typically proprietary, and are thus highly valuable. *Id.* at 222 (discussing alleged theft of Goldman Sachs algorithmic code.)

³⁵⁹ Matt Prewitt, *High Frequency Trading: Should Regulators do More?*, 19 MICH. TELECOMM. & TECH. L. REV. 131, 134 (2012).

³⁶⁰ Golumbia, *supra* note 6, at 12.

³⁶¹ Andrew J. Keller, *Robocops: Regulating High Frequency Trading After the Flash Crash of 2010*, 73 OHIO ST. L.J., 1457, 1459 (2012).

³⁶² Prewitt, *supra* note 359, at 135.

the difference, or spread, between bid and ask prices.”³⁶³ Momentum trading “involves identifying price movements that are likely to persist in the short term, then trading directionally while the movement continues and ceasing when it stops.”³⁶⁴ HFTs can profit from “liquidity detection” if they can interpret the actions of large buyers and sellers as part of an ongoing attempt to exit or enter a position.³⁶⁵ Buying before big players enter a position, and selling before they exit, can produce big returns for a highly leveraged trader. Finally, arbitrageurs in HFT, like those elsewhere in the markets, try to take advantage of buying the cheaper and selling the more expensive of “securities that structurally tend to move in unison.”³⁶⁶ Algorithms can spot extremely small price differences and move on them very rapidly, opening up new horizons for arbitrageurs.³⁶⁷

In *When The Speed Of Light Is Too Slow: Trading at the Edge*, Thomas McCabe discusses some of the kinds of price differences high frequency traders (HFT’ers) spot and profit from:

Computers were originally introduced in trading because they are faster than us in responding to market signals. A human trader might buy up a million shares of Microsoft for \$20 a share, and sell them the next day for \$21, making a million dollars in profit. However, if the price of a stock is \$15.67 in New York and \$15.68 in London one moment, but jumps to \$15.70 and then \$15.69 a tenth of a second later, no human could react quickly enough to buy the stock in New York and sell it in London before the prices reversed. To solve this problem, traders over the last few years have been building automated high-frequency trading (HFT) systems that compete by making thousands of trades a minute to maximize profit.³⁶⁸

Lately, the limiting factor in fast trading is not computing power, but communication power. Thus firms are paying to construct ultra-fast cables (not for use by the public)

³⁶³ *Id.*

³⁶⁴ *Id.*

³⁶⁵ *Id.*

³⁶⁶ *Id.* at 136.

³⁶⁷ Companies can build neural networks to optimize stock-picks, as other firms try to observe their behavior on graphs at Nanex that help firms reverse engineer rivals’ strategies. *Nanex: Investors Need to Realize The Machines Have Taken Over*, PEAK PROSPERITY (Oct. 6, 2012), <http://www.peakprosperity.com/podcast/79804/nanex-investors-realize-machines-taken-over> (“[Nanex] . . . is a company that provides exchange reporting and delivery of whole market data feeds.”).

³⁶⁸ Thomas McCabe, *When The Speed of Light Is Too Slow: Trading at the Edge*, KURZWEIL ACCELERATING INTELLIGENCE (Nov. 11, 2010), <http://www.kurzweilai.net/when-the-speed-of-light-is-too-slow>.

between financial centers.³⁶⁹ Modelers have devised more extreme solutions to the time delay problem. McCabe describes proposals to locate computers at “optimal locations from which to coordinate the statistical arbitrage.”³⁷⁰ An “optimal scheme” would “push trading firms to build new computers [at] the exact, optimal points in between markets”—even if that happened to be in the middle of an ocean.³⁷¹

Unfair and Irrational Competition

As HFT has developed, several commentators have worried that its leading firms are not only developing relatively public advantages in communication and computing power, but are also angling for preferential access to market information itself.³⁷² Others claim that HFT exacerbates marketplace volatility.³⁷³ HFT became something of a household word on the day of the Flash Crash (alternately called the “Crash of May 6, 2010, 2:45PM”), when the Dow Jones Industrial Average lost almost one thousand points in minutes, but recovered much of the loss almost immediately.³⁷⁴ Commentators worry it foreshadows future, more disruptive events along those lines.³⁷⁵

Runaway algorithmic interactions can have some humorous results. News-reading technology may cause “Berkshire-Hathaway” stock to go up whenever Anne Hathaway is mentioned in the news.³⁷⁶ But Edward Tenner warns that the resulting

³⁶⁹ For example, McCabe observes, a “Chicago-New York cable will shave about 3 milliseconds off . . . communication time.” *Id.*

³⁷⁰ A. D. Wissner-Gross & C. E. Freer, *Relativistic Statistical Arbitrage*, 82 PHYSICAL REV. E 056104-1 (2010), available at http://www.alexwg.org/publications/PhysRevE_82-056104.pdf.

³⁷¹ McCabe, *supra* note 368.

³⁷² See generally SAL L. ARNUK AND JOSEPH C. SALUZZI, *BROKEN MARKETS: HOW HIGH FREQUENCY TRADING AND PREDATORY PRACTICES ON WALL STREET ARE DESTROYING INVESTOR CONFIDENCE AND YOUR PORTFOLIO* (2012); see also Jessica Holzer & Kristina Peterson, *SEC Bans ‘Naked Access,’* WALL ST. J., Nov. 4, 2010, <http://online.wsj.com/article/SB10001424052748703506904575592243789868142.html> (reporting on SEC move to “bar brokers from granting high-frequency traders unfiltered access to an exchange, a move aimed at imposing safeguards meant to prevent bad trades from disrupting the markets.”).

³⁷³ This can either take the form of “anomalous volatility” (a severe and sudden event) or “normal volatility” (volatility under normal conditions). Prewitt, *supra* note 359, at 142–43.

³⁷⁴ Prewitt, *supra* note 359, at 132.

³⁷⁵ Courtney Comstock, *There Will Be Another Flash Crash*, BUSINESS INSIDER (Aug. 31, 2010, 1:29 PM), <http://www.businessinsider.com/nanex-there-will-be-another-flash-crash-because-someone-will-cause-it-on-purpose-2010-8>.

³⁷⁶ Graham Bowley, *Trading Programs*, N.Y. TIMES, Dec. 23, 2010, <http://www.nytimes.com/2010/12/23/business/23trading.html?ref=technology> (“Math loving traders are using powerful computers to speed-read news reports, editorials, company Web sites, blog posts and even Twitter messages — and then letting the machines decide what it all means for the markets. . . . In some cases, the computers are actually parsing writers’ words, sentence structure, even the odd emoticon. A wink and a smile — ;) — for instance, just might mean things are looking up for the markets. Then, often without human intervention, the programs are interpreting that news and trading on it”);

intertwining of trading and text about trading can create dangerous feedback loops.³⁷⁷ The dynamics start to resemble a video-game or video-poker, but with real-world consequences (especially for the 10% of persons who own about 80% of stocks).³⁷⁸

Law enforcers also worry that HFT can hide market manipulation behind millions of rapidly sequenced buy and sell orders (and cancellations of those orders).³⁷⁹ Because the algorithms are extremely complex and the trades occur rapidly, it is difficult for regulators to identify when the high frequency traders are engaging in illegal activities, and HFT firms are capable of using a number of strategies to deceive other traders.³⁸⁰ Many algorithmic trades occur in “dark pools” outside normal trading venues, where abusive order types can’t easily be detected.³⁸¹ One computer scientist who has developed AI trading strategies has even warned that “[f]ears of algorithmic terrorism, where a well-funded criminal or terrorist organization could find a way to cause a major market crisis, are not unfounded.”³⁸² When the Pentagon “war-gamed” financial instability, participants expressed similar concerns.³⁸³ As the financial economy

Frank Pasquale, *Tricks of the Traders*, CONCURRING OPINIONS (July 11, 2010, 7:22 PM), <http://www.concurringopinions.com/archives/2010/07/tricks-of-the-traders.html>.

³⁷⁷ Edward Tenner, *Wall Street’s Latest Bubble Machines*, THE ATLANTIC, Dec. 27, 2010, <http://www.theatlantic.com/business/archive/2010/12/wall-streets-latest-bubble-machines/68547/> (“Economists and psychologists have for over a decade been analyzing information cascades, in which people’s observations of each other’s judgments may accelerate trends for worse as well as better. These systems might turn cascades into torrents. Think, too, of the ethical quandary of journalists working for the financial news agencies offering the services, knowing that any turn of phrase may nudge somebody’s machine into a decision. And to make things even livelier, speculators will be able to program banks of computers to generate and broadcast verbiage that will feed the analysis machines and move markets, as some operators have already taken advantage of the quirks of search engine algorithms.”).

³⁷⁸ Felix Salmon & Jon Stokes, *Algorithms Take Control of Wall Street*, WIRED, Jan. 2011, available at http://www.wired.com/magazine/2010/12/ff_ai_flashtrading/.

³⁷⁹ See, e.g., Prewitt, *supra* note 359, at 147–148.

³⁸⁰ Prewitt, *supra* note 359, at 147.

³⁸¹ Brown, *supra* note 358, at 210, 227; SCOTT PATTERSON, DARK POOLS 51 (2012) (describing an exchange rep who said, of a certain dark pool hosting abusive order types, “[i]t probably should be illegal, but if we changed things, the high-frequency traders wouldn’t send us their orders.”).

³⁸² John Bates, *Fixing the Fat Finger Faux Pas Epidemic*, EVENT PROCESSING BLOG (Feb. 18, 2011, 10:30 AM), http://apama.typepad.com/my_weblog/2011/02/fixing-the-fat-fingered-faux-pas-epidemic.html.

³⁸³ Eamon Javers, *Pentagon Preps for Economic Warfare*, POLITICO (Apr. 9, 2009, 4:18 AM), <http://www.politico.com/news/stories/0409/21053.html> (“Several . . . said the event had been in the planning stages well before the stock market crash of September [2008], but the real-world market calamity was on the minds of many in the room. ‘It loomed large over what everybody was doing,’ said [Yale professor Paul] Bracken. ‘Why would the military care about global capital flows at all?’ asked another person who was there. ‘Because as the global financial crisis plays out, there could be real world consequences, including failed states. We’ve already seen riots in the United Kingdom and the Balkans.’”).

continues to grow and dwarf the real economy in size, it becomes a source not merely of “systemic risk,” but of far more profound disruptions.³⁸⁴

The Race to Zero

How are we to understand the rise of such algorithms in equities trading? Felix Salmon and Jon Stokes develop the martial metaphor of Milton Friedman, comparing the work of algorithmic traders to submarine navigators avoiding mines.³⁸⁵ Graham Bowley also reports on the dynamic in the language of war: “In a business where information is the most valuable commodity, traders with the smartest, fastest computers can outfox and outmaneuver rivals.”³⁸⁶ Other financial journalists agree that the battle of rival computerized trading strategies can become “an inscrutable and uncontrollable feedback loop. Individually, these algorithms may be easy to control, but when they interact they can create unexpected behaviors—a conversation that can overwhelm the system it was built to navigate.”³⁸⁷ Nevertheless, Salmon and Stokes argue that this “system represents an efficient and intelligent capital allocation machine, a market ruled by precision and mathematics rather than emotion and fallible judgment.”³⁸⁸

But can we really declare the algorithms’ patter(n) of interactions “efficient and intelligent capital allocation” without much more evidence about the results of the investments they favor?³⁸⁹ Even one of the founders of automation in trading, Charles Peterffy, has warned that the “race to zero” (time elapsed between order and receipt of order) is zero sum. A desiccated concept of efficiency may simply stipulate that whatever technology fills orders faster contributes to the efficient buying and selling of stocks. But consider the speeds and advantages we are now dealing with.

³⁸⁴ Yves Smith, *Credit Default Swaps and Bank Leverage*, NAKED CAPITALISM (Apr. 16, 2008, 3:05 AM), <http://www.nakedcapitalism.com/2008/04/credit-default-swaps-and-bank-leverage.html>.

³⁸⁵ Salmon & Stokes, *supra* note 378 (quoting the head of Advanced Execution Services at Credit Suisse).

³⁸⁶ Bowley, *supra* note 376 (“‘It is an arms race,’ said Roger Ehrenberg, managing partner at IA Ventures, an investment firm specializing in young companies, speaking of some of the new technologies that help traders identify events first and interpret them.”). Note that Elizabeth Van Couvering has also noted the prevalence of the war metaphor in the development of search engine algorithms. Elizabeth Van Couvering, *Is Relevance Relevant? Market, Science, and War: Discourses of Search Engine Quality*, 12 J. COMPUTER-MEDIATED COMM. 866, 866–887 (2007).

³⁸⁷ Salmon & Stokes, *supra* note 378.

³⁸⁸ Salmon & Stokes, *supra* note 378.

³⁸⁹ After Justin Fox, Yves Smith, and John Quiggin have lain waste to various forms of the “efficient markets” hypothesis, it’s hard to see how commentators can use the term “efficient” without explaining the scope and duration of the alleged efficiency. See Fox, *supra* note 199; Smith, *supra* note 217; John Quiggin, *Refuted Economic Doctrines #1: The Efficient Markets Hypothesis*, JOHNQUIGGIN (Jan. 2, 2009), <http://johnquiggin.com/2009/01/02/refuted-economic-doctrines-1-the-efficient-markets-hypothesis/>.

A firm has spent about \$300 million to develop a cable link that shaves about a thousandth of a second off the communication between New York and Chicago.³⁹⁰ Imagine that we had a trading rule where the milliseconds didn't matter.³⁹¹ Any orders put in between, say, 1:00:01 PM and 1:00:02 PM would simply be filled--and if the "asking" seller did not have enough shares for all the "bidding" buyers, then the "winning" bidders--those who actually got to fill their order--would be chosen randomly.³⁹² Is there any rational account of market efficiency which can justify privileging, say, the firm which purchased access to the high-speed cable link over firms which failed to?

Some authorities have already indicated interest in rules designed to tame aspects of HFT. For example, in September 2012, "the European Parliament voted for a compulsory half-second minimum 'resting time' in which an order cannot be cancelled."³⁹³ Andrew G. Haldane, the Executive Director of Financial Stability at the Bank of England, has observed that such a resting rule would assure that "liquidity would on average be more expensive but also more resilient."³⁹⁴

³⁹⁰ DONALD MACKENZIE ET AL., DRILLING THROUGH THE ALLEGHENY MOUNTAINS: LIQUIDITY, MATERIALITY AND HIGH-FREQUENCY TRADING 14–15 (Jan. 2012), *available at* http://www.sps.ed.ac.uk/__data/assets/pdf_file/0003/78186/LiquidityResub8.pdf ("Leasing 'dark fibre' in the cable (i.e. fibre for one's own private use) shaves around 1.3 milliseconds off the previously fastest one-way time, and this enables the link's owner, Spread Networks, to charge fees reported to be as much as ten times higher than those of older routes.").

³⁹¹ For purposes of comparison, compare the minute demarcations in Rule 1007.00 of the Chicago Board of Trade in 1996, discussed in BERNARD E. HARCOURT, THE ILLUSION OF FREE MARKETS 12–15 (Harvard Univ. Press, 2011) ("Immediately following the prescribed closing procedure for all contracts, there shall be a two (2) minute trading period (the 'modified closing call.')").

³⁹² Informal norms of parceling out roughly contemporaneous orders prevailed in Chicago's trading pits. MacKenzie & Pardo -Guerra, *supra* note 2, at 32–33.

³⁹³ MacKenzie & Pardo -Guerra, *supra* note 2, at 35. MacKenzie also notes that the "the German government adopted a draft *Hochfrequenzhandelsgesetz* requiring algorithm-generated orders to be earmarked as such and high-frequency firms to be licensed." *Id.* As of 2012, the European Parliament is debating a new iteration of the Markets in Financial Instruments Directive ("MiFID"), that may include more aggressive measures. Prewitt, *supra* note 359, at 157.

³⁹⁴ Andrew G. Haldane, Executive Director of Financial Stability and member of the interim Financial Policy Committee, Speech at the International Economic Association Sixteenth World Congress in Beijing, China: The Race to Zero 18 (July 8, 2011), <http://www.bankofengland.co.uk/publications/Documents/speeches/2011/speech509.pdf> ("Minimum resting periods . . . tackle the arms race at source by imposing a speed limit on trading By increasing the per period transaction cost, the imposition of a minimum resting period would tend to widen bid-ask spreads and damage market liquidity in peacetime That is of course only one side of the coin. Setting a minimum T would also tend to reduce the risk of liquidity drought. While raising the average bid-ask spread, it might also lower its variability at times of stress. Liquidity would on average be more expensive but also more resilient. So in determining whether there is a role for minimum resting periods, this trade-off between market efficiency and stability is key.").

Haldane posits a trade-off between “efficiency and stability” in financial markets,³⁹⁵ but there is more at stake than that in the computerization of trading in general and in high-frequency trading in particular. His narrow concept of liquidity already concedes too much to high frequency traders. As John Cassidy has observed:

Liquidity refers to how easy or difficult it is to buy and sell. A share of stock in a company on the Nasdaq is a very liquid asset: using a discount brokerage such as Fidelity, you can sell it in seconds for less than ten dollars. A chocolate factory is an illiquid asset: disposing of it is time-consuming and costly. The classic justification for market-making and other types of trading is that they endow the market with liquidity. . . .

But liquidity, or at least the perception of it, has a downside. The liquidity of Internet stocks persuaded investors to buy them in the belief they would be able to sell out in time. The liquidity of subprime-mortgage securities was at the heart of the credit crisis. Home lenders, thinking they would always be able to sell the loans they made to Wall Street firms for bundling together into mortgage bonds, extended credit to just about anybody. But liquidity is quick to disappear when you need it most. Everybody tries to sell at the same time, and the market seizes up.”³⁹⁶

The pursuit of speed of ordering for its own sake has now reached the point that it rewards the purchasing power of certain traders (their ability to buy access to mountain-spanning cables) over their skill at allocating capital. As Joel Kurtzman put it, “all they are trading are ghostly images that symbolize buying power, images that store labor, wisdom, and wealth the way a computer stores numbers.”³⁹⁷ With this unmooring, new opportunities have arisen for the creation of vast sums of paper wealth—and paper losses.³⁹⁸ What is being encouraged beyond the accumulation of

³⁹⁵ Haldane, *supra* note 394, at 18.

³⁹⁶ John Cassidy, *What Good is Wall Street?*, THE NEW YORKER Nov. 29, 2010, http://www.newyorker.com/reporting/2010/11/29/101129fa_fact_cassidy#ixzz16ELPEibd; cf. JOHN CASSIDY, *HOW MARKETS FAIL* (2010).

³⁹⁷ JOEL KURTZMAN, *THE DEATH OF MONEY: HOW THE ELECTRONIC ECONOMY HAS DESTABILIZED THE WORLD’S MARKETS AND CREATED FINANCIAL CHAOS* 161 (1994). Kurtzman provides an apt metaphor for the programs blindness to underlying fundamentals: “They are . . . trading mathematically precise descriptions of financial products (stocks, currencies, bonds, options, futures). Which exact product fits the description hardly matters as long as all the parameters are in line with the description contained in the computer program. For stocks, any one will do if its volatility, price, exchange rules, yield, and beta fit the computer’s description. . . .In a way these programs are not all that different from those in the nose of a cruise missile. . . .When the missile is launched, it sensors . . . scan the terrain below. It is matching one set of digitized descriptions with another via an elaborate computer model.”). *Id.*

³⁹⁸ Dean Baker, *TARP Repayment and Legalized Counterfeiting*, REAL-WORLD ECONOMICS REVIEW BLOG (Dec. 14, 2010), <http://rwer.wordpress.com/2010/12/14/tarp-repayment-and-legalized-counterfeiting/>.

fortunes for fortunate insiders is less clear. Perhaps the key rationale for slowing down trading is simply to diminish the scale and speed of the damage it can do, rather than hoping reform will actually change the nature of its activity.

We can imagine a gentler time, when sleepy firms employing slow-footed clerks needed some incentive to pick up the pace and adopt new technology to place and receive orders.³⁹⁹ But that time is long past. We are now entering a brave new world of securities trading where, as Donald MacKenzie states, the key constraint on the dissemination of pricing data is a physical one—the speed of light.⁴⁰⁰ There is little reason to think that a social or legal limit would be any worse. Indeed, by freeing both programs to calculate (and persons to reflect) a bit more, slower trading might improve decision-making overall.⁴⁰¹

Trading, Talking, and Computing

Salmon & Stokes's use of the term "conversation" to describe the interaction of computerized trading programs is also strange, and deserves interrogation. We should not try to cloak in familiar metaphor a process that diverges so drastically from normal human interaction.⁴⁰² There is a fundamental difference between communicative actions like conversations and strategic competition. Since conversation and other basic human interaction involve "performances where an explicit definition of the problem seems beyond our capacity . . . [and] deploys skilled performances which are themselves not explicitly thematized," strategic modes of artificial-intelligence "thinking" do not mirror communicative human interactions.⁴⁰³

Humans are receptive to the world, altering their responses to it, and their rules and sensibility about altering responses, as a result of encounters with others. The algorithms are not "conversing;" rather, they are analogous to programmed weapons

³⁹⁹ This may well be the case in the health care sector, where the HITECH legislation of 2009 authorized billions in stimulus funds to motivate providers to digitize records. See American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, div. A, tit. XIII, 123 Stat. 226 (codified as amended in various sections of U.S.C.) The health care sector spends far less on IT than the finance sector, as a percentage of revenues. See Kim S. Nash, *Information Technology Budgets: Which Industry Spends the Most?*, CIO (Nov. 2, 2007), http://www.cio.com/article/151301/Information_Technology_Budgets_Which_Industry_Spends_the_Most_.

⁴⁰⁰ MacKenzie et. al, *supra* note 390, at 16 ("The idea ... that everyone can know at all times what the price is' . . . violates special relativity, which postulates that the maximum speed of a signal is the speed of light in a vacuum. In 1999, that was not yet a matter of importance; by 2012, it has become a crucial material constraint on the social structure of liquidity.").

⁴⁰¹ For an intriguing discussion of the role of timing in algorithmic trading, see FRANK PARTNOY, *WAIT: THE ART AND SCIENCE OF DELAY* 34 (2012).

⁴⁰² SHERRY TURKLE, *LIFE ON SCREEN: IDENTITY IN THE AGE OF THE INTERNET* 142 (1995) ("[W]hat is involved here is not a weighing of scientific theory but an appropriation of images and metaphors").

⁴⁰³ Charles Taylor, *Philosophy and Psychology of Mind*, in 1 *PHILOSOPHICAL PAPERS: HUMAN AGENCY AND LANGUAGE* 188 (1985).

sent out to strategically outwit one another.⁴⁰⁴ We should be under no illusions that anything resembling a “conversation” is taking place here. Even the desiccated normative goal of “price discovery” seems out of place.

Unmoored from analysis of the productivity of firms whose stock is traded, the HFT appears more like a game. Though the reduction of daily life into stepwise patterns and immediate feedback has been celebrated in many quarters as “gamification,” it has its dark side.⁴⁰⁵ As McKenzie Wark puts it in *Gamer Theory*:

The game is what grinds. It shapes its gamers, not in its own image, but according to its algorithms. The passage from topography to topology is the passage from storyline to gamespace, from analog control of the digital to digital control of the analog, from the diachronic sequence of events to the synchronic inter-communications of space, from voice to code As games players, we are merely a set of directional impulses (up, down, left, right) Gamespace is an end in itself.⁴⁰⁶

Computerized finance is becoming an end in itself, as well—a form of “digital control over the analog.” Traders compete to write programs that can anticipate what average programs expect other programs to do. The algorithmic turn contributes to finance’s degeneration into an ever more self-referential system—to quote Keynes, we have “reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be.”⁴⁰⁷ Especially in the case of high frequency trading, financiers are trying to make money in microseconds from tiny price fluctuations, rather than backing investment that would help the real economy.

At this point, the finance system approaches an asymptote of complete self-reference, unmoored from any foundation of estimates of the long-term value of

⁴⁰⁴ We may eventually treat “autonomous artificial agents” as bearing some legal responsibility for what results from them, especially if their authors/owners/controllers are fully identifiable and indemnified for the damage they can cause. At present, such concerns inform our regulatory determinations about the degree of responsibility programmers should have for the negative consequences of their creations. See SAMIR CHOPRA & LAURENCE F. WHITE, *A LEGAL THEORY FOR AUTONOMOUS ARTIFICIAL AGENTS* (2011).

⁴⁰⁵ Compare. JANE MCGONIGAL, *REALITY IS BROKEN* (2011) (arguing that gamification can lead to “epic wins” for persons otherwise overwhelmed by the complexity of tasks), with David Golumbia, *Game of Drones 2* (Sept. 2007) (unpublished conference paper), <http://www.uncomputing.org/wp-content/uploads/2012/10/game-of-drones.blog-version.pdf> (calling McGonigal’s work a “book that masquerades as neutral intellectual study while avoiding any substantive reflection on its author’s direct commercial interest in its conclusions”).

⁴⁰⁶ MCKENZIE WARK, *GAMER THEORY* 221, 223 (Harvard Univ. Press 2008), available at <http://www.futureofthebook.org/gamerttheory2.0/?cat=9&paged=5>.

⁴⁰⁷ JOHN MAYNARD KEYNES, *GENERAL THEORY OF EMPLOYMENT, INTEREST, AND MONEY* 140 (Atl. 2008); see also Jan Toporowski, *The Wisdom of Property and the Politics of the Middle Classes*, 62 MONTHLY REV. 10, 12 (2010) (“In an era of finance, finance mostly finances finance.”).

enterprises, and focused instead on the millisecond-by-millisecond demands of a turbocharged trading environment.⁴⁰⁸ Like the social science lamented by Ian Shapiro,⁴⁰⁹ or the legal scholarship dismissed by Judge Harry Edwards,⁴¹⁰ the “science” of trading here has few addressees beyond its narrow circle of devotees. Algorithmic trading both reflects and reinforces the segregation of the buying power of wealthy persons and institutions into closed circuits of spending and investment.⁴¹¹

Back in 1993, Joel Kurtzman warned about these problems in a prescient book entitled *The Death of Money*.⁴¹² Kurtzman endorsed many proposals to dampen the volatility arising out of computerized trading, including a financial transactions tax. Unfortunately, his ideas failed to influence a policy space besotted with theoretical “liquidity” (however quickly it dries up in the very crises it is supposed to help solve).⁴¹³ Even free-market mavens like the Economist magazine have expressed concerns about the social utility of ever-faster trading.⁴¹⁴

Both the CFTC and SEC are interested in better monitoring HFT.⁴¹⁵ As Bloomberg News reports,

In addition to writing proposed rules, the SEC’s enforcement division is investigating whether computer-driven traders have manipulated prices. “You have to be concerned every time there’s a lack of transparency into a market practice, particularly one like high-frequency trading that is so

⁴⁰⁸ See John J. Chung, *Money as Simulacrum: The Legal Nature and Reality of Money*, 5 HASTINGS BUS. L.J. 109, 151–152 (2009) (discussing the “hyper-reality” money culture.)

⁴⁰⁹ See generally, IAN SHAPIRO, *THE FLIGHT FROM REALITY IN THE HUMAN SCIENCES* (2007).

⁴¹⁰ Harry T. Edwards, *The Growing Disjunction Between Legal Education and the Legal Profession*, 91 MICH. L. REV. 34, 34 (1992) (“While the schools are moving toward pure theory, the firms are moving toward pure commerce . . .”).

⁴¹¹ Frank Pasquale, *Closed-Circuit Economics*, BALKANIZATION BLOG (Nov. 26, 2010, 11:27 AM), <http://balkin.blogspot.com/2010/11/closed-circuit-economics.html> (“If a very wealthy person wants to maintain his spending power today, he may be far more interested in buying gold, collectible handbags, or commodities futures, than investing in a green energy company or even, say, Ikeas in China, so long as the former are in demand by fellow big spenders, and the latter cater to classes with declining purchasing power.”).

⁴¹² JOEL KURTZMAN, *THE DEATH OF MONEY* (1993), available at http://www.kurtzmangroup.com/death_of_money.php; but see RU SIRIUS, *Has the Death of Money Been Greatly Exaggerated?*, HPLUSMAGAZINE (Mar. 19, 2009), <http://www.hplusmagazine.com/articles/economy/has-death-money-been-greatly-exaggerated> (interviewing Joel Kurtzman).

⁴¹³ Ian Salisbury, *Flash Crash Report: ETFs’ Liquidity Vanished During Drop*, CAPITAL (Oct. 1, 2010, 11:14 PM), <http://english.capital.gr/News.asp?id=1058527>.

⁴¹⁴ *High Speed Trading: Wait a Second*, ECONOMIST (Aug. 11, 2012), <http://www.economist.com/node/21560258>.

⁴¹⁵ See STAFFS OF CFTC & SEC, *PRELIMINARY FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010*, (May 18, 2010), available at <http://www.cftc.gov/ucm/groups/public/@otherif/documents/ifdocs/opa-jointreport-sec-051810.pdf>.

prevalent,” Robert Khuzami, the SEC’s enforcement chief, said in an interview.⁴¹⁶

House Majority Leader Eric Cantor says that the SEC should “collect all the facts and develop coherent and rational policy objectives before adopting any potentially far-reaching rulemaking proposals,”⁴¹⁷ but simultaneously⁴¹⁸ supports the defunding of entities created under Dodd-Frank, including the Office of Financial Research, designed to do just that.⁴¹⁹ While such entities may never achieve technological parity with the wizards of Wall Street, they should be capable of detecting some of the more grotesque overreaches.⁴²⁰

Monitoring also appears to be key to any good regulation of rapidly changing, tech-driven industries. As Daniel Altman explains, the key to preventing further disruptive events is to assure that regulators have some reliable map of all trading activity.⁴²¹ The new Office of Financial Research must take this recommendation seriously, by integrating the leading government technology policy into financial regulation. There are also calls for more transparency in “dark pools,” so that HFT firms trading in these pools are required to notify the SEC and the public, and to disclose the percentage of capital being traded on the pools.⁴²² Concurrent dissemination of information between institutional and individual investors would help level the playing field as well.⁴²³

⁴¹⁶ Jesse Westbrook, Robert Schmidt, & Frank Bass, *High Frequency Traders Lobby, Donate to Head Off U.S. Rules*, BLOOMBERG, Nov. 9, 2011, <http://www.bloomberg.com/news/2010-11-09/high-frequency-firms-accelerate-lobbying-donations-to-head-off-u-s-rules.html>. (“The scrutiny has spurred the industry to seek friends in Washington. . . . [The] companies . . . have more than quadrupled their political giving over the last four years. . . . Last January, Representative Cantor of Virginia, the second highest-ranking Republican in the House, sent [SEC Chair Mary] Schapiro a letter saying her agency’s ideas for regulating fragmented, electronic markets, including a proposal that would prohibit exchanges from giving high-frequency traders and other market participants a split-second peek at stock orders, ‘appeared ad hoc in nature.’”).

⁴¹⁷ *Id.*

⁴¹⁸ David Dayen, *New Financial Services Chair Bachus Wants to Dismantle Dodd-Frank*, FIREDOGLAKE (Nov. 4, 2010, 12:04 PM), <http://news.firedoglake.com/2010/11/04/new-financial-services-chair-bachus-wants-to-dismantle-dodd-frank/>.

⁴¹⁹ Jennifer Taub, *Great Expectations for the Office of Financial Research*, ROOSEVELT INSTITUTE, [http://www.rooseveltinstitute.org/\[menu-trail-parents-raw\]/great-expectations-office-financial-research](http://www.rooseveltinstitute.org/[menu-trail-parents-raw]/great-expectations-office-financial-research).

⁴²⁰ Annelise Riles has also identified other rationales for reporting requirements; she cites research showing that they “are not simply ways of getting information—they are means of structuring an internal conversation within an institution that can lead to rethinking policies and perhaps internal change.” ANNELISE RILES, *COLLATERAL KNOWLEDGE* 236 (2011).

⁴²¹ Daniel Altman, *The Network*, THE NEW REPUBLIC (Oct. 9, 2009), <http://www.tnr.com/article/economy/the-network>.

⁴²² Brown, *supra* note 358, at 227.

⁴²³ *Id.*

V. Beyond Disclosure

In response to the failings of the financial sector in each of the three areas mentioned above, reformers have frequently promoted disclosure.⁴²⁴ The hope is that if every consumer understands the consequences of his actions, or every investor can ascertain all the data about a security that its seller has, the financial playing field will finally be leveled. As law professor and SEC advisor Henry T. C. Hu suggests, “objective reality in its full, gigabyte richness” may be a mere file transfer away, even if it is “subject to multiple meanings.”⁴²⁵

In many cases, sunshine truly is the “best disinfectant.”⁴²⁶ However, transparency may simply provoke complexity that is as effective at defeating understanding as real or legal secrecy. Government has frequently stepped in to require disclosure and “plain language” formats for consumers.⁴²⁷ But financiers have parried transparency rules with more complex contracts and transactions.⁴²⁸ When this happens, without substantial gains in efficiency, regulators should step in and limit complexity. Transparency is not just an end in itself, but an interim step on the road to intelligibility.

Even when disclosure does occur, regulators are routinely overwhelmed as they interpret it, and outgunned when they try to act on it. Many knowledge workers feel “behind the curve” when their computers are three years out of date, but the chair of the SEC recently admitted that her agency’s “technology for collecting data and surveilling our markets is often as much as two decades behind the technology currently

⁴²⁴ E.g., Regina F. Burch, *Financial Regulatory Reform Post-Financial Crisis: Unintended Consequences for Small Businesses*, 115 PENN ST. L. REV. 409, 443 (2010); see generally Thomas J. Schoenbaum, *Saving The Global Financial System: International Financial Reforms and United States Financial Reform, Will They Do The Job?*, 43 UCCL.J. 3 (2010).

⁴²⁵ Henry T. C. Hu, *Too Complex to Depict? Innovation, Pure Information, and the Securities and Exchange Commission*, 90 TEX. L. REV. 1601, 1601, 1610 (2012). Hu traces the disclosure paradigm back to the New Deal, when Franklin Roosevelt adopted the regulatory ideals of Louis Brandeis over the more aggressive industrial policy of economic advisors like Adolph Berle.

⁴²⁶ LOUIS BRANDEIS, *OTHER PEOPLE'S MONEY* 62 (1933) (“Sunlight is said to be the best of disinfectants”); Eric W. Pinciss, *Sunlight Is Still the Best Disinfectant: Why the Federal Securities Laws Should Prohibit Soft Dollar Arrangements in the Mutual Fund Industry*, 23 ANN. REV. BANKING L. 863 (2004).

⁴²⁷ An example is the mandatory disclosure of finance charges under the Truth in Lending Act. FTC, *Sample Mortgage Disclosure Forms*, <http://www.ftc.gov/os/2007/06/samplecurrentforms.pdf> (last accessed Apr. 26, 2013, 4:09 PM); see generally 1 THOMPSON & RENUART, *TRUTH IN LENDING* (7th ed. 2010).

⁴²⁸ See Lauren Willis, *Disclosure 2.5: Moving from the Lab to the Field*, CREDIT SLIPS (Feb. 22, 2013, 2:31 AM), <http://www.creditslips.org/creditslips/2013/02/disclosure-25-moving-from-the-lab-to-the-field.html> (“Lenders faced with a new mandated disclosure that could reduce their business volume are unlikely to stand idly by. They will dynamically respond with changes in advertising, sales talk, pricing structures, etc.”).

used by those we regulate.”⁴²⁹ US financial regulators’ resources are dwarfed by the assets of the firms (and sometimes the individuals) they police.⁴³⁰ For the past several years, the yearly annual income of a handful of *individuals* in finance eclipsed that of agencies with hundreds of employees. When a hedge fund manager like John Paulson can earn over four times the entire annual budget of the SEC in a single year, monitoring becomes more charade than substance.⁴³¹

Paradoxes of Price Discovery

A main stated purpose of the financial sector is price discovery.⁴³² If there are only a few people buying and selling a given company’s stock, it can be very difficult to determine what the right price is. Whatever haggling takes place between the buyers and sellers may reflect the bargaining power of either side or random conditions of the negotiations rather than the actual value of the equity. Larger, impersonal markets are supposed to overcome this problem by spreading trades over multiple locations, involving diverse buyers and sellers.⁴³³ Sometimes the buyer may be desperate, and sometimes the seller might be. In the aggregate, this “noise” should cancel out as a clear price signal emerges.⁴³⁴

As Gillian Tett demonstrates in her book, *Fools Gold*, the inventors of credit default swaps hoped that their derivative could achieve in debt markets what stock exchanges were (theoretically) performing in equity markets.⁴³⁵ The ultimate goal was

⁴²⁹ Mary L. Schapiro, Chairman, SEC, Opening Statement at SEC Open Meeting in Washington, D.C., (May 26, 2010), available at <http://www.sec.gov/news/speech/2010/spch052610mls-audit.htm>.

⁴³⁰ See DAVID ROTHKOPF, *POWER, INC.* (2012).

⁴³¹ Compare Ronald D. Orol, *Obama’s SEC Budget Targets Hedge Fund, Buyout Shop Managers*, Market Watch (Aug. 10, 2013), <http://blogs.marketwatch.com/election/2013/04/10/obamas-sec-budget-targets-hedge-fund-buyout-shop-managers/>, with GREGORY ZUCKERMAN, *THE GREATEST TRADE EVER* (2010) (on Paulson’s shorting of CDOs based on RMBSs).

⁴³² VALDONE DARSKUVIENE, *FINANCIAL MARKETS 7*, (2010), available at http://www.bcci.bg/projects/latvia/pdf/7_Financial_markets.pdf (“Financial markets provide the following three major economic functions: 1) Price discovery 2) Liquidity 3) Reduction of transaction costs.”).

⁴³³ See Russell Robinson, *Fraud-on-the-Market Theory and Thinly-Traded Securities Under Rule 10b-5: How Does A Court Decide If A Stock Market Is Efficient?*, 25 WAKE FOREST L. REV. 223, 224 (1990)

(“[T]he efficient market hypothesis, proclaims stock markets to be ‘efficient.’ Efficiency in this context means that all economically relevant public information about a publicly-traded security is rapidly absorbed by investment professionals and immediately reflected in the price of that security in an unbiased fashion. Because the stock market is efficient, the price of a security is an adequate reflection of its worth.”); but see Eric C. Chang & J. Michael Pinegar, *Seasonal Fluctuations in Industrial Production and Stock Market Seasonals*, 24 J. FIN. & QUANTITATIVE ANALYSIS 59, 59 (1989) (“Many researchers document stock market anomalies that challenge the efficient markets hypothesis.”).

⁴³⁴ Robinson, *supra* note 433, at 224.

⁴³⁵ GILLEN TETT, *FOOL’S GOLD* 3–23 (2010).

to set exact and stable prices on a wide array of financial risks. The financial engineers saw this as a great triumph of human ingenuity, a technology of risk commodification that would vastly expand societal capabilities to plan and invest.⁴³⁶ In the giddy days of the real estate bubble, investors who bought both a CDO and a credit default swap may have felt like Midas, guaranteed gains no matter how the future turned out.⁴³⁷

As we now know, the price discovery function failed miserably. Complexity, malfeasance, and sometimes outright fraud made a mockery of the finely engineered financial future promised by quants.⁴³⁸ Instead, the crash generated enormous volatility, with individuals radically uncertain about the value of homes and retirement portfolios.

In the first months after the crisis, it seemed as though the failures of this price discovery system would lead to much greater regulation of finance.⁴³⁹ A similar crash before the Great Depression led to fundamental structural changes in the banking system. More recently, Sweden temporarily nationalized banks after a financial crash there in the early 1990s.⁴⁴⁰ The US chose another path. Congress did not fundamentally alter banks' business practices. Even implementation of the much vaunted Volcker rule, setting limits on proprietary trading, was delayed.⁴⁴¹ The proposed Volcker rule also appeared to be so watered down by 2012 that analysts said it would not even have stopped the machinations of the "London Whale," a JP Morgan executive whose position in credit default swaps caused massive losses for the bank.⁴⁴²

There is little chance of democratic demands for wholesale reform of finance. The sector's details are dull, but its culture and promises are glamorous.⁴⁴³ Americans have begun to rely upon finance (including mortgages, reverse mortgages, 401(k) plans, and other investments) to provide types of security once only promised by public

⁴³⁶ *Id.*

⁴³⁷ *Id.* at 12 (describing the bankers' who invented derivatives seemingly "godlike" powers to manipulate transactions).

⁴³⁸ *Id.* at 250 ("Financial engineering was taken to a level which was unsustainable.").

⁴³⁹ *E.g.*, David Hogberg, *Is a New Era of Big Gov't on the Way?*, INVESTOR'S BUS. DAILY, Sept. 29, 2008, at A10; Ruth Walker, *Wall Street's Game Over; Economics Hit Home*, CHRISTIAN SCIENCE MONITOR, Sept. 26, 2008, at 18 ("The lazy fair is over, we're hearing from Washington and Wall Street. Reeling from its worst financial crisis since the Great Depression, the United States may be headed back to a round of reregulation.").

⁴⁴⁰ *See* Carter Dougherty, *Sweden's Fix for Banks: Nationalize Them*, Jan. 22, 2009, <http://www.nytimes.com/2009/01/23/business/worldbusiness/23sweden.html?pagewanted=all>.

⁴⁴¹ The Volcker Rule may even face another delay. Scott Patterson, *Volcker Rule Could Be Delayed-Again*, WALL STREET J., Feb. 27, 2013, <http://online.wsj.com/article/SB10001424127887324662404578330563892792982.html>

⁴⁴² *See* David Benoit, *J.P. Morgan's Whale of a Volcker Question*, WALL STREET J. DEAL J. BLOG (Mar. 15, 2013), <http://blogs.wsj.com/deals/2013/03/15/j-p-morgans-whale-of-a-volcker-question/>.

⁴⁴³ *See* SIMON JOHNSON & JAMES KWAK, 13 BANKERS 113 (2011) (explaining how films like *Wall Street* made finance sexy).

institutions.⁴⁴⁴ Even if average voters have virtually no direct investment in private financial institutions, they still see the unquestioned integrity of the whole as vital to future possibilities.

Finance's black box also promises future income derived in much more pleasant and exciting ways than plain old government redistribution and infrastructure provision. Consider, for instance, a would-be retiree who had to choose between a government pension or a 401(k) plan invested with a financial firm. Ideally, the government plan relies on taxes that are used, at least in part, to build up infrastructure and education that make future generations more productive. They can in turn be taxed to support the elderly, whose work made possible the country they live in.

Finance offers far more attractive opportunities, at least in the popular imagination. Evoking the much ballyhooed examples of tech darlings or wonder drugs, the finance sector can raise the possibility of nearly unlimited gains, dwarfing the cost of living adjustments built into American social insurance. Financial intermediaries also spare small time investors the trouble of actually understanding the business model and future prospects of what they invest in. "No need to worry if it's a bit of a black box," the intermediary may counsel about a hot tip. "It's our job to understand the details."

Sadly, many workers who earnestly contribute to 401(k) plans mistake the glitter of venture capital for the unglamorous realities of fixed income arbitrage, algorithmic trading, and mind-numbing derivative contracts. Investors think of their dollars going to innovators and entrepreneurs. But, as Doug Henwood has shown, nearly all of the activity in the current stock market is transfers of existing shares.⁴⁴⁵ The money is not going directly to new products or business plans, but is simply part of a massive process of allocating and reallocating claims to the future productivity of existing firms. In the debt markets, the financial needs of the bond investors may be distorting the types of projects that can be completed. Short time horizons and pressures to maximize and guarantee yield steer money to "guaranteed" income from tenants, mortgagors, and prisoners, and away from riskier (but potentially far more productive) projects like green energy.

⁴⁴⁴ See, e.g., Johanna Montgomerie, *America's Debt Safety-Net* (Univ. of Manchester CRESC Working Paper, Paper No. 90, 2011), available at http://www.academia.edu/529592/Americas_debt_safety-net.

⁴⁴⁵ HENWOOD, *supra* note 5, at 4; see also Doug Henwood, *NPR Hack Apologizes for Wall Street*, Left Business Observer Blog (Jan. 15, 2012), <http://lbo-news.com/page/7/?archives-list&archives-type=cats> ("[t]rading in existing assets, the bulk of what Wall Street does, has almost nothing to do with real activity.").

A Menace of Martingales

Self-dealing is rampant in finance. But the sector need not be perfect in order to continue to attract massive amounts of capital; it need only surpass alternatives. In the public mind, it is beginning to do that with respect to the government. Individualized, privatized, financialized dreams are bouncing back, even after the crisis.⁴⁴⁶ Government debts are public, and campaigns from financiers cast aspersions on them and warn of impending collapse.⁴⁴⁷ Meanwhile, financial firms can use all the techniques described above to hide their own debts, vulnerabilities, and risky bets. They can continually malign the government's fiscal foundations, all the while depending on the Fed to back them in case their own gambles fail.

During Franklin Roosevelt's presidency, government tended to fight back, underscoring the need for public alternatives to private promises to store and build wealth.⁴⁴⁸ The Bush and Obama administrations have taken a fundamentally different course. They have backed cash infusions for the banks and quantitative easing that has raised the price of stocks.⁴⁴⁹ The fundamental concern has been to rebuild public confidence in equity and debt markets as safe and reliable guardians of financial security.⁴⁵⁰ Social Security, by contrast, has become a target for the bipartisan Bowles-Simpson Commission.⁴⁵¹

Like the alliances of business and law enforcement in fusion centers, the cooperation of big bank and big government leaders is supposed to reassure us. Experts

⁴⁴⁶ *E.g.*, Eric Snyder, *Obama Administration to Explore Sale of TVA*, NASHVILLE BUS. J., Apr. 11, 2013, http://www.bizjournals.com/nashville/morning_call/2013/04/obama-administration-to-explore-sale.html

⁴⁴⁷ Billionaire Pete Peterson has endowed a think tank, the Peterson Institute, to buttress a Beltway consensus about the debt-induced fragility of public finances. *See About the Institute*, PETERSON INSTITUTE FOR INTERNATIONAL ECONOMICS, <http://www.iie.com/institute/aboutiie.cfm> (last visited Apr. 23, 2:21 PM).

⁴⁴⁸ Sjostrom, *supra* note 330; see Michael Hiltzik, *Obama Should Channel FDR and Fight Back*, LA TIMES, Dec. 3, 2010, <http://articles.latimes.com/2010/dec/03/business/la-fi-hiltzik-20101203>.

⁴⁴⁹ Sjostrom, *supra* note 330; Doug Oest, *Quantitative Easing and the U.S. Stock Market*, MARQUETTE ASSOCIATES (June 15, 2011), <http://www.marquetteassociates.com/Research/ChartoftheWeekPosts/ChartoftheWeek/tabid/121/ArticleID/126/Quantitative-Easing-and-the-U-S-Stock-Market.aspx>.

⁴⁵⁰ *Id.* ("Higher stock prices will boost consumer wealth and help increase confidence, which can also spur spending. Increased spending will lead to higher incomes and profits that, in a virtuous circle, will further support economic expansion") (quoting Ben Bernanke)

⁴⁵¹ Jon Walker, *Bowles and Simpson Still Want to Cut Your Medicare and Social Security*, FIREDOGLAKE (Feb. 19, 2013), <http://fdlaction.firedoglake.com/2013/02/19/bowles-and-simpson-still-want-to-cut-your-medicare-and-social-security/>. Even President Obama has conceded to conservative demands that Social Security be cut. Tamara Keith, *'Chained CPI' Worked Into Obama's 2014 Budget*, NATIONAL PUBLIC RADIO (Apr. 11, 2013, 4:00 AM), available at <http://www.npr.org/2013/04/11/176880579/chained-cpi-worked-into-obamas-2014-budget>.

at the commanding heights of business and government are in harmony, sharing a common vision. But, as Peter Boone & Simon Johnson have shown, the interconnections between the two can also erode confidence.⁴⁵² Boone & Johnson foresee a “doom loop:” as financial institutions are increasingly treated as too big to fail, they are empowered to take greater and greater risks, which will inevitably lead to greater stresses on the governments that effectively sponsor them.⁴⁵³ These obligations foment worries about governments’ ability to support both TBTF banks and the tens of millions who depend on health and welfare benefits. Meanwhile, as interest rates on sovereign debt are suppressed to spark a recovery, investors feel compelled to flee to the finance sector to gain more than nominal returns. Finance’s black box is all the more appealing as ten-year Treasury bills flirt with their lowest yield ever (in the 130 years or so they have been issued).⁴⁵⁴

The end result is a crippled state promising to succor a reckless finance sector prone to “martingale” strategies—the gambling term for a bettor who doubles down after each loss.⁴⁵⁵ As *Financial Times* columnist John Kay observes, if you are infinitely rich at the start, the martingale strategy is a sure winner, as long as each bet’s chance of winning is greater than zero.⁴⁵⁶ But infinite riches are a thing of fantasy, even in an era when models can predict a “1 in 10,000” chance of losing money on a credit default swap.

Money is a claim on future production, not a good in itself. The towering digital edifices of credit erected by advanced finance are increasingly disconnected from actual productivity. Rather, they create illusions of prosperity. For example, Yves Smith

⁴⁵² Peter Boone & Simon Johnson, *10: Will the Politics of Global Moral Hazard Sink Us Again?*, in *THE FUTURE OF FINANCE* (London School of Economics and Political Science, 2010), available at <http://harr123et.files.wordpress.com/2010/07/futureoffinance-chapter101.pdf>.

⁴⁵³ *Id.* Peter Boone and Simon Johnson describe how a “doomsday cycle” of privatized gains and socialized losses continues to this day. (“[M]ajor private sector firms (banks and nonbank financial institutions) have a distorted incentive structure that encourages eventually costly risk-taking. Unfortunately, the measures taken in various US and European bailout rounds during 2008-2009 (and again in 2010 for the eurozone) have only worsened, and extended to far more entities, these underlying moral hazard incentive problems. . . . This cycle of boom followed by bailouts and bust amounts to a form of implicit taxpayer subsidy that encourages individual institutions to become larger – and the system as a whole to swell. Our preparation to bail out their creditors means systemic institutions are able to raise finance cheaply in global markets. The implicit subsidy to creditors encourages greater debt, which makes the system ever more precarious.”). *Id.* at 247–248.

⁴⁵⁴ *10-year Treasury Yield Rises From Near Record Low*, ASSOCIATED PRESS, May 18, 2012, available at <http://bigstory.ap.org/content/10-year-treasury-yield-rises-near-record-low>.

⁴⁵⁵ William N. Thompson et. al., *Remedying the Lose-Lose Game of Compulsive Gambling: Voluntary Exclusions, Mandatory Exclusions, or an Alternative Method?*, 40 J. MARSHALL L. REV. 1221, 1257 n. 89 (2007).

⁴⁵⁶ John Kay, *It’s Madness to Follow a Martingale Betting Strategy in Europe*, JOHN KAY (Nov. 23, 2011), <http://www.johnkay.com/2011/11/23/it%E2%80%99s-madness-to-follow-a-martingale-betting-strategy-in-europe>.

describes a structure that catalyzed \$533 in funding for subprime mortgages for every dollar invested in it.⁴⁵⁷ Behind all the reticulated swaps of risk and reward, the crash of 2008 boils down to a familiar story: risk and leverage hidden in order to promote ever more fee-generating deals.⁴⁵⁸ One Wall Street bank paid out over \$5 billion in bonuses in 2006, only to lose three times that amount by early 2009.⁴⁵⁹ Virtually none of that bonus money has been recovered from individuals. To this day, the tax and accounting manipulations used to demonstrate that various institutions have or have not paid back government bailouts are confounding.⁴⁶⁰

From the tech and telecom craze of the late 1990s to house price escalation from 2002 to 2006, asset bubbles are a predictable consequence of black box finance.⁴⁶¹ Insiders who understand their true dynamics can sell at the top, reaping enormous gains. However rich they become, wealth they draw on is ultimately fictitious: it

⁴⁵⁷ See SMITH, *supra* note 302, at 261 (“if you look at the non-synthetic component, every dollar in mezz ABS CDO equity that funded cash bonds created \$533 in subprime demand”); see also Frank Pasquale, *The Question Concerning Finance: Party Like It’s 1929 or Prepare Like It’s 1957?*, Concurring Opinions (Aug. 27, 2010, 9:19 PM) <http://www.concurringopinions.com/archives/2010/08/the-question-concerning-finance-party-like-its-1929-or-prepare-like-its-1957.html>; Bernstein & Eisinger, *supra* note 342 (“As the housing boom began to slow in mid-2006, investors became skittish about the riskier parts of those investments. So the banks created — and ultimately provided most of the money for — new CDOs. Those new CDOs bought the hard-to-sell pieces of the original CDOs. The result was a daisy chain that solved one problem but created another: Each new CDO had its own risky pieces. Banks created yet other CDOs to buy those. . . . Because of Wall Street’s machinations, more mortgages had been granted to ever-shakier borrowers.”).

⁴⁵⁸ As Clive Dilnot puts it, “*The Producers* were more inventive, the stock-exchange games of the 1920s were more complex.” Clive Dilnot, Triumph—and Cost—of Greed 46 (Real World Economics Review 2009), available at <http://www.paecon.net/PAERreview/issue49/Dilnot49.pdf>. Or, as Thorvaldur Gylfason writes, our bankers were about as creative as Mel Brooks. *Mel Brooks and the Bankers*, Vox (Aug. 18, 2010), <http://www.voxeu.org/article/mel-brooks-and-bankers>. Cf. Galbraith, *supra* note 5, at 58 (“In 1929 the discovery of the wonders of the geometric series struck Wall Street with a force comparable to the invention of the wheel. There was a rush to sponsor investment trusts which would sponsor investment trusts, which would, in turn, sponsor investment trusts. The miracle of leverage, moreover, made this a relatively costless operation to the ultimate man behind all of the trusts.”). There is an eerie similarity between the 1920s investment trusts and the speculative leveraging that ended in the collapse of 2008.

⁴⁵⁹ Louise Story, *On Wall Street, Bonuses, Not Profits, Were Real*, N.Y. TIMES, Dec. 17, 2008, <http://www.nytimes.com/2008/12/18/business/18pay.html?scp=1&sq=%22dow%20kim%22&st=cse>.

⁴⁶⁰ Roben Farzard, *AIG May Not Be as Healthy as it Looks*, BUSINESSWEEK, Apr. 26, 2012, <http://www.businessweek.com/articles/2012-04-26/aig-may-not-be-as-healthy-as-it-looks> (discussing US Treasury department decision to allow AIG, Ally, and Citibank to claim “operating losses from previous years to eliminate taxes on current income”—an allowance which “typically does not apply to bankrupt or acquired companies.”).

⁴⁶¹ See generally, Erik F. Gerding, *Laws Against Bubbles: An Experimental-Asset-Market Approach to Analyzing Financial Regulation*, 2007 WIS. L. REV. 977 (2007).

represents “a claim on future wealth that neither had been nor was to be produced.”⁴⁶² By creating the illusion of enormous value in securities like CDOs and CDSs, black box financiers make their own fees (ranging from a fraction of a percent to over 30% in the case of some hedge funds) seem trivial in comparison.⁴⁶³ When the mirage dissipates, the desert of zero productive gains becomes clear. But in this harsh new economic reality, the fees “earned” by the financiers have all the more purchasing power, arrayed against the smaller incomes of those who did not take advantage of the bubble.

Thus the great paradox of contemporary finance: its premier practitioners are far better at creating need and demand for their “product” (price discovery) than they are at providing it. Theoretical justifications for finance’s power focus on “free markets” generating fundamental knowledge about the economy. Without the great brokerages, and “bank holding companies,” how would we price debt, equity, or the more exotic risks assimilated into derivatives?⁴⁶⁴ Yet the rise of financialization has created enormous uncertainty about the value of companies, homes, and even (thanks to the pressing need for bailouts) the once rock-solid promises of governments themselves. Finance thrives in such an environment of radical uncertainty, taking commissions in cash as investors race to speculate on or hedge against an ever less knowable future.

The Decline of Financial Facts in an Era of Advanced Information Technology

In 2004, the Cato Institute awarded Peruvian economist Hernando de Soto the \$500,000 Milton Friedman Prize for Advancing Liberty.⁴⁶⁵ The libertarian think tank commended de Soto for his tireless advocacy for property rights. Despite two assassination attempts by communist Shining Path guerrillas, de Soto proselytized for *The Other Path*, his book-length account of how clear title to land could help the poorest of the poor rise from desperation to self-sufficiency.⁴⁶⁶ Celebrated for his courage and insight, de Soto was advising international leaders by the 1990s.⁴⁶⁷ He even inspired idealistic students to visit his home country, bringing American principles of due

⁴⁶² Benjamin Kunkel, *Forgive Us Our Debts*, 34 LONDON REVIEW OF BOOKS 23 (2012), available at <http://www.lrb.co.uk/v34/n09/benjamin-kunkel/forgive-us-our-debts>.

⁴⁶³ For an overview of CDO fees, see Adam J. Levitin & Susan M. Wachter, *Explaining the Housing Bubble*, 100 GEO. L.J. 1177, 1258 n. 283 (2012).

⁴⁶⁴ See generally ALAN MORRISON, *INVESTMENT BANKING* (2008).

⁴⁶⁵ Gene Healy, *Dangerous Minds: Hernando de Soto*, CATO INSTITUTE, <http://www.cato.org/publications/commentary/dangerous-minds-hernando-de-soto> (last visited Apr. 26, 2013, 5:34 PM).

⁴⁶⁶ HERNANDO DE SOTO, *THE OTHER PATH* (2002).

⁴⁶⁷ Mathew Miller, *The Poor Man’s Capitalist*, N.Y. TIMES, July 1, 2001, <http://www.nytimes.com/2001/07/01/magazine/01DESOTO.html?pagewanted=all>.

process, the rule of law, and property rights to fledgling agencies of the Fujimori administration.⁴⁶⁸

By 2011, de Soto went from praising to condemning the American economic system. The financial crisis had revealed a “staggering lack of knowledge” about “who owned and owed” in the United States.⁴⁶⁹ The “public memory systems” that the U.S. had exported to countries like Peru (such as “publicly accessible registries, titles, balance sheets, and statements of account”) proved to be utterly unreliable at home. Incompetence and untested innovations clouded property records. Terms and conditions of billion dollar deals were hidden. Behind the glass towers and state of the art computer networks of American finance lay ramshackle institutions and a declining respect for the rule of law.⁴⁷⁰

De Soto’s critique was not a rash response to the panic of 2008. Rather, he identified decades-long trends in banking, insurance, and tax policy that continue to this day. In each area, wealthy and powerful players have crafted deals that shift risk to unwitting investors and taxpayers while claiming enormous fees and bonuses for themselves. The strategies for hiding the risk are legion, ranging from murky accounting to secret liens, shadow banking to proprietary models. As leading firms obsessed over short-term profit opportunities, one wag concluded that finance’s core competencies were “finding fools for counterparties,” evading regulations, and “disguising gambling as hedging.”⁴⁷¹

Once a prominent promoter of Western capitalism, de Soto become one of its harshest critics because he realized its fundamental premises were disappearing. We increasingly lack reliable recordations of ownership, be it of interests in mortgages, or “off balance sheet” entities, or the proliferating debts and swaps that magnified the crisis. From mortgage brokers to CEOs, many finance workers rely on opaque complexity to generate profits. We must always ask of finance’s “innovative algorithms:” are they designed to reveal or obscure underlying realities?

Reining in Finance

⁴⁶⁸ Jeremy Clift, *People in Economics: Hearing the Dogs Bark (Interview with Hernando de Soto)*, 9–10, FINANCE AND DEVELOPMENT (Dec. 2003), <http://www.imf.org/external/pubs/ft/fandd/2003/12/pdf/people.pdf>.

⁴⁶⁹ Hernando De Soto, *The Destruction of Economic Facts*, BusinessWeek. (Apr. 28, 2011), http://www.businessweek.com/magazine/content/11_19/b4227060634112.htm.

⁴⁷⁰ *Id.*

⁴⁷¹ Brad DeLong, *What are the Core Competencies of High Finance?*, DELONG.TYPEPAD (May 19, 2012), <http://delong.typepad.com/sdj/2012/05/what-are-the-core-competences-of-high-finance.html> (quoting Robert Waldmann.)

Even if resource asymmetries between regulators and regulated could be addressed, the technocratic pursuit of intelligibility of algorithms may not address the most important market problems. A great deal of financial regulation (and firm self-regulation) rests on the idea that the risks and liabilities of a firm are quantifiable.⁴⁷² A vast and growing industry aspires to boil down firms' many obligations and expectations into comprehensive-yet-comprehensible accounts of financial well-being. Technology was supposed to perfect this process.⁴⁷³ Instead, it has largely given firms and their regulators a false sense of security. It is by no means clear that the tasks of disclosure set for it can, even in principle, be achieved.

Kenneth Bamberger has shown that technological systems used to quantify risks have many shortcomings.⁴⁷⁴ For example, "computer code . . . operates by means of on-off rules, while the analytics it employs seek 'to quantify the immeasurable with great precision.'"⁴⁷⁵ Bamberger makes at least two worthy suggestions for addressing the issue:

[C]urrent regulations [miss] the potential for transparency as to the exact methods of quantifying risk and the ways such measures automate decisionmaking [and] lack the ongoing capacity to provide timely and evolving risk information. . . . Transparency into the workings of regulated firms, however, provides only half the prescription. A new governance model further requires significant investment in the competence of administrative agencies themselves—both in terms of technical expertise and computing capacity. Regulators constrained by limited resources cannot currently keep up with the massive data-processing capacity of private corporations.⁴⁷⁶

The SEC and CFTC also appear to be interested, given the broadly positive views expressed in their "Joint Study on the Feasibility of Mandating Algorithmic Descriptions for Derivatives."⁴⁷⁷ In that document, the staff concludes "that current technology is capable of representing derivatives using a common set of computer-readable

⁴⁷² THEODORE M. PORTER, *TRUST IN NUMBERS* 187 (1996).

⁴⁷³ See generally PATTERSON, *supra* 186.

⁴⁷⁴ Kenneth A. Bamberger, *Technologies of Compliance: Risk and Regulation in a Digital Age*, 88 *TEXAS L. REV.* 669 (2010), available at <http://ssrn.com/abstract=1463727>.

⁴⁷⁵ *Id.* at 676.

⁴⁷⁶ *Id.* at 732–35.

⁴⁷⁷ STAFFS OF THE U.S. SEC. AND EXCH. COMM'N AND THE U.S. COMMODITY FUTURES TRADING COMM'N, *JOINT STUDY ON THE FEASIBILITY OF MANDATING ALGORITHMIC DESCRIPTIONS FOR DERIVATIVES* (April 7, 2011), available at <http://www.sec.gov/news/studies/2011/719b-study.pdf>.

descriptions[, which] are precise enough to use both for the calculation of net exposures and to serve as part or all of a binding legal contract.”⁴⁷⁸

Unfortunately, after considering the vagaries of accounting, securitization, and credit rating described above, it is difficult to credit the SEC’s optimism here. Just as the FDIC’s hypothetical resolution of Lehman “amused many by its naiveté,”⁴⁷⁹ the staff appears to be promoting an aspiration as a likely achievement. A better goal would revolve less around *representing* the value of such exposures than preferring or otherwise supporting more manageable deals. This is one idea behind the research program of Lanier’s “formalized financial expression:”⁴⁸⁰

[H]ighly regular financial instruments . . . can be traded on an exchange . . . because they are comparable. But highly inventive contracts, such as leveraged default swaps or schemes based on high frequency trades, [should] be created in an entirely new way. They would be denied ambiguity. They would be formally described. Financial invention would take place within the simplified logical world that engineers rely on to create computing chip logic.

Reducing the power of expression of unconventional financial contracts might sound like a loss . . . for the people who invent them, but, actually, they will enjoy heightened powers. The reduction in flexibility doesn’t preclude creative, unusual ideas at all. Think of the varied chips that have been designed [for computers].⁴⁸¹

Or, we might add, the dream of synthetic biologists to bring the efficiencies of interchangeable parts to the living world.⁴⁸² Lanier insists that “the ability to register complex, creative ideas in a standard form would transform the nature of finance and its regulation,” making it “possible to create a confidential . . . method for regulators to track unusual transactions.”⁴⁸³

The language of trading needs to change before a “big picture” view of transactions will be plausible. Jaron Lanier has proposed methods of representing a

⁴⁷⁸ *Id.* at 1.

⁴⁷⁹ Lubben, *supra* note 261 **Error! Bookmark not defined.**, at 1–2 (“The Federal Deposit Insurance Corporation (FDIC or Corporation), keen to demonstrate its competency to wield the new powers given it under Dodd–Frank, rushed to produce a hypothetical resolution of Lehman that amused many by its naiveté.”).

⁴⁸⁰ LANIER, *supra* note 338, at 111.

⁴⁸¹ LANIER, *supra* note 338, at 113.

⁴⁸² Michael Specter, *A Life of Its Own*, THE NEW YORKER, September 28, 2009, http://www.newyorker.com/reporting/2009/09/28/090928fa_fact_specter.

⁴⁸³ LANIER, *supra* note 338, at 114.

“wide range of innovative, nonstandard transactions” in order to give central banks and “other authorities” a “full comprehension” of the risks involved.⁴⁸⁴ As the OFR sets standards for Legal Entity Identification for Financial Contracts,⁴⁸⁵ and the SEC works on its Consolidated Audit Trail,⁴⁸⁶ they should develop methods not merely for real-time monitoring of troubling developments caused by computerized high frequency trading, but also for stopping the most problematic trading strategies.

Admittedly, industry groups are sure to protest. The ISDA said in comments on the “Algorithmic Descriptions” rulemaking that “it would be costly for regulators to independently define or impose a data representation standard, due to the breadth, complexity, and rapid rate of change in the OTC derivative marketplace.”⁴⁸⁷ One can only imagine how much more vehemently they would oppose a proposal to actually limit certain types of currently executed trades, rather than just require their representation according to common standards.

But how much more costly is the present system, where some new AIG might be blithely cashing in premium checks for obligations it can never meet? As Roscoe Pound has said, “In a commercial age wealth is largely made up of promises.”⁴⁸⁸ Combine the recklessness or excessive optimism of swap “protection sellers” promises with the rampant agency problems that survive the crisis, and you have a recipe for ongoing turmoil and lack of trust in financial markets.⁴⁸⁹ Until massive and volatile financial concerns are well and truly ring-fenced from the real economy, disclosure laws cannot work until regulators ban certain types of deals whose effects can’t be adequately represented, measured, or tax them to fund potential government responses to the externalities they create.⁴⁹⁰

⁴⁸⁴ *Id.* (proposing the development of “formalized financial expression” in order to better represent the aggregate effects of trading activity).

⁴⁸⁵ See, e.g., DEP’T OF THE TREASURY, OFFICE OF FINANCIAL RESEARCH, POLICY STATEMENT ON LEGAL ENTITY IDENTIFICATION FOR FINANCIAL CONTRACTS, *available at* http://www.treasury.gov/initiatives/Documents/OFR-LEI_Policy_Statement-FINAL.PDF.

⁴⁸⁶ See, e.g., Press Release, U.S. Sec. & Exch. Comm’n, SEC Approves New Rule Requiring Consolidated Audit Trail to Monitor and Analyze Trading Activity (July 18, 2011), *available at* <http://www.sec.gov/news/press/2012/2012-134.htm>.

⁴⁸⁷ ISDA & SIFMA, Joint Comment No. 26827. p. 12, on Acceptance of Public Submissions on a Study Mandated by the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 719(b), , 75 FED. REG. 76706, (Dec. 31, 2010), *available at* <http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26827&SearchText=>.

⁴⁸⁸ M.W. LAU, THE ECONOMIC STRUCTURE OF TRUSTS: TOWARDS A PROPERTY-BASED APPROACH 115 (2011) (quoting ROSCOE POUND, JURISPRUDENCE 163-64 (West Publishing 1959).

⁴⁸⁹ Arthur E. Wilmarth, *The Dark Side of Universal Banking: Financial Conglomerates and the Origins of the Subprime Financial Crisis*, 41 CONN. L. REV. 963, 993 (2009), *available at* <http://ssrn.com/abstract=1403973>.

⁴⁹⁰ Neil Hume, *How to Ring-Fence a TBTF*, FINANCIAL TIMES ALPHAVILLE (April 11, 2011), <http://ftalphaville.ft.com/blog/2011/04/11/542021/how-to-ring-fence-a-tbtf/>.

There are a number of concrete options beyond disclosure for the regulation of high-frequency trading and securitization, including “certain taxes on share transactions or rules that curb the more harmful types of algo-trading across the board.”⁴⁹¹ In the case of high frequency trading in particular, several specific proposals focus not merely on making HFT practices more transparent, but also on banning some altogether. Brown, for instance, suggests an SEC ban on “quote stuffing,” which occurs when an HFT firm enters a large order, and then promptly cancels that same order.⁴⁹² Unfortunately, the SEC has only called for exchanges to impose cancellation taxes, which have only been partially enacted and only prohibit “most blatantly excessive cancellations.”⁴⁹³ In 2011, the Commodity Futures Trading Commission and the SEC “proposed a basket of rational safeguards against other flash crashes, and pursued regulations implementing them.”⁴⁹⁴ These safeguards include “updated circuit breakers . . . stub quote bans, and naked-access bans.”⁴⁹⁵ Such rules would at least slow down the potentially destabilizing and unfair application of HFT technology.

VI. Conclusion

Little more than a decade ago, the internet promised to bring a new era of transparency. Open access to information was to result in extraordinary liberty. Law professor Glenn Reynolds predicted that an “army of Davids” would use new technology to expose and overthrow smug, self-satisfied elites.⁴⁹⁶ Space physicist David Brin believed that new technology would finally answer the old Roman challenge, “who will guard the guardians?” Brin’s book, *The Transparent Society*,⁴⁹⁷ offered a vision of mutual surveillance that has only come to pass in a few areas. But powerful actors did

⁴⁹¹ Michael J. McGowan, *The Rise of Computerized High Frequency Trading*, 2010 DUKE L. & TECH. REV. 16, 51, available at <http://www.law.duke.edu/journals/dltr/articles/2010dltr016>.

⁴⁹² Brown, *supra* note 358, at 226–27. Quote stuffing “effectively eliminates the individual investor’s right to obtain an accurate bid or ask price on a security,” because the goal is to flood the market with quotes that competitors must process, causing those competitors to lose the edge in high frequency trading.

⁴⁹³ Prewitt, *supra* note 359, at 160.

⁴⁹⁴ *Id.*, at 151.

⁴⁹⁵ *Id.* Circuit breakers are mechanisms that prevent anomalous trades, and even halt trading when there is evidence of harmful volatility. *Id.* at 152. Stub quotes are offers to buy or sell at unrealistic prices given current market conditions. Stub quotes played a role in the Flash Crash and Prewitt argues that banning them will help prevent another similar occurrence. *Id.* at 153. The naked access ban prevents HFT firms from exploiting a loophole that allowed them to have direct access to exchanges by trading on their brokerage accounts, which firms used to avoid risk checks and capital requirements. *Id.*; see also Brown, *supra* note 358, at 221.

⁴⁹⁶ GLENN REYNOLDS, ARMY OF DAVIDS xiii (2007) (“The growth of computers, the Internet, and niche marketing means you don’t have to be a Goliath to get along. Like David’s sling, these new technologies empower the little guy to compete more effectively.”).

⁴⁹⁷ DAVID BRIN, THE TRANSPARENT SOCIETY (1999).

not meekly submit to the fishbowl he prophesied. Rather, they engaged in the strategies of obfuscation. The question now for the finance sector is whether to double down on calls for transparency, or to adopt another path.⁴⁹⁸

Merely making the algorithms and modeling of banks and traders more amenable to outside analysis is not likely to do much to push the financial sector toward serving the larger economy, rather than extracting value from it.⁴⁹⁹ Even after the crisis of 2008, scandals have proliferated in the sector: 2012 alone saw tax-evasion, money laundering, racial discrimination, illegal foreclosures, bond bid-rigging, and reckless trading.⁵⁰⁰ Taken individually, each scandal can be explained away as the deviance of a “bad apple.” Together, they suggest that modern finance itself is rotten. Corruption has become so endemic that the very possibility of ethical deployment of algorithms in the US banking sector has been called into question.⁵⁰¹ As former prosecutor Neil Barofsky puts it in his book *Bailout*, “The incentives are to cheat, and cheating is profitable because there are no consequences.”⁵⁰²

Regardless of the abstract and arid discussions of “liquidity” and “efficiency” among finance economists, the primary purpose of the finance sector has been (and continues to be) the enrichment of its leading participants. The spread and intensification of algorithmic strategies there did not democratize wealth—instead it coincided with a remarkable run-up in inequality and instability. There is no simple cause and effect relationship here, but algorithms did play a crucial role in *rationalizing*—in both senses of the word—dominant distributional patterns. Workers

⁴⁹⁸ For a paradigmatic transparency proposal, see Daniel Roth, *Road Map for Financial Recovery: Radical Transparency Now!*, WIRED (Feb. 23, 2009), http://www.wired.com/techbiz/it/magazine/17-03/wp_reboot?currentPage=all.

⁴⁹⁹ For accounts of the extractive role of finance, see GEOFF MULGAN, *THE LOCUST AND THE BEE* (2013); Martin Wolf, Presentation at the London School of Economics and Political Science: Grasshoppers, Ants and Locusts: The Future of the World Economy (Mar. 16, 2011), available at <http://www2.lse.ac.uk/publicEvents/events/2011/20110316t1830vOT.aspx>; PAUL H. DEMBINSKI, *FINANCE: SERVANT OR DECEIVER?: FINANCIALIZATION AT THE CROSSROADS* (2009).

⁵⁰⁰ Frank Pasquale, Book Review, *Big Finance's Best Friend*, Boston Review (Aug. 30, 2012) (reviewing ROBERT J. SHILLER, *FINANCE AND THE GOOD SOCIETY* (2012), http://www.bostonreview.net/BR37.5/frank_pasquale_robert_shiller_finance_good_society.php).

⁵⁰¹ Admittedly, there are admirable efforts to improve data science and economics generally. See, e.g., *Proposed Data Science Code of Conduct*, Rose Business Technologies, <http://www.rosebt.com/1/post/2013/03/open-for-comment-proposed-data-science-code-of-professional-conduct.html> (last visited Apr. 23, 7:22 PM); GEORGE F. DEMARTINO, *THE ECONOMIST'S OATH* (2011).

⁵⁰² NEIL BAROFSKY, *BAILOUT* (2012); Gretchen Morgenson, *Into the Bailout Buzz Saw*, N.Y. TIMES, July 21, 2012, <http://www.nytimes.com/2012/07/22/business/neil-barofskys-journey-into-a-bailout-buzz-saw-fair-game.html?pagewanted=all>.

have tended to pay for higher living standards with debt rather than higher wages.⁵⁰³ With the help of algorithmic models, financiers could justify continuing that pattern in the 2000s, however implausible on their face assumptions like “ever-rising housing prices” might have been. Moreover, the growing complexity, only “understood” by figurative (and occasionally literal) “rocket scientists,” became a rationale for their own outsized compensation. We are told not to be surprised that the sector employs only 4% of workers, but got 20 to 30% or more of corporate profits, because these “winner take all” dynamics are a natural consequence of “skills-biased technological change.”⁵⁰⁴

Wall Street’s quants are frequently praised for spreading innovative algorithms. But few ask the question: is the innovation here simply a better way for the already rich to get richer, or is it actually contributing to higher living standards overall? Algorithms could help investors find, say, companies likely to develop cancer cures over the next few decades. But there is far more demand for recipes for rationalizing asset-stripping and short-term thinking. That combination has devastated many industries over the past two decades. A study from the New Economics Foundation recently estimated that leading London bankers “destroy £7 of social value for every pound in value they generate.”⁵⁰⁵ In the United States, the Kauffman Foundation concluded that an “expanding financial sector” is “depleting [the] pool of potential high growth company founders.”⁵⁰⁶ Why go to the trouble of developing a new product or service when you can take on much less risk (and probably net a far bigger return) as a financier deciding which company merits investment? Whatever one thinks of their methods, at least the NEF and Kauffman are asking tough questions about finance’s role vis-à-vis the real economy of goods and services. Unfortunately, little of the finance literature even tries to assess what part of financiers’ outsized returns are attributable to their outsized power, and what reflects productive contributions to the economy.

⁵⁰³ RAGHURAN RAJAN, *FAULT LINES* 8–9 (2011); ANDREW BACEVICH, *THE LIMITS OF POWER* 44 (2009).

⁵⁰⁴ For more on skills-biased technological change, see David Card & John E. DiNardo, *Skill-Biased Technological Change and Rising Income Inequality: Some Problems and Puzzles*, 20 J. LABOR ECON. 733 (2002), available at <http://davidcard.berkeley.edu/papers/skill-tech-change.pdf>.

⁵⁰⁵ Vincent Fernando, *REPORT: Bankers Destroy \$7 Of Social Value For Every \$1 They Earn*, BUSINESS INSIDER (Dec. 14, 2009, 7:35 AM), <http://www.businessinsider.com/bankers-destroy-7-of-social-value-for-every-1-they-earn-2009-12>.

⁵⁰⁶ Ben Branham & Barbara Pruitt, *The Cannibalization of Entrepreneurship in America: Expanding Financial Sector Depleting Pool of Potential High-Growth Company Founders*, KAUFFMAN FOUNDATION (March 25, 2011), <http://www.kauffman.org/newsroom/expanding-financial-sector-depleting-pool-of-potential-high-growth-company-founders.aspx>; PAUL KEDROSKY AND DANE STANGLER, *FINANCIALIZATION AND ITS ENTREPRENEURIAL CONSEQUENCES* 11 (Kauffman Foundation Mar. 2011) (“financialization, an effect and cause of entrepreneurial capitalism, subsequently cannibalized entrepreneurship in the U.S. economy.”).

Even the most methodologically sophisticated quants can end up rationalizing a corrupt status quo if they fail to grapple with the actual power dynamics within Wall Street firms and the captured regulatory system that allows those dynamics to persist. Whatever their merits in other financial contexts, algorithmic methods played several troubling roles in the run up to the crisis of 2008. They allowed contracts to become so complex that no one was able to understand the consequences when certain unexpected developments happened. They helped fraudulent or reckless entities to hide risk. They contributed to finance's degeneration into an ever more self-referential, self-enclosed system. Especially in the case of high frequency trading, financiers are trying to make money in microseconds from tiny price fluctuations, rather than determining (and backing) the types of investments that actually add to the productive capacity of the economy.

Algorithms tend to enhance productivity and respect human dignity to the extent they (and the data they are based on) are open, contestable, and diverse. Unfortunately, present commercial imperatives and legal rules bias the finance sector to favor algos that fail on all three counts. The algorithms of high-frequency trading are all too often mere rule manipulation or new methods of using brute speed to gain an advantage over rivals. Neither credit scores nor mortgage backed securities have done much to spur investment in a more fair, sustainable, and efficient future.

In principle, complex modeling could promote those goals. But we have now seen numerous instances where computerization and mathematicization of finance merely helped leading firms lull regulators and counterparties into a false sense of security. The burden is now on the advocates of algorithmic finance to demonstrate that its methods on balance actually improve the real economy, rather than merely extract value from it.⁵⁰⁷

⁵⁰⁷ In this vein, I hope to see more volumes in the future like RICHARD L. SANDOR AND RONALD COASE, *GOOD DERIVATIVES: A STORY OF FINANCIAL AND ENVIRONMENTAL INNOVATION* (2012) (describing climate exchanges).