a rule is that a bank's capital-to-asset ratio should be a given percentage. His example of a standard is that bank managers should "manage their affairs prudently and maintain capital adequate to remain safe and sound." Rules foster "predictability and generality." For example, if the rule is to have a minimum capital-to-asset ratio of 10%, bankers know they can sell $1 billion of shares, borrow $9 billion, and buy $10 billion of assets. They know the competition can do that too.

The problem with standards is imprecision. How much capital is enough "to remain safe and sound"? Rules are clear, but they cause "regulatory arbitrage." The simple rule of a minimum 10% capital ratio leaves a bank free to invest in the riskiest assets. Shadow banking is regulatory arbitrage as well. The advantage of a standard relates to the way in which a bank can comply with a rule yet promote systemic risk. Tucker puts it this way: "standards (or a rule for an objective) are preferred by those who regard the state of economic knowledge as insufficient for society to harness itself to a detailed rule book … and who place weight on the avoidance strategies likely to be adopted by regulated industries." If one thinks of rules and standards more as complements than substitutes, effective bank regulation means enforcing rules using judgment guided by standards of financial stability.

Several contributors attest that more bank capital, resolution planning, and stress testing enhance the "resilience" of the financial system. Readers will not encounter details of measuring bank capital, specific resolution plans, or how the Fed conducts stress tests. However, readers will encounter some detailed analyses. O'Halloran and Nikolai Nowaczyk use data science to build a "systemic risk engine" that simulates the effects of regulatory changes. Baklanova and Tanega summarize the post-crisis regulations on money market funds such as liquidity requirements, disclosure of portfolio holdings, liquidity fees, and redemption gates. Mark Roe and Michael Tröge estimate that eliminating the deductibility of interest expense from corporate income would induce banks to increase their capital-to-asset ratios by 6 percentage points. Agostino Capponi explains how derivative clearinghouses work; understanding the intricacies he describes is challenging intellectual labor.

The blindside / To paraphrase Frank, the core of the Dodd–Frank Act pertains to over-the-counter swaps, subprime mortgages, bank capital, resolution of insolvent institutions, and the Consumer Financial Protection Bureau. Despite amendments to the act that increased the asset size of institutions falling under the authority of FSOC and relief for small banks, Frank insists that the core regulations are "essentially unscathed." That, he says, is evidence of success.

Coffee's observation that "crises always come from the blind side" proves to be prescient as COVID-19 stifles the economy. The shock of the pandemic will be the ultimate stress test on the financial system and the regulations that aim to ensure its resilience. *R*

Algorithms: The Life Blood of the FANGs

REVIEW BY VERN MCKINLEY

Algorithms are omnipresent but not always noticeable because they work in the background of our everyday activity. When we follow directions to get our family to that new restaurant, when we apply for a credit card, or when our soon-to-be high school graduate submits a college application, we are interacting with algorithms. These three basic activities have been an integral part of life for generations.

The significant difference is that they are now automated, often with the aid of artificial intelligence such as machine learning. To isolate just one of these three examples, consider how the credit approval process has evolved over the past 100 years. In the early part of the 20th century, a loan was in large measure based on character as judged by a face-to-face meeting with a loan officer, supported by a few pages of paperwork on finances dropped into a loan file. When the credit card industry was in its infancy during the mid-20th century, a retail sales clerk used a rotary phone to call an authorization clerk who would look through stacks of computer-generated paper reports to determine if someone was approved for a credit card or an individual purchase.

That clunky process has been modernized, as explained by Michael Kearns and Erin Roth in their book *The Ethical Algorithm*. They write:

> When you apply for a credit card, your application may never be examined by a human being. Instead an algorithm pulling in data about you (and perhaps also about people "like you") from many different sources might automatically approve or deny your request.

Kearns and Roth are faculty members in the computer science department at the University of Pennsylvania. They specialize in and have published widely on algorithms, machine learning, and algorithmic game theory. Both have also co-authored academic books in this field: Kearns with *An Introduction to Computational Learning Theory* and Roth with *The Algorithmic Foundations of Differential Privacy*. In *The Ethical Algorithm* the authors try to address the less technical reader. To that end, they start with a simplified definition

"重新识别"风险，即暴露数据贡献者身份或其他个人详细信息的可能性

of an algorithm: "a very precisely specified series of instructions for performing a concrete task."

The placement of "ethical" in the book's title makes sense because one of the themes that arises throughout the book is the consideration of the privacy, fairness, and other ethical issues that occur in the development and application of algorithms. The authors also apply game theory to how users interact with algorithms and assess the reliability of data used in typical assessments of algorithms.

Widely applied algorithms / Everyone who follows the financial markets on a regular basis has heard of the "FANG" stocks: Facebook, Amazon, Netflix, and Google. Each of the members of this American technology club has its own famous underlying algorithm that contributed to such phenomenal success. Facebook has its news feed and advertising algorithms, Amazon has its "customers who bought this item also bought" algorithm, Netflix has a similar algorithm to recommend movies, and Google's Search and Maps applications are driven by algorithms.

太好了这个例子

很好的例子

The Ethical Algorithm: The Science of Socially Aware Algorithm Design
By Michael Kearns and Erin Roth
228 pp.; Oxford University Press, 2019

Most of these algorithms fall into the category of "collaborative filtering." According to Kearns and Roth, the description of these algorithms as "collaborative" is because an individual user's data are blended with the available data of others to create recommendations. The authors take this approach frequently throughout *The Ethical Algorithm* as they twin a recognizable or easily explained algorithm with an explanatory, technical term used by computer science experts.

很好的词
协同过滤

它们将个体用户的数据与其他人的数据结合起来以生成推荐

Privacy concerns / Kearns and Roth break down case studies of the increasing lack of anonymity for our personal data because of the expansion of these algorithms. This includes what they call "reidentification," the risk of exposing a data contributor's identity or other personal details. A troublesome example of this phenomenon is the release of fitness data compiled based on contributions of users of Fitbit, an application that allows a user to track progress and set fitness goals. The technology for Fitbit relies on GPS coordinates, which has a benign purpose: to allow precise distance measurements and to enable those who want to keep fit while traveling to determine where popular running routes are in an unfamiliar city. But it also reveals the location of American military bases in countries like Afghanistan because U.S. military personnel are some of the biggest users of Fitbits. Given the dearth of Fitbit users in such countries, it is easy to locate U.S. military bases.

The authors also delve into very sensitive data issues such as health records:

> In the mid-1990s, a government agency in Massachusetts called the Group Insurance Commission (GIC) decided to help academic researchers by releasing data summarizing hospital visits for every state employee. To keep the records anonymous, the GIC removed explicit patient identifiers.

The governor at the time, William Weld, assured voters that patient privacy was protected. "Latanya Sweeney, who was a PhD student at MIT at the time ... set out to find William Weld's medical records from the anonymous data release," Kearns and Roth explain. Sweeney was able to narrow the data set to six records based on Weld's birthday, and then narrowed it down to one because, of the six, "only one lived in the Governor's zip code." In her final act of this research, "She sent them to [Weld's] office."

Kearns and Roth explain the concept of "k-anonymity" as one potential way to address these privacy concerns:

> An initial idea for a solution ... is to redact information from individual records so that no set of characteristics matches just a single data record. Individual characteristics are divided into "sensitive" and "insensitive" attributes.... The goal of k-anonymity is to make it hard to link insensitive attributes to sensitive attributes.

初步的解决思路是从个人记录中删减信息，以确保没有一组特征仅匹配单一数据记录。个体特征被分为"敏感"和"非敏感"属性……k-匿名性的目标是使得敏感属性很难与非敏感属性链接

Applying an accepted definition of fairness / The concept of privacy is something most people understand and appreciate, but the notion of fairness has a broad range of interpretations. Kearns and Roth explain that, in the case of some of the FANG algorithms, "controlled online experiments have demonstrated racial, gender, political and other types of bias in Google search results, Facebook advertising, and other Internet services." Kearns and Roth commit some time to defining fairness in terms of statistical parity in a world of two races of people, Circles and Squares. They write:

公平性的概念却存在广泛的解释范围

Google 搜索结果、Facebook 广告和其他互联网服务中存在种族、性别、政治和其他类型的偏见

> Suppose for some reason we are concerned about discrimination against Squares in the granting of loans by a lender.... Statistical parity simply asks that the fraction of Square applicants that are granted loans be approximately the same as the fraction of Circle applicants that are granted loans, a crude constraint saying that the rate of granted loans has to be roughly the same for both races.

After walking through the mechanics of how this would work in practice, Kearns and Roth summarize the two likely results of developing an ethical algorithm: "one by denying loans to creditworthy Circle applicants and the other by granting loans to Square applicants we know (or at least predict) will default." They conclude that "in an era of data and machine learning, society will have to accept, and make decisions

about, trade-offs between how fair models are and how accurate they are." Similar choices are presented in the case of having a "fair" university application process.

Conclusion / The authors open the book by making the argument that, rather than addressing these algorithm tradeoffs through post hoc regulations, "the idea is to fix them from the inside." One example of this approach is the k-anonymity concept, which was a solution to reduce the likelihood of reidentification. The authors also talked early on about developing "quantitative definitions of social values that many of us can agree on."

与其通过事后监管来解决算法的权衡问题，不如"从内部解决这些问题

I was expecting a final chapter (or two) that would bring home the strains of thought on these topics, but the final chapter was a bit of a disappointment. It is quite brief (half a dozen pages) and the final discussion of design of ethical algorithms ended abruptly, relying on a "case-by-case" approach to developing solutions, although many of the solutions posited throughout the book were helpful in giving a sense of possible approaches. The authors emphasize that avoidance of algorithms is simply not an option, as their omnipresent and growing nature means that it is not at all possible to "avoid algorithms altogether ... [as] all decision-making—including that carried out by human beings—is ultimately algorithmic."

I admit that I was a bit out of my comfort zone in reading this book. The case studies on the FANG companies were understandable and relatable, as I had not given much thought to how these algorithms come together. But the discussions of the technical issues were a tough climb at times. I consider myself comfortable with high-level discussions about statistical and technology issues, but some of the terminology on computer science was a bit too much in the weeds for my taste. They became difficult to follow once Kearns and Roth strayed from the case studies and tried to link them to statistical or technology concepts.

Serves me right for accepting a book recommendation from someone who has a doctorate in economics. R

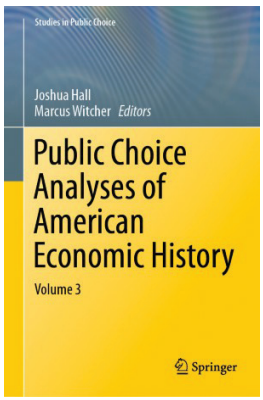
A Potentially Fruitful Collection

REVIEW BY ART CARDEN

West Virginia University's Joshua Hall is the very definition of an academic entrepreneur: someone who notices a misalignment in production and realigns it. This collection, edited by Hall and historian Marcus Witcher of Huntingdon College, is an example of such entrepreneurship and a timely contribution in light of the ways in which economics—and public choice economics in particular—have come under fire from the "new history of capitalism."

I talked with Hall about this project at the 2019 Southern Economic Association meeting. He described his and Witcher's strategy for the collection: they looked for interesting papers that have circulated or sat in filing cabinets for quite some time—decades, in some cases—unpublished. This is how they got contributions from a mix of young, more established, and very prominent scholars. There are a lot of names that will be very familiar to readers of the public choice literature and there are contributions from several prominent economic historians.

Suffice it to say that I am sympathetic to this project (and, I should acknowledge, professionally and personally acquainted with some of the contributors). Hence, I worried that I would have too-great expectations for the project. Nonetheless, it largely does not disappoint. Some of the contributions are straightforward cliometric—quantitative/historical—analysis applied to political issues. Others read like proposals or proofs of concept. Some of the analyses, like the papers by Phil Magness on southern secession and Jayme Lemke and Julia Norgaard on the role of "club women" in the provision of public goods, are counterexamples—critics might say the exceptions that prove the rule—to the criticism that public choice ignores issues of race, class, and gender.



***Public Choice Analyses of American Economic History*, vols. 1–3**

Edited by Joshua Hall and Marcus Witcher

199, 178, and 206 pp.; Springer, 2018–2019

What scholars should write / The set begins promisingly with a contribution from King's College economist Vincent Geloso that marries one of the traditional concerns of public choice theory—public debt and budgeting—with the oppression of a minority and an explanation of the American Revolution. Geloso studies the expulsion of the French-speaking Acadians from Atlantic Canada beginning in 1755 and points out some familiar tropes that will be familiar to observers of oppression. (For instance, the Acadians were "lazy" according to stereotypes). He explains how their expulsion was basically a land grab by British settlers cloaked in bias against French-speaking Catholics and the language of security. It was, he argues, part of a fiscal debacle that contributed to the American Revolution.

The volumes in *Public Choice Analyses of American Economic History* contain several contributions on the American founding specifically and the less-than-perfect compromises that made the U.S. Constitution possible. A chapter by University of Akron economist Robert McGuire