

# Symmetric ignorance: The cost of anonymous lemons

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## Abstract

Rules that restrict information required in negotiated private transactions have spurred a vast increase in the scope of anonymous financial markets, particularly in the United States. The subtle costs of the information-restricting rules raise questions about the social value of “completing” anonymous markets that would not naturally survive and did not historically exist.

## KEYWORDS

information asymmetry, liquidity, regulation, securities markets, securitization

## JEL CLASSIFICATION

G10; G18; G28; G38; K22; N2

## 1 | SYMMETRIC IGNORANCE: THE COST OF ANONYMOUS LEMONS

Continuous anonymous markets that can range from open outcry “pits” to exchanges with specialist market makers to “over-the-counter” trading networks, provide well-known benefits such as immediate and low-cost transactions (Demsetz, 1968). However, anonymous trading precludes measures such as direct inspection, reference checks, and postpurchase recourse

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widely used to reduce “lemon” problems (Akerlof, 1970) in private transactions. Instead, I argue, rules in many financial markets, such as restrictions on insider trading in stock markets, reduce information asymmetries by symmetrically restricting information. In other words, though anonymous trading naturally limits what buyers can know, the enabling rules increase everyone's ignorance.

This argument questions claims that Schumpeterian innovation has increased the scope of anonymous financial markets. R. Rajan (2006), for instance, argued that new information and financial technologies developed in the previous 30 years had helped spur deregulation and institutional change. These changes had combined to move many financial transactions “from being embedded in a long-term relationship between a client and a financial institution to being conducted at arm's length in a market. In many parts of the world where relationship banking had dominated, arm's length corporate bond markets and equity markets had expanded ... Increasingly, only the most complicated, innovative, or risky financial transactions are embedded in relationships” (R. Rajan, 2006, p. 504). Rajan further reported that the changes had produced “beneficial real effects, increasing lending, entrepreneurship, and growth rates of GDP, while reducing costs of financial transactions,” (R. Rajan, 2006, p. 504) although they had increased the misalignment of incentives.

*Contra* Rajan, my historical and institutional analysis suggests that: 1) Information restricting rules, not “deregulation” that unleashed competitive forces, spurred the expansion of anonymous markets. 2) Public policy choices, rather than new technologies, spurred the imposition of these rules. 3) Increasing the scope of anonymous markets by inducing symmetrical ignorance has subtle costs that can offset the more obvious benefits of anonymous markets.

## 1.1 | Exceptional anonymity

Competing, unconditional bids and offers for standardized goods or claims (such as copper bars or U.S. government bonds) that may be made on behalf of anonymous buyers and sellers, self-evidently support immediate, low-cost transactions in anonymous markets. But these very features also self-evidently require restricting information about specific items and sellers and exclude recourse to buyers who later regret their purchases.

These information and recourse restrictions have historically limited anonymous markets in tangible goods mainly to metals and agricultural commodities where a few, easily verifiable specifications can sustain continuous arm's length trading. For instance, buyers of copper care about purity, not about who mined the metal or where. Exchanges can, therefore, sustain anonymous markets in copper by specifying purity and some delivery terms acceptable to many buyers and sellers. Moreover, copper exchanges provide benefits that offset the inflexibility of standardized terms. Transactions do not require time-consuming or costly negotiation. Buyers can reduce the risk of idiosyncratic supply disruptions that might arise from an accident at a particular mine; conversely, sellers are protected from the bankruptcy of a particular buyer.

However, easily standardized commodities are exceptional. When goods have many valued attributes, buyers face considerable problems in verifying quality and fit with their preferences. Transactions, therefore, require some combination of direct examination, knowledge of seller reputations, and credible after-sales recourse. Houses, for example, are not purchased over trading screens by the square foot the way copper is bought by the ton. Rather, homebuyers assess properties for a good fit with their preferences and make bids contingent on a home inspection. Branded products sold in sealed packages cannot be examined; but they are usually sold by reputable producers who typically offer 30-day returns and extended warranties. Also, the

examinations, reputations, and warranties that enable mutually beneficial transactions in complex goods preclude anonymous trading.

Similarly, anonymous markets in financial claims are most easily sustained when buyers care mainly about a few easily verifiable terms and, therefore, do not worry about concealed adverse information. For instance, traders of quintessentially “information-insensitive” government bonds mainly care about the coupon and time to maturity. This is not the case, however, for claims whose attractiveness depends on complex attributes. Here, as with residential properties, the value of comprehensive case-specific information in assessing the risks and returns—including the risks of buying from better-informed or overconfident issuers and sellers—discourages unconditional sight-unseen bidding. For instance, investors would not normally purchase shares in a startup without access to the confidential information that startups only provide to credible investors, such as reputable venture capitalists, under non-disclosure agreements. Private transactions can also include provisions whereby payments to sellers partially depend on the subsequent achievement of milestones.

Investors in some financial claims accept restrictions on information to secure the benefits of immediate, low cost trading in anonymous public markets. For instance, purchasers of publicly traded corporate bonds forgo the confidential information that borrowers provide to lenders in securing bank loans. However, certification by underwriters who have access to confidential information (which we can think of as “indirect examination”) provides some comfort to investors. Bond covenants also provide some postpurchase recourse; some bonds even include put options.<sup>1</sup>

## 1.2 | Fragile origins

Anonymous financial markets originated in English government bonds issued in the 1690s to fund a war against France. Information asymmetry problems in tradable government bonds were inherently low because governments could levy taxes and issue money. Indeed, unlike bank loans made to private borrowers, bonds issued by credible governments were not—and still are not—backed by collateral nor do they have covenants. “Covered” bonds backed by real estate were created by Frederick The Great in Prussia in 1769 after the Seven Year War (1756–1763) and in Denmark in 1795 after the Great Fire of Copenhagen.

In the United States, most publicly traded securities consisted of government issues until the 1870s. (The first insider trading scandal, implicating William Duer, an Assistant Secretary of the Treasury in the 1790s, involved government bonds.) The financing needs of 19th-century railroads—and, later, other large industrial enterprises—then made raising capital from diffused providers a necessity. This, in conjunction with a highly fragmented banking system in the United States, helped spur the development of anonymous markets in railroad and industrial bonds and underwriting firms that certified and sold the bonds. Certification by underwriters was not always effective, however, and the bond market was prone to periodic panics and collapses.

U.S. stock markets in the 19th and the first decades of the 20th century were narrower and more fragile. “Before 1920,” Baskin writes, “there were no large-scale markets in common

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<sup>1</sup>At the same time, markets in corporate bonds are not as liquid as markets in U.S. government bonds, even though the government does not provide confidential information to underwriters or include covenants in its bonds.

stock... Shares were viewed as akin to interests in partnerships and were simply conveniences for trading among business associates rather than instruments for public issues” (Baskin, 1988, p. 222). Promoters of canals and railroads—the few businesses organized as joint-stock companies—restricted ownership to known investors whom they believed to be “both wealthy and committed to the enterprise.” The public at large perceived equities as “unduly speculative,” and “tales of the South Sea fiasco evoked instant horror” (Baskin, 1988, p. 216).

Vinzant (1999) similarly observes that, through the early 20th century, the stock market was considered “a shadow world in which only the initiated could find their way.” Most companies raised money from the public through bonds. Of the 1,200 public issues listed in 1900, “fewer than a quarter were stocks, and nearly half of those were railroads.” Emerging high technology companies of the time relied mainly on private funding. DuPont family money helped Durant (and later Alfred Sloan) build General Motors. Investors represented by J.P. Morgan helped Vail build AT&T and Coffin create the modern General Electric.

### 1.3 | Securities Acts

Between 1 September 1929 and 1 July 1932, stocks listed on the NYSE lost 83% of their total value and half of the \$50 billion of new securities which had been offered in the 1920s proved to be worthless (Seligman, 1982, p. 1). The Crash, according to the Securities and Exchange Commission (SEC), brought the “country’s business and financial systems to the verge of disaster.” It followed a decade in which some 20 million shareholders “took advantage of the postwar prosperity and set out to make their ‘killing’ on the stock market,” but gave “little thought to the inherent dangers” (SEC, 1984, p. 7).

The Crash led to landmark securities legislation in the form of the Securities Act and Securities and Exchange Act, as well as the creation of the SEC. A legal expert at the time observed that “until the advent of the New Deal, the law relating to security markets has been characterized by gradual growth rather than by abrupt change... [W]hat has heretofore been evolution has become revolution” (Meyer, 1934, p. 11). The response to earlier panics had been to let the victims bear the consequences and prosecute frauds and cheats. The Securities Acts, however, sought to protect investors before they incurred losses in three ways: Ensuring adequate disclosure by firms to investors, discouraging the unfair use by insiders of information which is not made public (Meyer, 1934, p. 11) and eliminating “manipulation and sudden and unreasonable fluctuations of security prices” (Section 2 of the 1934 Act).

*Disclosure rules* required issuers of publicly traded securities to file registration statements containing information about the directors, officers, underwriters, and large stockholders (and their remuneration), as well as about the organization, its financial condition, and its material contracts. Issuers were also required to file annual and quarterly reports, whose form and detail could be prescribed by the SEC (Meyer, 1934, p. 19–20). The disclosure regulations were backed by a variety of enforcement devices: The securities laws provided criminal penalties for willful, material false or misleading statements and empowered the SEC to suspend or withdraw the registration of securities for failure to comply with the reporting provisions of the Acts.

*Insider trading rules* of the Securities Exchange Act sought to prevent “the unfair use of information” by corporate officers, directors, or stockholders who owned 10% or more of the firm’s equity. Accordingly, the Act required every such “insider” to report their ownership of all equity securities. The Act also provided that any short-term profits realized by insiders (i.e., due to purchases and sales within any 6-month period) shall “inure to and be recoverable by” the

company. The SEC zealously prosecuted the insider trading provisions of the 1934 Act, and, arguably, expanded the scope of its provisions. For example, in the 1966 Texas Gulf Sulfur case, the SEC first asked a federal court to order outsiders to make restitution to shareholders who sold them stock (SEC, 1984, p. 46). In the 1980s, the SEC began to seek jail terms for insider trading and the 2009 Galleon case broke new ground through the use of wiretaps.

*Rules to eliminate market manipulation* in the 1934 Act prohibited sham transactions and subjected other practices (such as stop loss orders and short sales) to regulation by the SEC. The SEC could also close exchanges that did not adequately enforce antimanipulation rules. The SEC soon used its powers to close nine stock exchanges, and, in the late 1930s, Chairman William O. Douglas virtually threatened the NYSE with takeover by the SEC if reforms were not instituted (Phillips & Zecher, 1981, p. 12).

Disclosure rules, backed by criminal penalties, increased the uniform availability of reliable information. However, the rules did not require disclosure of confidential information and plans, which if made public, would harm stockholders' interests. Insider trading rules that forbade trading on material, nonpublic information discouraged investors from expending resources to secure confidential information. At the same time, the expectation of unmanipulated trading under stringent disclosure and insider trading rules encouraged investors to purchase widely diversified portfolios. Wide diversification reduced incentives to investigate the prospects of individual companies. In other words, securities rules helped reduce information differentials by symmetrically reducing information production.

Securities rules could not, however, reduce lemon problems in the "primary" issuance of stocks to the same degree as they could in the secondary trading of previously issued securities. Inevitably, issuers have material, nonpublic information. They also have the incentive to issue stocks when they believe prices are unduly elevated; the securities laws only discourage outright fraud or hiding material risks. Investors who expect well-timed issuance will in turn be more reluctant to buy newly issued stock. The protections of the securities laws notwithstanding, this lemon problem, therefore, tends to "bunch" stock issuance to "windows" of unusual investor optimism. However, because stocks don't have a termination or maturity date, even opportunistic issuance can produce a "float" of interchangeable claims that can sustain active trading in secondary markets. (The lemon problem of primary issuance is less acute in high-grade bonds of blue-chip companies because outside investors can more confidently assess creditworthiness. Issuance of bonds—which do mature—therefore, tends to be more routine).

## 1.4 | Indications of effectiveness

In 1984, the SEC celebrated its 50th anniversary. Its then-Chairman John Shad wrote that when the agency had been created, in the depths of the depression, the nation's securities markets were demoralized. "Today," he observed, "they are by far the best capital markets the world has ever known—the broadest, the most active and efficient, and the fairest. The SEC has played an important role in the restoration of public confidence...[and] has discharged with distinction its mandate to protect investors and maintain fair and orderly markets" (SEC, 1984, p. 1).

Shad's claim could not be definitively validated—and the SEC had not made stock issuance in the U.S. routine. As Baskin (1988, p. 213) reported four years later, large public corporations in the US, as in all major industrialized nations, issued common stock to raise funds "only in the most exigent circumstances," and that "funds raised by new equity issues—especially by established firms—appear[ed] to be relatively insignificant." Nonetheless, the limited liquidity

and breadth of many European markets, where securities regulation was relatively weak, bore out Shad's claims.

Transaction costs in the United States through the 1980s were half the level of Germany, Italy, and Japan, which were the next most liquid stock markets. Restraints on insider trading, disclosure requirements, and manipulative practices were much weaker in the less-liquid markets outside the United States. Most countries in Europe did not have statutes against insider trading until the European Community directed member countries to adopt a minimum level of shareholder protection laws by 1992. The U.S. occupation forces instituted laws against insider trading in Japan after World War II, but officials exercised “benign neglect” of the rules (The Economist, 19 May 1990, p. 91).

After European and other regulators adopted U.S.-style insider trading and other investor protection rules, those stock markets caught up with U.S. stock markets in breadth and depth. There is nothing to suggest, *contra* R. Rajan (2006) that information technology played any role either in first holding back stock markets outside the United States or then spurring their catch up.

## 1.5 | Sustaining securitization

As other countries adopted U.S.-style securities rules and their stock markets started catching up after the mid-1980s, credit tradable in anonymous markets in the United States began a transformative expansion. Previously, most tradable private debt had comprised obligations of large creditworthy companies (where, as in government bonds, concerns about information asymmetries are naturally lower). After the 1980s, it included significant amounts of securities created by pooling residential mortgages, credit cards, auto loans, and other such consumer debt. The stock of such tradable “securitized” debt outstanding grew from about \$800 billion in 1987 to over \$4.5 trillion in 2001, and despite a decline after the 2008 crisis, recovered to about \$8.3 trillion in 2014.

Secondary trading in securitized debt benefitted from securities rules discussed earlier, but primary issuance—a prerequisite for secondary trading—posed distinctive problems. Securitizing small loans, that regularly mature or get repaid, requires a routinized, high-throughput system. Organizations that produce securities cannot rely on their opportunistic issuance in favorable markets, unlike issuers of common equity. They must also originate many loans to produce an issue with tradable “float.” For instance, producing a \$1 billion float—now considered the minimum necessary for a tradable issue—requires pooling hundreds of thousands of credit card obligations.

Producing (“originating”) the underlying loans itself poses information asymmetry problems, because loan applicants can exaggerate their creditworthiness. But, hiring and controlling a staff to screen hundreds of thousands of loan applications poses organizational challenges. And, because turnover of the lending staff can be high, their screening mistakes can be unpredictable, especially for outside purchasers of securitized loans. Moreover, good screening of loan applications increases the concerns of outside purchasers that loan originating organizations will selectively securitize their bad loans. In other words, reducing information asymmetries in loan screening (by securing more information about the ultimate borrowers) increases the information asymmetry problems of issuing securities to investors.<sup>2</sup>

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<sup>2</sup>This problem does not arise with European “covered bonds” backed by mortgage loans. Banks who originate the mortgages have full responsibility for interest and principal repayments on the bonds and, therefore, have no incentive to “keep” their good loans to themselves. Covered bonds are thus simply safer versions of traditional industrial bonds (which are usually not secured by specific collateral).

Statistical models to screen loan applications can reduce reliance on the quality and diligence of front-line lending staff. But models cannot solve the information asymmetry problems of issuance: Securitizing organizations may exaggerate the accuracy of their models or use statistical screening to sell just high-risk loans. A private equity investor negotiating the purchase of a loan portfolio can ask to check the models, applications, and loans. This direct examination is impossible when selling securitized loans to diffused public investors.

The U.S. government's fair-lending rules and mortgage guarantee programs have helped reduce this lemon problem by encouraging originators of mortgages and other consumer loans to rely on credit scores, commonly referred to as FICO scores, produced by credit bureaus (as I detailed in Bhidé, 2017).

### 1.5.1 | Fair lending rules

Bank regulators enforcing the 1968 Fair Housing Act and 1974 Equal Credit Opportunity Act subject lenders who use “judgmental” systems or “customized” statistical credit scoring models (instead of FICO scores) to more scrutiny. Regulators worry that subjective judgments may reflect unwarranted biases and customized models may contain variables, such as education, that could correlate with prohibited factors like race, ethnicity, and gender. Customization isn't prohibited but it can require lenders to provide a “business justification.” Regulators also subject lenders who permit “discretionary overrides” of credit scores to more scrutiny, especially if lenders allow staff in their branches (rather than at headquarters) to overrule scores.

My interviews suggest that these fair-lending rules have significantly influenced lending practices, particularly of large banks whose size alone tends to attract regulatory attention. Thus, banks with nationwide branch networks do not allow any discretionary overrides of score results by local staff. And though some large lenders may customize their scoring models (rather than rely on outsourced FICO scores), they typically take (or claim to take) measures to exclude or limit the influence of variables that could have “disparate impact” under fair-lending rules.<sup>3</sup>

### 1.5.2 | Mortgage guarantee programs

U.S. government-“sponsored” agencies, notably Fannie Mae and Freddie Mac, now guarantee most new residential mortgages in the U.S. against defaults by borrowers. The guarantees in turn support the issuance of trillions of dollars of mortgage-backed securities. But because very little capital supports the guarantees, the credibility of the protection that Fannie and Freddie offer investors depends on their capacity to limit loan defaults. The government, widely regarded as a backup guarantor, also has reason to worry about default rates.

Until the mid-1990s, the agencies used “thick books of underwriting guidelines” that were “stringently designed” to screen mortgages originated by brokers and banks. Yet, unscrupulous

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<sup>3</sup>Why then do credit card issuers even bother developing proprietary models with variables that only have a modest impact on outcomes? My interviews suggest that card issuers believe that, on the margin, including more variables reduces losses on the high-risk tranches issuers usually retain to mitigate information asymmetry concerns. Issuers also hope that if they can convince investors about the superior quality of their models, they may realize slightly higher prices for their securities. They balance this hope, however, against the risk of regulatory problems if superior scoring produces “disparate impact.”

originators found loopholes and the costs and time required to verify applications limited the loans guaranteed (Poon, 2009, p. 661–663).

During the mid-1990s, the agencies automated screening to increase mortgage guarantees by cutting costs and times, and to prevent racial discrimination by removing “subjective reasoning” (McDonald et al., 1997, p. 861). As the complexity of existing rules made computerizing them difficult, the agencies developed an algorithm based on FICO scores to simplify screening of applications (Freddie, 1996).

By 1997, Fannie Mae reported significant reductions in time and effort spent on processing loans (McDonald et al., 1997); the net issuance of mortgage-backed securities guaranteed by Fannie Mae and Freddie Mac jumped from \$127 billion in the first half of the 1990s to \$314 billion in the second half of the decade. The example set by U.S. government agencies—and fair lending laws that applied to housing as well as consumer credit—also encouraged the use of FICO in evaluating mortgages that weren’t eligible for Fannie Mae and Freddie Mac guarantees, such as “jumbo” mortgages. In this way, FICO scoring became “hardwired throughout the [mortgage] industry” (Poon, 2009, p. 661).

The use of credit-bureau scores to discourage discriminatory lending and evaluate mortgage applications was itself predicated on credible credit reporting promoted by lawmakers. In the 1950s and ’60s, as Bank of America and Citibank started marketing credit cards in states where they weren’t yet allowed to have branches, they used credit bureau scores to screen applications. Growing use of these scores by card issuers prompted the U.S. Congress to enact the Fair Credit Reporting Act of 1970. The Act, which forbade lenders from providing inaccurate information to credit bureaus and required the bureaus to ensure maximum possible accuracy helped increase confidence in credit-bureau scores, which promoted even wider use of the scores to extend credit.

Relying on outsourced scores and credit analysis helped reduce lemon problems of issuing securitized loans. By restricting the information loan originators themselves got and used—and by forgoing discretionary overrides based on local knowledge of individual applicants—issuers could credibly tell investors almost everything of the little they knew. Additionally, less accurate credit screening would not trouble buyers of securitized loans, as long as they received an interest rate commensurate with the symmetrically reduced information.<sup>4</sup>

## 1.6 | Indications of FICO promotion effects

Securitization has lagged in Europe just as stock-trading once had before regulators adopted U.S.-style rules. In 2001, the amount of mortgage-backed and asset-backed securities outstanding in Europe was less than 6% of the amount outstanding in the United States. Although there was catch-up in the credit boom (now often considered nearly a mania) preceding the 2008 crisis, from 2009 onwards more mortgage-backed and asset-backed securities were retired in Europe each year than were issued. By 2014, European mortgage-backed and asset-backed securities outstanding had fallen back to below one-fifth of U.S. levels, amounting to a difference of more than \$5 trillion.

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<sup>4</sup>Additionally, generic scoring has facilitated the securitization of mortgages and other consumer loans that are not guaranteed by government agencies by making the securities more fungible and easier to analyze (Adelson and Bartlett, 2004).



Bernanke and Lown (1991) argued that the “main impetus” for securitization were rules that increased the capital costs of holding loans to maturity and, as mentioned, R. Rajan (2006) suggested that new technologies had spurred securitization. But capital requirements and technology cannot explain the large difference in European and U.S. securitization; capital requirements were virtually identical until 2004 and the same technology was available on both sides of the Atlantic. Nor can a general aversion to market-based debt explain the size of the gap; in recent years, issuance of investment-grade corporate bonds in Europe has exceeded U.S. issuance. Similarly, proceeds from “high-yield” corporate bonds issued in Europe have not lagged to the same extent as they have in securitized debt.<sup>5</sup>

High securitization in the United States is consistent, however, with differences in information production rules. European rules do not encourage lenders to rely on scores calculated by credit bureaus. Historic and contemporary rules in Europe have effectively, if unintentionally, discouraged the development of U.S.-style credit scoring. Therefore, generic credit scores have not become popular in Europe despite the efforts of the European subsidiaries of U.S. credit bureaus to propagate their use. The absence of U.S.-style fair-lending rules has allowed European banks to use more customized scoring models that use proprietary customer information as inputs. Unlike their U.S. counterparts, many large European banks allow branch staff to override their credit scoring models and some even require their local staff to review scores. But, as mentioned, good screening of loan applicants makes issuing securitized loans harder. Investors who worry that more information about borrowers gives banks more scope for selectively securitizing bad loans will demand commensurately high rates. In fact, my simulations (Bhidé, 2020) suggest the large information asymmetry “penalty” that potential buyers require may preclude securitization of well-screened loans.

The same argument also helps explain why differences in the securitization of small-business loans between the United States and Europe have been trivial. Fair-lending rules in the United States that support the widespread use of consumer scores do not apply to business borrowers. Unlike Fannie Mae and Freddie Mac, the U.S. Small Business Administration does not mandate the use of generic bureau scores for the loans it guarantees. Also, because the information asymmetry problems that hinder securitization are as severe in the United States as in Europe, small-business loans account for less than 1% of securitized U.S. debt outstanding.

## 1.7 | Costs of symmetric information restriction

Rules that enable anonymous trading of financial claims by symmetrically restricting information—and the tradability itself—also impose a variety of costs.

Impaired governance is an often-overlooked consequence of anonymous stock markets. Insider trading rules, for instance, discourage investors from playing an active “insider role” that would compromise the liquidity of their holdings, as Roe (1990) points out. Likewise, unmanipulated low-cost stock trading encourages passive indexation of portfolios. But, active, inside stockholding is crucial for good governance because evaluating a firm’s management is, necessarily, highly subjective. Stockholders must weigh observed outcomes against their *guesses* about what would have happened if managers had followed different strategies. Active

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<sup>5</sup>And, as mentioned, European banks have a very long tradition of issuing bonds backed by mortgages. Crucially, however, the bonds are the liabilities of the issuing banks, not of a special entity or trust created to pool and sell securitized interests in the mortgages.

stockholders who obtain confidential data and maintain close contact with managers enjoy obvious advantages in making these subjective evaluations.

Monitoring by bondholders who do not have access to confidential information is also more limited than in lending by banks. Reduced monitoring is, however, less consequential for bondholders promised fixed payments than for stockholders whose residual claims are more sensitive to what managers do. Therefore, as mentioned, high quality bonds are naturally more tradable in anonymous markets.<sup>6</sup>

Rules that help securitization by inducing reliance on generic FICO scores (instead of customized models), while limiting local review of the scoring results, will tend to increase unwarranted lending and defaults as research on mortgage lending by U. Rajan et al. (2014) suggests.<sup>7</sup> Increased defaults in turn will tend to increase the rates charged to borrowers, likely contributing to a multi-decade high rate of 17.8% on credit card balances in July 2019 when rates on risk-free government debt were in the low single digits (Armstrong, 2019). Therefore, though fair lending rules (and reliance on bureau scoring) have likely increased lending to minorities and women (Ryan et al., 2011), such rules have also likely increased the indebtedness of overconfident borrowers and required creditworthy borrowers (including minorities and women) to pay higher rates.

## 1.8 | Concluding comments

New technological antidotes to information asymmetry problems have given buyers of many nonfinancial goods and services more scope to examine goods, investigate track records of sellers, and secure postpurchase recourse. For instance, online marketplaces such as Airbnb provide pictures of the lodgings offered and ratings of the hosts. Amazon's marketplace provides pictures, ratings, and swift returns. But purchases made from remote and previously unknown sellers on these innovative "platforms" contrast sharply with anonymous transactions without "prior personal examination of the goods," which Demsetz (1968, p. 50) calls a distinguishing characteristic of organized public exchanges.

In many financial sectors technological advances have played a very different role of supporting the anonymous trading and issuance of financial claims. Computerized algorithmic and high-frequency trading now accounts for more than half of U.S. stock-trading volumes (Seth, 2019). Bank and non-bank lenders now mail more than 3 billion automated offerings of credit cards and other personal loans to U.S. consumers each year and websites offer "instant approval credit cards." This use of technology to increase trading volumes and issue more anonymously tradable securities was not foreordained. Like their European counterparts, U.S. banks could have developed customized credit-scoring algorithms to better identify creditworthy borrowers. This would in turn have limited the growth of securitized consumer credit.

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<sup>6</sup>The absence of confidential information and joint-action problems created by diffused ownership do, however, hinder ongoing adjustments, such as waivers or modifications of covenants. These and other tradeoffs of issuing corporate bonds instead of borrowing from banks have been extensively analyzed in Diamond, 1984; R. Rajan, 1992; Townsend, 1979; Petersen and Rajan, 1994, 1995; Berger and Udell, 1995; Boot, 2000; Cole, 1998; Elsas and Krahn, 1998; Degryse and van Cayseele, 2000; Agarwal and Hauswald, 2010; Berger and Udell, 2002.

<sup>7</sup>U. Rajan et al.'s (2014) finding that purely statistical lending leads to more defaults clearly supports the hypothesis that relying on generic scores increases lending mistakes. Other researchers, mistakenly in my view, attribute the higher defaults to willfully "lax screening" of securitized loans rather than to rules that encourage loan originators to stick to FICO scores—and thereby facilitate securitization.

Instead, securities, fair lending, and credit-reporting laws, and government-sponsored housing finance agencies favored more active and complete anonymous markets. Yet, given the many direct and indirect consequences, the overall public benefit of reducing information along with information asymmetries is debatable.

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