

Formulaic Transparency: The Hidden Enabler of Exceptional U.S. Securitization

by Amar Bhidé, Tufts University*

In 1984, then-SEC Chairman John Shad wrote: *Fifty years ago, in the depths of the depression, the nation's securities markets were demoralized. Today they are by far the best capital markets the world has ever known—the broadest, the most active and efficient, and the fairest. The Securities and Exchange Commission 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.*¹

In a 1993 *Journal of Financial Economics* article, I argued that Shad's claims were well founded²—and subsequent events vindicated my argument. When 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.

In the area of securitized debt backed by residential mortgages, credit cards, auto loans, and other such consumer debt, however, U.S. capital markets expanded much more rapidly than in Europe. In 2001, the amount of mortgage-backed and asset-backed securities outstanding in Europe was less than 6% of the amount outstanding in the U.S. Although Europe caught up a bit in the credit boom 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 (Table 2), a difference of more than \$5 trillion.

A common explanation attributes this securitization gap to an immutable preference for market-based credit over bank borrowing in the U.S. But this explanation ignores the convergence that has occurred in other kinds of tradable claims after European regulators adopted U.S.-style securities rules. In recent years, proceeds from the issuance of investment-grade corporate bonds in Europe have actually exceeded proceeds from U.S. issuance. “High-yield” corporate bonds issued in

Europe have lagged U.S. issues, but not to the same extent as they have in securitized debt, even though high-yield corporate bonds are also a 1980s innovation that displaced traditional bank lending. And the gap between the U.S and Europe in new stock offerings is even smaller (as can be seen in Figure 1 and Table 3). In other words, a significant portion of the multi-trillion-dollar difference in mortgage-backed and asset-backed securities outstanding cannot plausibly be attributed just to a general European aversion to market-based finance or to financial innovation.

In this article, I argue that just as unusually favorable rules had once made U.S. stock markets exceptionally broad and deep, securitization in the U.S. has been spurred by distinctive policy interventions. U.S. rules have strongly encouraged originators of mortgages and other consumer loans to rely on credit scores (commonly referred to as FICO scores) produced by credit bureaus. And reliance on scores that loan originators use but don't produce helps overcome the information asymmetry problems that would otherwise constrain securitization.

My argument turns the usual concern about securitization on its head: Whereas transferring risks to investors is normally expected to *discourage* careful screening of borrowers, I argue that limited, formulaic screening actually *enables* risk transfer by reducing information asymmetry problems.

This framing of the loan originator's ignorance as the investor's bliss exemplifies a general regulatory tradeoff: rules that limit the acquisition of information play a pivotal role in making financial claims tradable in public markets. In equity markets (I argued in the 1993 *Journal of Financial Economics* article mentioned above) insider trading rules discourage stockholders from securing confidential information; this helps assuage the concerns of buyers about buying stock from better informed sellers. In this article, I argue that limiting the information that loan originators use to assess the creditworthiness of borrowers facilitates the large-scale securitization of mortgage and consumer loans.

The trade-off has implications for policy makers on both

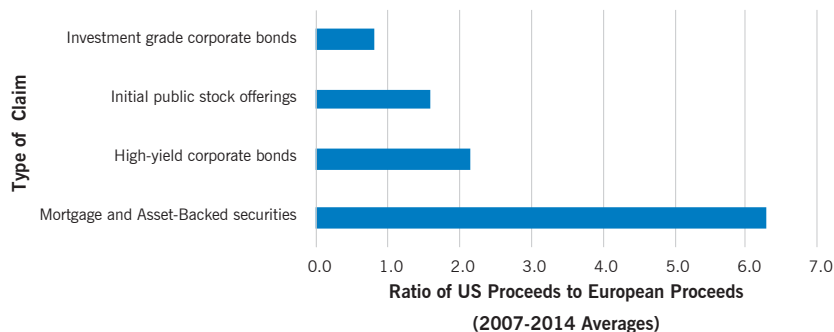
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1. SEC (1984, p. 1). References at the end provide full citations of all articles cited in the text or footnotes.

2. Bhidé (1993).

Figure 1 Proceeds from newly issued financial claims: US vs. Europe



sides of the Atlantic: European regulators cannot expect to create U.S.-style securitization without restricting the scrutiny of borrowers by European lenders—and U.S. regulators cannot significantly increase the scrutiny of consumer and mortgage loan applications without reducing the securitization of loans made to U.S. borrowers.

How U.S. Policies Encourage Reliance on FICO Scores

Fair lending rules. U.S. regulators enforcing the 1968 Fair Housing Act and 1974 Equal Credit Opportunity Act distinguish between “judgmental” systems and statistical credit scoring. Lenders who use judgmental systems undergo more detailed scrutiny by regulators for possible violations of fair-lending laws. But merely using statistical scores does not shield lenders from additional scrutiny because fair lending examiners consider two additional factors.

The first is the extent of “discretionary overrides.” The Federal Deposit Insurance Corporation (FDIC) instructs its fairness examination staff that “[t]he more discretion bank staff is permitted in overriding a credit scoring system and the greater the number of staff with override authority, the greater the risk that the discretion will be exercised discriminatorily.”³ Consequently, lenders that allow front-line loan originators to extend credit to individuals with low scores or deny credit to individuals with high scores face more regulatory scrutiny.

Second, regulators distinguish between “generic credit history scoring models” and “customized” scoring. Generic scores, such as FICO scores, are based on samples of *all* records in credit bureaus and are calculated on the basis *only* of the variables that are contained in bureau records. Notably, an individual’s income and assets are not contained

in bureau records and therefore do not directly affect FICO scores. In contrast, regulators consider scores “customized” if the scoring models are derived from samples of the lenders’ current or prospective customers (rather than from unbiased samples of all individuals in bureau databases) and if the models include variables (again, such as incomes) not contained in credit bureau records.⁴

If a lender uses generic scores, effectively outsourcing its credit screening, the FDIC guide advises that “the examiner does not need to obtain more information about the scoring system.”⁵ In contrast, custom scoring models can pose fairness problems, according to the FDIC guide, because they can include “prohibited” variables or variables that are correlated with prohibited variables. For instance, because “non-bureau” variables such as wealth and education that may improve predictions of defaults are also likely to be correlated with race, ethnicity, sex, or age, the use of such variables can require lenders to demonstrate a business justification.

My interviews with lenders suggest that these fair-lending rules have significantly influenced lending practices in the U.S., although the extent of such influence depends on the degree to which lenders are willing to risk regulatory scrutiny. Smaller lenders, for example—those with a greater hope of flying under the regulatory radar—seem to take more regulatory risk by allowing local staff to override score results or by using customized scores. Large U.S. banks with nationwide branch networks do not allow any discretionary overrides of score results by the local staff. And while some large lenders also customize their scoring models (rather than rely on 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.⁶

3. “Fair Lending Implications of Credit Scoring Systems” Downloaded from https://www.fdic.gov/regulations/examinations/supervisory/insights/sisum05/article03_fair_lending.html on November 15, 2015.

4. Federal Reserve (2007 p. 8).

5. FICO itself has to trade-off accurate predictions in its scores against pressures to exclude variables that might lead to the denial of loans to borrowers who regulators believe should be extended credit. For instance, in August 2014, after “months of discussions with lenders and the Consumer Financial Protection Bureau,” Fair Isaac announced it would “stop including in its FICO credit-score calculations any record of a consumer failing to pay

a bill if the bill had been paid or settled with a collection agency” and “give less weight to unpaid medical bills that are with a collection agency.” See Andriotis (2014).

6. 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 they retain. 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.”

Creditworthiness criteria used by governmental agencies.

U.S. government-“sponsored” agencies, notably Fannie Mae and Freddie Mac, who now guarantee most new residential mortgages in the U.S. have been instrumental in making FICO scores the main determinant of the creditworthiness of mortgage applicants. Until the mid-1990s, the agencies used what one observer described as “thick books of underwriting guidelines” that were “stringently designed” to screen mortgages originated by brokers and banks for “acceptable” quality. Yet, unscrupulous originators found “procedural loopholes” for low-quality mortgages and the costs and time required to verify applications limited the loans that the government-sponsored agencies could guarantee.⁷

But then, during the mid-1990s, the agencies made a “shift from rule-based rating towards a system of score-based rating” that “marked a fundamental change in mortgage underwriting.” This shift resulted from an effort to automate underwriting, apparently prompted by ambitious goals to expand loans guaranteed by the agencies. Thus, Fannie Mae’s 1994 pledge of a \$1 trillion increase in housing finance was supported by a technological initiative that was intended to cut the costs of making a mortgage by \$1,000 while reducing the origination time from more than eight weeks to five days. The initiative also sought to enforce uniform underwriting standards and to prevent racial discrimination by “removing subjective reasoning.”⁸

Previous technology projects had “simply converted existing underwriting standards to an electronic format.”⁹ But computerizing complex rules intended to prevent dishonest mortgage origination proved difficult. Fannie Mae and Freddie Mac therefore chose to develop a credit-scoring algorithm that would simplify, not just automate, their screening of mortgage applications.

Fannie Mae and Freddie Mac further sped up automation by relying on FICO scores which had been designed for consumer rather than mortgage lending. And, because the scores were well known to the public, “the FICO feature of automated system design was politically useful when the software was showcased to legislators.”¹⁰ By 1997, Fannie Mae reported “a significant reduction in time and effort”¹¹ spent on processing loans; and 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.

In principle, the government-sponsored agencies could have encouraged deeper credit analysis by giving better terms to originators with low default rates. But favoring originators with good track records would have jeopardized the growth of

new mortgage lenders such as Countrywide Financial, which grew from a two-man operation in 1969 to approximately 500 branches in 2007. It would also have increased the administrative costs of the agencies. Instead, Fannie and Freddie’s terms favored high-volume origination, not low default rates.¹²

The example set by government agencies—and the pressure of 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.”¹³

Credit reporting rules. The use of bureau scores by bank regulators and government-sponsored agencies to control discriminatory lending and to screen mortgage applications was predicated on a well-developed system of credit reporting and scoring. In the 18th and 19th centuries, U.S. banking rules discouraged commercial banks from lending to consumers. What consumer credit existed was generally provided by merchants; and because a highly mobile populace had opportunities to move while leaving unpaid debts behind, merchants established mutual societies to share information about borrowers. For-profit credit bureaus began collecting and selling such information in the 19th century and, by 1960, about “1,500 independent local credit bureaus collected information on household income, profession, marital status, and outstanding debts, plus informal testimonies from neighbors and colleagues.”¹⁴

Technology and consolidation then transformed the industry. The Retail Credit Company, which eventually became Equifax, computerized all of its 45 million credit records by 1970, and, along with TransUnion and Experian, came to dominate the market. And computerized credit records prompted the development of statistical credit scoring. Fair, Isaac, and Company (later renamed FICO) built the first credit scoring system in 1958. FICO delivered its first generic score in 1989 and, by the end of 1991, all three major bureaus—Equifax, TransUnion and Experian—were providing the scores to clients.

New Deal banking rules passed in the 1930s that allowed banks to expand consumer lending while keeping longstanding geographic restrictions on their branch networks encouraged banks to use credit bureaus. Banks extended credit by issuing credit cards in places where they were not allowed to open branches and to people with whom they had no prior relationships. Bank of America issued the first bank credit card in 1958 and Citibank pioneered unsolicited mass mailings for its cards in 1967.¹⁵ And

originators whose loans had defaulted. But this was intended to sanction banks for not following the rules, rather than for their failure to go beyond the specified standards.

13. Poon (2009) p. 661.

14. Ryan, Trumbull, and Tufano (2011), p. 475.

15. “Where it couldn’t gain territory with bricks and mortar Citibank tried to do so with plastic,” as Zweig (1995), p. 803, put it.

7. See Poon (2009), p. 661-663.

8. McDonald et. al (1997) p. 861.

9. Freddie Mac (1996).

10. Poon (2009) p. 663.

11. McDonald et. al (1997) p. 882.

12. After the 2008 housing crisis government sponsored agencies did try to penalize

outsourcing credit analysis to credit bureaus allowed the banks to lend to remote customers.

The growing use of credit scores and reports (by card issuers and other lenders) increased public concerns about inaccurate and incomplete bureau records. In response, the U.S. Congress enacted the Fair Credit Reporting Act (FCRA) in 1970. FCRA, which was significantly amended in 1996 to strengthen consumer protection, prevented lenders from furnishing inaccurate information to credit agencies; required credit bureaus to use reasonable procedures for maximum possible accuracy; and encouraged consumers to correct errors in their own reports. California passed a law in 2000 requiring credit bureaus to disclose credit scores to individuals who asked for them. Until then, people did not have the right to know their credit scores unless they had been turned down for a loan because of a low score. The rules helped increase confidence in the accuracy and completeness of credit bureau scores and records.

Contrast with U.S. Small Business and European Lending Practices

It is conceivable that the low cost of outsourced statistical scoring would naturally have led to widespread reliance on FICO-based credit screening, especially in consumer lending and in mortgages that don't qualify for Fannie Mae and Freddie Mac guarantees. However, the lending practices of small business lenders in the U.S. and of banks in Europe suggest that U.S. policies have in fact played a pivotal role.

Nationwide agencies that assessed the creditworthiness of businesses emerged long before their consumer counterparts.¹⁶ But the fair-lending rules that support the widespread use of consumer scores do not apply to business borrowers. Bank regulators do not discourage lenders to small businesses from using judgment, customizing credit scores, or allowing staff to override the scores. Small-business scoring is not subject to FCRA-like rules that can help borrowers correct the mistakes of credit bureaus.¹⁷ The Small Business Administration does not mandate the use of generic bureau scores for the loans it guarantees.

And consistent with my hypothesis, we don't find widespread use of generic bureau scores in small business lending. Large banks that make small business loans do use statistical scoring and restrict local discretion. But the scoring is typically customized by each bank. And small businesses whose needs don't match a statistical process can

turn to small banks that are more willing to examine the specific circumstances of the borrower. We should normally expect a similar diversity in consumer lending, with borrowers whose creditworthiness is better than their FICO scores getting loans from lenders willing to consider more information. The universally low consideration of borrower-specific information actually observed in U.S. consumer lending supports the hypothesis that regulation, not competitive forces, has been the most important factor in making the non-discretionary use of outsourced scoring the dominant practice in the industry.

European lending practices provide another instructive contrast. Historic and contemporary rules in Europe have effectively, if unintentionally, discouraged the development of U.S.-style credit scoring. Large European commercial banks, which did not historically face the same restrictions on consumer lending¹⁸ and geographic scope as their U.S. counterparts, have had little incentive to share information with credit bureaus.¹⁹ And many local and regional banks have opposed information-sharing because they fear that more complete bureau data would help their large national competitors more. 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.

What's more, European privacy rules reduce the usefulness of credit bureau information. Whereas U.S. individuals must actively "opt out" of credit bureau lists, European rules require individuals to "opt in." Similarly, U.S. individuals cannot prevent their lenders from sharing information—including account balances, payment histories, account transaction, and credit card or other debt—with credit bureaus, while European consumers can limit that information.

A detailed case study on Handelsbanken and my interviews with ten large European banks (summarized in the Appendix) indicate that European lenders make virtually no use of generic, bureau-provided credit scores. In fact, some of the bankers I interviewed were unaware that they could purchase generic credit scores, and those bankers who were aware of the availability of scores were skeptical about their quality. Instead, European lenders used what U.S. regulators classify as "customized" scoring.

All the banks I surveyed in Europe allowed some degree of discretionary overriding of their credit scoring models—which has never been discouraged by European rules—and some even

16. See Madison (1974) and Ryan, Trumbull, and Tufano (2011).

17. Bureau records are rife with inaccurate data about small businesses, as I discovered in my research (See Bhidé (2008)) on venture capital-backed businesses. Using bureau data bases (and other publicly available data), we built dossiers on 108 companies, which we then verified with the CEOs. In nearly all cases there was a large gap between company revenues in the data bases and what we were told by the CEOs.

18. In the 19th and early 20th century, for instance, German savings banks "won the legal right to expand into new products and services in order to compete effectively with credit banks" and became "one-stop shops for middle class citizens." Their U.S. coun-

terparts meanwhile were "increasingly circumscribed by rules that limited their ability to innovate and compete in emerging product and geographic markets for personal finance." See Wadhvani (2011), p. 514-515.

19. As the business of unsecured consumer lending became more concentrated, US lenders also tried to limit information sharing, but regulators resisted this, possibly because credit bureaus had become pivotal in US consumer lending. In the late 1990s for instance, lenders accounting for half of US consumer credit reduced the information they reported to bureaus. After regulatory warnings and retaliatory steps taken by the leading credit bureaus, the lenders revoked the cuts. See Hunt (2002), p. 23.

required their local staff to review scores. Some bankers said that the information they already have on applicants—predominantly existing customers²⁰—helped them make good override decisions.²¹ And the difficulty of getting new customers made them anxious to avoid losing existing customers because of unwarranted rejections by a scoring model.

How Generic Credit Scoring Promotes Securitization

Making debt claims tradable in public markets requires satisfying two conditions: (1) producing an issue with tradable “float”—which typically now means at least \$1 billion; and (2) persuading investors to forgo the confidential information that borrowers might provide to a bank but can’t or won’t make public. Traditional investment-grade corporate bonds easily satisfy both conditions: a blue-chip borrower like IBM can readily use the proceeds of a \$1 billion issue. And IBM can reassure investors about its creditworthiness from the information it can make public and by securing the imprimatur of a reputable investment bank (to which IBM provides confidential information).

The float and information problems are also easily overcome in securitizing large commercial loans. For instance, a \$1 billion security may require pooling just 10 commercial mortgages or 20 aircraft leases. And as in the case of IBM’s bonds, considerable information about each mortgage or lease—and about the underwriting staff—can be disclosed.²²

But creating a \$1 billion float of securitized consumer loans or residential mortgages requires pooling a large number of loans; in credit card securitizations, these can number in the hundreds of thousands. Pooling many loans in turn limits the information issuers can provide to investors about the ultimate borrowers. And investors cannot know much about the experience and track-records of a large staff of local loan originators. Solving the pooling problem thus poses severe information asymmetry and agency problems.

Reliance on bureau-provided FICO scores (rather than customized scoring models) and limiting local discretionary overrides soothes investors’ worries about the quality and diligence of front-line lending agents, model-developers, and issuers. In other words, fair lending rules that encourage strict

reliance on FICO scores also help reduce agency problems in securitizing loans: Issuers that are expected to have limited information can credibly tell investors almost every bit of the little they know about the risks of what they securitize.²³

FICO scores have also helped securitize residential mortgages guaranteed by government-sponsored agencies in a different but important way. Agency guarantees mitigate investors’ concerns about defaults of securitized mortgages—but only if they are credible. And because just a sliver of capital supports the guarantees, the credibility of the protection Fannie Mae and Freddie Mac offer investors depends on the capacity of the agencies to control incompetent or dishonest mortgage originators. The U.S. government is widely regarded as a co-guarantor and thus also has reason to worry about the quality of agency-backed mortgages. And, as mentioned, Fannie Mae and Freddie Mac have used FICO scores (that mortgage originators cannot manipulate) to credibly screen mortgage applicants quickly and cheaply. Large-scale guarantees in turn have helped create a multi-trillion-dollar residential mortgage-backed securities market in the U.S.²⁴

Additionally, generic scoring has facilitated the securitization of mortgages and other consumer loans that aren’t guaranteed by government agencies by making the securities more fungible and easier to analyze. “Before the widespread use of FICO scores,” according to credit analysts Mark Adelson and Elizabeth Bartlett, “investors and other market participants faced greater difficulties in comparing the riskiness of loans... Although each lender had a classification system for borrowers or loans (e.g., quality grades A, B, C, and D), the classification systems differed from one company to the next. FICO scores provided an independent and broadly applicable measure of borrower credit quality.”²⁵ In other words, outsourced credit scoring both “transparently” controlled variability in the underwriting of mortgages within a particular security and increased uniformity across all residential mortgage-backed securities. And such uniformity in turn reduced the costs incurred by investors when evaluating individual securities and optimizing portfolios.

20. European banks had a clear preference for lending to their existing customers, whose creditworthiness they assess using their own information, whereas U.S. lenders routinely make “firm offers” of credit to individuals with whom they have no prior relationships through solicitations mailed to lists provided by credit bureaus. (FCRA rules permit blind mail solicitations—to individuals who have not “opted-out”—but require to lenders make “firm offers” to everyone on the list provided by the bureaus. See Federal Reserve Board (2007), p. 30.

21. Case-by-case credit reviews do not necessarily imply reliance on “soft” information, as the recent literature on traditional lending suggests. Even Handelsbanken, which gives unusual lending discretion to branch-based bankers, requires them to submit written credit analyses with verifiable facts to independent credit staff (who are not branch-based and are not in direct contact with the borrowers. Thus while “gut feel” may play a role in the decision to extend credit, it is almost entirely excluded from the control system. See Bhidé, Campbell and Stack (2016).

22. For instance, a table in a Kroll bond rating agency report on the “Apollo Aviation Securitization Equity Trust 2014-1” included the following information on each of the 40 aircraft backing the ABS: the manufacturer’s serial number, airframe type, engine type, age, estimated base value, estimated market value, and the airline to which the aircraft

was leased. The report included “stress test” simulations of the capacity of each airline to meet its lease obligations and bios of the management team of Apollo (the firm promoting the ABS). The report noted the rating analysts had interviewed members of Apollo’s management team and that Apollo used proprietary data to generate cash flow scenarios for each lease. Such detailed disclosure—or analysis by bond rating agencies—is obviously infeasible in ABSs backed by hundreds of thousands of credit card receivables.

23. Issuers also mitigate investors’ concerns by dividing the cash flows from loan pools into tranches and keeping the highest-risk tranche. This never happens with traditional investment grade bonds, presumably because issuers can provide adequate comfort about their creditworthiness from the information they disclose and from the imprimatur they secure from their investment bankers.

24. The very large residential mortgage-backed securities market in the U.S. has also arguably sustained the underwriting, trading, and technological capabilities used to securitize credit cards, car loans, student loans, and other non-commercial debt.

25. See Adelson and Bartlett (2004).

Lax or Conscientious Screening?

Research by Keys et al. (2009 and 2010), compares mortgages extended to borrowers with “prime” credit scores (just above those necessary for securitization) with mortgages made to “sub-prime” borrowers (whose scores were just below the securitization threshold). Surprisingly, mortgages made to borrowers whose low scores precluded securitization had lower defaults. The researchers attribute this result to the “lax screening” that occurred when underwriters transferred the risk to the buyers of mortgage securities.

But why would investors buy securities containing negligently screened loans? My analysis suggests the following hypothesis: fair lending rules encourage loan originators to restrict screening, which buyers of securitized mortgages will actually prefer (because it reduces information asymmetry problems), provided they receive an interest rate commensurate with the higher defaults that result from restricted screening.

Explaining Exceptional U.S. Securitization

When securitization was just starting in the early 1990s, economists argued that the “main impetus” for securitization was “avoidance of regulatory costs”—namely, rules that increased the capital costs incurred by banks when holding loans to maturity.²⁶ But regulatory capital requirements cannot explain the large difference in European and U.S. securitization: capital requirements were virtually identical for large banks on both sides of the Atlantic until 2004.²⁷ Exceptionally high securitization in the U.S. is consistent, however, with my argument that U.S. rules that encourage, if not explicitly require, widespread reliance on the FICO scores facilitate securitization. Moreover, as my recent simulations²⁸ suggest, the information asymmetry “penalty” that potential buyers may be expected to impose when lenders go beyond FICO scores is many times larger than any avoided regulatory capital cost.²⁹

The same argument also helps explain why differences in the securitization of small-business loans between the U.S. and Europe have been trivial (See Table 5). U.S. rules do not induce reliance on generic scoring in small-business lending. Therefore, the information problems that hinder securitization are as challenging in the U.S. as in Europe, with small-business loans accounting for less than 1% of securitized U.S. debt outstanding (See Table 1).

Costs of Strict Reliance on Generic Scoring

Fair-lending rules that favor generic scores (which, as we have seen, omit crucial variables such as income and assets) while limiting local review of the scoring results, effectively reduce the information that lenders use to screen borrowers. And the failure to use potentially relevant information almost certainly increases unwarranted lending, defaults, and—assuming creditors anticipate the increased defaults—the rates charged to borrowers.³⁰

Research on mortgage lending suggests that reliance on FICO does indeed increase default rates³¹—although some researchers, mistakenly in my view, seem to 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 (see box). We can also note that the more detailed evaluations allowed in small-business lending seem to more effectively control defaults: According to the Federal Reserve Bank of New York, in the last 10 years about 9% of credit card balances have been delinquent for more than 90 days,³² whereas small-business loans delinquent for more than 31 days averaged about 2.5% of loans.³³

Efforts to tighten the screening of securitized loans have included attempts to address the moral hazard problem arising from the transfer of risk to buyers³⁴ by requiring issuers to retain a significant interest in the pools of securitized mortgages. But, without addressing the current restrictions on the kinds of information that now enable securitization,

26. See Bernanke and Lown (1991).

27. Uniform capital requirements were first imposed on US banks by regulators in 1981 and were toughened by the 1990 Basel Accord establishing global standards. The rules encouraged banks to transfer loans to off-balance-sheet vehicles that issued tradable securities. They also created incentives for banks to replace the transferred loans with tradable securities: in 2008, banks held 30% of the world's AAA-rated asset-backed securities and another 20% were owned by bank-sponsored entities. See Acharya and Schnabl (2009), Table 2.

28. Bhidé (2017).

29. Other explanations for the growth of securitization (which are discussed in Appendix D in the longer online version of this article) also have limitations in explaining the large gap between securitization in the US and Europe.

30. Reducing information may also increase the unwarranted rejection of credit, for instance to applicants whose low FICO scores overestimate their risk of default. More-

over, higher rates (charged because of higher loan losses) may discourage prudent borrowers from even applying for credit.

31. The findings of Rajan, Vig, and Seru (2014) that purely statistical lending leads to more defaults clearly supports the hypothesis that relying on generic scores increases lending mistakes.

32. See Zumbun (2016).

33. According to the Thomson Reuters/PayNet Small Business Delinquency Index (SBDI) downloaded on November 1, 2015 from <http://www.paynetonline.com/issues-and-solutions/all-paynet-products/small-business-delinquency-index-sbdi/>.

34. According to a statement issued by the Financial Economists Roundtable (2008) shortly after the September 2008 meltdown, “transferring credit risk from lenders to investors ... undermines incentives to perform due diligence at virtually every stage in the securitization process. In the last year, evident shortfalls of care and diligence ... have led to a collapse in the prices of securitizations.”

such proposals miss the point. As it happens, issuers have long retained the highest-risk tranches of the loan pools they securitize, whereas underwriters of traditional corporate bonds do not usually retain any financial risk. If rules required issuers to retain even more risk, their scope for more detailed credit analysis would remain limited, unless fair-lending rules that encourage strict reliance on FICO scores were also changed. Or, if loan originators somehow got around the fair-lending rules to secure more information, they would face more severe information asymmetry problems in selling securitized loans to investors. Risk-retention rules, in other words, could lead to full risk retention and thus no securitization.³⁵

Yet the “coarser screening for more securitization” choice implicit in current fair-lending and housing finance policies in the U.S. may not best serve the public good. In principle, positive externalities from high securitization could offset the costs of restricting information. For example, it is plausible that fair lending rules (and reliance on bureau scoring) have increased the availability of credit for minorities and women.³⁶ But such rules have also likely increased the indebtedness of borrowers who overestimate their capacity to repay and potentially harmed creditworthy borrowers (including minorities and women) by requiring them to pay higher rates.

Similarly, while it is highly likely that securitization reduces the cost of diversifying risks *by* creditors, this also promotes the sameness of the holdings and risks *across* creditors: if all lenders purchase securitized consumer loans, their portfolios will be exposed to FICO risk. Any unexpected jump in the return the market expects for bearing FICO risks will cause a correlated fall of everyone’s securities—and may prompt a rush to get out that further exacerbates this fall.

In sum, restricting information and the high securitization it helps enable can be expected to increase negative as well as positive externalities. And, although the positive externalities are better known, their increase may or may not offset the more hidden negative ones.³⁷

Concluding Comments

Lemon problems do not stop the sale of well over a million used cars in the U.S. each year, but they do prevent the operation of a market in which buyers place sight-unseen bids for used cars offered by unknown sellers. In fact, anonymous markets for physical goods are restricted mainly to metals or agricultural commodities. Most goods—including new or secondhand cars, shoes and homes—are purchased from identifiable sellers. Buyers also prefer to examine specific items—test-driving cars

or trying on shoes, for instance—before they make a purchase.

Outside finance, revolutionary technological advances have not turned many goods or services into anonymously traded commodities. Rather, the advances have reduced the cost of communicating and using detailed information, mitigating information asymmetries, and helping buyers select items that match their preferences. And technology has reduced anonymity: in contrast to the street-hailing of taxis, users of ride-hailing apps can screen drivers based on their ratings. Similarly, consumers can review the ratings of plumbers on the web instead of randomly picking one from the telephone directory.

Why, then, did anonymous debt markets—markets that require investors to forgo information they could secure in private transactions—experience such remarkable growth in the U.S.? Until the 1980s, creditors in the U.S. were willing to give up information to get tradability mainly in the case of bonds issued by governments or blue-chip companies. The subsequent securitization of trillions of dollars of loans extended to unknown individuals in the U.S. has required investors, loan originators, and government housing finance agencies to rely on generic credit bureau scores. But while reliance on scores that loan originators cannot manipulate reduces the information asymmetry problems that investors would otherwise face, it also makes estimates of default risks noisier, increasing the unwarranted extension and denial of credit.

Technological advances did not preordain the revolutionary “completion” of anonymous credit markets in the U.S. U.S. banks could have used technology to improve decentralized, case-by-case lending. Or, like many European lenders, U.S. banks could have developed proprietary credit-screening algorithms that incorporate a wide range of data about applicants. U.S. government-sponsored agencies also could have developed rule-centered Artificial Intelligence systems to automate case-by-case mortgage underwriting. Instead, fair lending and credit reporting laws and government-sponsored housing finance agencies favored tradability over information by promoting—to the point of virtually requiring—reliance on bureau scoring. Policy choices fostered the expansion of anonymous credit markets to an extent that few would have thought prudent or possible.

AMAR BHIDE is the Thomas Schmidheiny Professor at Tufts University’s Fletcher School of Law and Diplomacy.

35. In Europe, policy makers who regard low securitization as a significant problem also apparently ignore the role of transparent, non-discretionary loan origination in enabling securitization. Rather, the European regulators have undertaken or proposed initiatives, including direct purchases of securitized claims by the ECB, and reduced capital charges on purchases by insurance companies and banks, that do not make loan origination more transparent. In fact, new rules to discourage imprudent lending likely encour-

age European banks to secure more information that they cannot disclose to investors, especially under tougher privacy rules. My analysis would predict that these initiatives are unlikely to significantly increase European securitization.

36. See Ryan, Trumbull, and Tufano (2011) p. 482-3.

37. See Appendix F in the longer online version.

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Appendix: Lending Practices in Europe Banks Surveyed

I surveyed the lending practices of Handelsbanken and 10 other banks headquartered in France, Iceland, Italy, Germany, the Netherlands, Spain, Sweden, Switzerland, and the UK. I chose large banks, since they were more likely to use models and to securitize loans than small banks. All the banks were

in the top 3-4 in their home countries and nine of the 11 were also in the top 20 European banks by capitalization.

Use of models and technology

All the banks I surveyed used automated credit scoring for unsecured consumer loans. The models were estimated largely from proprietary customer records or from loan applications

Using Technology for Decentralized Lending: The Case of Handelsbanken

Handelsbanken, a Sweden-based bank that ranks in the top 20 in Europe, gives branch managers—and the loan officers who report to them—unusual authority and responsibility. The bank disdains “check-box lending” and does not use statistical models in making large loans. It does use models to screen small consumer loans but requires loan officers to review each model result.

Decentralized, case-by-case lending allows the bank to make loans that competitors who follow a more centralized, formulaic approach reject. But, to control loan losses, branch-based loan officers have to send comprehensive—and entirely factual—analyses for review by credit staff

who are not in branches. Handelsbanken, which has a target of zero loan losses, also expects close monitoring of borrowers by local lending staff. And, as with lending decisions, monitoring includes numbers as well as non-numerical (but objective) local facts.

The bank considers itself “modern” in using IT to provide services to customers, to facilitate communication between branch-based lenders and credit staff, and in the ongoing monitoring of borrowers. Technology, in other words is designed to help a very large bank prudently offer customized credit with a personal touch.

Source: Amar Bhidé, Dennis Campbell, and Kristin Stack. 2016. “Handelsbanken 2002,” Harvard Business School Case No. 115-018

(rather than from credit bureau records) and were highly customized. As one Italian banker observed, “Models tend to be different in structure even though variables used tend to be the same. Differences are based on different modeling skills, different data availability and data quality (not all banks store the same quality of data), and different kinds of borrowers.” Another banker noted that there were no “surprises” in the actual variables, but the structures of the scoring models varied considerably across banks.

Several interviewees volunteered observations about the sophistication of their models and the effort devoted to refining them. A French banker noted his bank had pioneered combining artificial intelligence and statistical modeling for consumer lending. A banker from the Netherlands said his bank had been developing and using models since 1982 (i.e. well before many US banks). Another Netherlands banker said he was confident that his bank’s models captured the idiosyncrasy of borrowers because “the models had evolved to incorporate all the necessary variables.” A Swiss banker emailed that his bank’s models had been “enhanced and updated throughout the past decade” and would be soon replaced by a new technology that would “allow quantitative model tests with portfolio-specific test data and stress testing.” An Italian chief risk officer wrote that his bank’s models were “constantly updated, tuned, and calibrated to improve their predictive capabilities.”

Handelsbanken had made relatively little effort to develop its modeling capabilities but had instead invested in technologies that supported its case-by-case approach (see box).

Models typically played a less important role in mortgages than in credit cards and other consumer debt. Handelsbanken does not use models for mortgages at all. A banker from another leading Swedish bank also said the only “model” his bank uses is to set minimum loan-to-value and loan-to-income ratios. Instead, his bank relies on manuals and underwriting rules established by the bank’s

board of directors. And, in cases where banks did use models for underwriting mortgages, many bankers noted (again unasked) that extensive human interventions overshadowed automated credit scoring. A French banker, for instance, observed that incomes and spending patterns are carefully verified by loan officers to assess debt-bearing capacity. A UK bank (and its competitors) required face-to-face interviews for mortgages and, for reasons discussed below, the interviews have become lengthier after 2013.

Discretionary overrides

To varying degrees, all the European banks I surveyed encouraged or at least permitted discretionary overrides (which US fair lending rules discourage).

An Icelandic banker emailed that, “The model only provides a suggestion. Models are used as a tool not an oracle—so a lot of qualitative assessment is done after the model has been run.” Similarly, as mentioned in the main text, to the extent Handelsbanken uses models at all, it requires branch staff to review every application processed.

One German bank did not require reviews but encouraged them. “Branches have credit discretion,” the banker I interviewed said, “and are expected to question model scores when they think this is necessary. I love models but I don’t fully trust them. Also, model challenges help us constantly fine-tune and refine our models.”

A Spanish banker said that discretionary review was built into the scoring system: the models produced “auto-decisions” for high-scoring and low-scoring customers, whereas “grey zone” scores were adjudicated by a centralized underwriting group. Branch staff also could choose to send an “auto-reject” case to the underwriting group for review. Underwriting groups took branch referrals seriously because they believed that branches had “deep knowledge” of their customers.

Other banks however tried to limit discretionary overrides. An Italian banker said that branches could override

model results but the branch manager had to take responsibility. A Netherlands-based bank capped overrides by branches to 2% of the total loan applications processed. A French banker said overrides depend on how the loan application originated. Some loan applications come in through retailers helping their customers buy appliances. In such instances the bank will allow retailers to override about 5% of automated rejections. Rejection of applications made over the web cannot, however, be appealed. Swiss bank executives similarly said there was “no possibility” of overrides for mortgage applications, while for credit cards overrides require a “hierarchy-specific approval process.” A UK banker I interviewed said, in contrast, overrides are more common for mortgages than for credit cards; in either case, branches do not have the authority to overrule models. Challenges to model decisions are reviewed centrally.

Credit bureau scores and data

Only three banks (in the UK, the Netherlands, and Germany) used bureau-provided scores—and even then only as one of several variables in their own scoring models. An executive from the Netherlands bank further noted that the “weight” of the bureau scores incorporated into models used to evaluate loan applications from existing customers is lower than in models used to lend to new customers (who receive less than 20% of consumer loans).

Banks that did not use credit bureau scores and even two that did (one in Germany and the other in the UK) volunteered unfavorable comparisons of European bureau scores to US bureau scores. For instance, a German banker (who had once worked in the US) observed that efforts by Schufa (the leading credit bureau in Germany) to build a US-style credit score had been unsuccessful. Even though Schufa covers about three-quarters of the population and nearly all German lenders participate, bureau records in Germany “do not have the same level of detail as US credit bureau records.” Therefore, his bank “takes the Schufa score, fine tunes it, and integrates it into our own scoring. It is just one of many elements.” Similarly, a Swiss banker (and non-user of bureau scores) wrote that “the models used to generate scores in Switzerland are not as sophisticated or meaningful as in the US.”

All the banks I surveyed used “negative” credit bureau data (on previous defaults and delinquencies) to screen out borrowers with bad payment histories. In fact, Icelandic and Spanish bankers said they did not get any other data from bureaus, with the Spanish banker adding that credit bureaus in Spain only provide data about delinquencies—and that too just on currently delinquent debt. The use of “positive” information secured from credit bureaus (where this was available) varied however. Swedish bureaus provided the broadest range: an interviewee said that income, wealth, tax, and other financial data that would be considered private elsewhere is in the

public domain in Sweden and his bank used credit bureaus as a convenient conduit for this data. Bankers outside Sweden did not mention such use. A French banker also said that positive bureau information was incomplete because lenders are not required to provide positive information. Other bankers pointed to the limitations of credit bureau data arising from strict European privacy laws.

Lending to non-customers

Only one bank (based in the UK) said that it issued more than half its credit cards to individuals with whom it did not have any other banking relationship. In every other case, bankers said that a majority of credit card (and other personal) debt was extended to borrowers with whom their bank had other relationships.

Bankers apparently regarded a multi-faceted relationship with borrowers as a complement to credit scoring models. According to an executive of a Swiss bank (that is a leading issuer of credit cards), about 97% of credit cards were issued to existing customers because “the relationship manager responsible could easily provide detailed information about the individual’s financial situation.” Similarly, the risk officer of a Netherlands-based bank observed that his bank’s credit model automatically extracted data such as trends in balances and payments from borrowers’ current accounts. In principle, borrowers who held accounts with other banks could also provide this data, but the computer system was not currently set up to do this easily.

Bankers also expected bundling with other products to help control risks. An Italian risk officer whose bank now makes 95% of its loans to existing customers emailed that “clients are less likely to default on loans from their primary bank where their pay accrues, i.e. where their salary is deposited directly. In 2006-2008 we strongly pushed loans to non-clients, including those generated by third parties such as real estate agents, car agents, and stores. Default rates on non-clients ended up being 6-8 times higher than on existing clients, and with third-party loans we had gigantic frauds. We then decided to focus only on existing clients.”

Similarly, a Swedish banker said that individuals who used their credit cards as a source of credit, rather than as a convenient way of making payments, were usually individuals who face liquidity constraints “between paychecks.” And although rates charged on card balances are high, so are defaults and cases of fraud. The bank therefore strongly prefers extending cards to existing customers with the following exceptions: the bank solicits applications from college students who are expected to become creditworthy but have no prior banking relationships; and the bank contracts with unions and professional associations (e.g. doctors) to offer credit cards to members. Regardless of whether there is a prior relationship, the bank requires credit card borrowers to either open an account into which the borrower’s salary is deposited

or maintain a savings account. Balances in these accounts are monitored against the draw against the credit card limit and other sources of debt.

None of the banks engaged in US-style mail offers of consumer credit to non-customers. One reason (beyond the informational advantage of lending to existing customers) was that privacy laws restrict access to credit bureau data about non-customers—which is less comprehensive and reliable to start with. An email from a German banker, who had previously worked in the US, observed that “Banking Act § 18 (2) (KWG) implies no changes in credit can be done (including new credit) without due proper credit decisioning. And proper credit decisioning means pulling a Schufa credit report, and this can only be done with prior customer consent. That means German banks cannot flood consumer mailboxes with solicitation offers.” UK lenders, I was told, do solicit borrowers by mail (through lists obtained from list brokers rather than bureaus) without analyzing creditworthiness, but they are not required to make “firm offers” of credit. Rather, the mailings are meant to solicit applications (although some recipients may believe they have been pre-approved).

Some interviewees reported that lenders are more willing to try to poach each other’s customers for mortgage loans where the value of the property mitigates default risks. A German banker said his bank tries to get new borrowers by telling them that they can keep their banking relationship with their main bank (since switching main banks can be difficult in Germany). Similarly, a Swedish banker said that traditionally the bank had made more than 90% of its mortgages to existing customers. But, as the real estate market in Sweden boomed after 2012, mortgage lending became intensely competitive, with borrowing rates published every day in the newspapers, allowing homebuyers to shop around for the best terms. The percentage of mortgages extended to customers with whom the bank has a prior relationship has therefore fallen.

The drop had not been precipitous however—the bank continues to make 70% of its mortgages to existing customers—and it encourages mortgage borrowers who were not currently customers to move over their “main banking relationship” by offering them better rates if they switch. A French banker too said that borrowers do shop around in France, but mainly to get a good rate from their existing bank. In fact, there was just one bank in my sample reporting that it made more than half of its mortgage loans to non-customers. And even with this bank, non-customers were in the majority only for mortgage applications received through mortgage brokers (rather than through the bank’s branch network).

Iceland was an exception. According to an email, there was “a healthy amount of turnover of customers after the banking collapse in Iceland because many people were not happy with their banks.” The extent of such turnover was

“very sensitive,” so my source could not provide even a rough estimate of the magnitude.

Regulatory influences

As in the US, most banks (the Icelandic and Spanish bank were exceptions) faced rules to control discriminatory lending. For instance, nearly all countries had rules prohibiting the use of gender in credit scoring models and many also prohibited the use of postal codes. But overall and in comparison to the US, anti-discrimination rules were “just not a day-to-day concern,” as one UK banker put it.

For instance, banks did not face regulatory scrutiny of scoring factors that might be correlated with prohibited discriminatory variables. Even if the rules prohibit direct use of postal codes, one banker said, if a scoring model leads to low loan approvals in some postal codes, that is not a problem. And regulators did not encourage use of standardized bureau scores that provide a safe harbor in FDIC fairness examinations in the US. In fact, according to one Italian banker, regulators (concerned about bank safety and soundness rather than discriminatory lending) “strongly discourage using external scores for credit decisions, because they feel—and rightly so—that banks must have their own credit assessment capabilities and their own rating models.”

The banks I surveyed also did not worry about regulatory risks from discretionary overrides that, according to the FDIC, have the potential to be applied “discriminatorily.” In fact, the rules tilted in the other direction: UK-based bankers said that new Financial Conduct Authority (FCA) rules instituted in 2014 had implicitly increased discretionary interventions, particularly in mortgages: under the new rules, banks have to verify that there was no “detriment to the borrower” from taking on excessive debt.

Similarly, a German banker noted that about 10% of decisions to reject loan applications because of a low score were reviewed not only because the bank wanted branch staff to look out for unwarranted rejections but also because, according to the German Federal Data Protection Act § 6a (BDSG), banks could not deny credit based only on a score. The banker further noted that a new European Mortgage Credit Directive was likely to encourage scrutiny of loans with acceptable scores as well: under the Directive, delinquent loans could be deemed “invalid” if the lender had relied just on a credit score and failed to do a “proper” individual analysis.

In contrast to anti-discrimination rules, privacy rules apparently had significant influence. As mentioned in the main text, privacy rules limit the information that lenders provide to or secure from credit bureaus. One noteworthy consequence is that European banks do not secure lists from credit bureaus to solicit new clients by mail; in fact, mail solicitations are uncommon and, where used, lenders purchase low-cost lists from sources that do not have much information about the creditworthiness of the individuals on their lists.

Table 1 U.S. Asset-Backed and Mortgage-backed Securities Outstanding (USD billions)

Year	Mortgage-backed (MBS)		Asset-Backed (ABS)								Total MBS+ABS
	Agency MBS	Total MBS	Auto	Credit Cards	Student Loans	Housing-Related	Equipment	Small Business	Other	Total ABS	
1985	394.8	394.8	0.9				0.3		0	1.2	396
1986	609.3	609.3	10.5				0.7		0	11.3	621
1987	800.9	801.0	14.2	2.4			0.7	0.3	0.5	18.1	819
1988	931.2	931.3	13.5	9.1			0.5	0.5	2.1	25.8	957
1989	1,074.8	1,075.0	14.1	20.0			0.3	0.8	1.7	36.9	1,112
1990	1,251.8	1,252.0	19.3	42.1			0.9	1.1	1.6	65.0	1,317
1991	1,429.9	1,430.1	27.2	59.0	0.2		1.2	1.5	1.3	90.4	1,521
1992	1,555.3	1,555.6	36.8	70.8	0.4		3.2	1.9	1.9	114.9	1,671
1993	1,636.3	1,636.5	42.3	75.1	0.8		6.7	2.4	3.1	130.5	1,767
1994	1,769.7	1,770.0	39.3	98.2	3.4		11.4	3.2	4.5	160.0	1,930
1995	1,886.5	1,886.8	52.8	129.9	6.5		12.5	4.3	6.4	212.4	2,099
1996	2,073.0	2,073.4	66.7	167.1	14		23.0	5.7	11.5	288.2	2,362
1997	2,291.0	2,291.5	79.4	191.0	26		26.0	7.3	22.1	351.6	2,643
1998	2,643.4	2,644.1	88.5	199.6	31		28.7	8.4	33.4	390.1	3,034
1999	3,173.9	3,174.8	109.4	213.8	36		33.5	9.7	44.9	447.7	3,622
2000	3,455.5	3,456.4	140.5	236.8	45		44.7	11.5	46.9	525.1	3,982
2001	3,914.7	3,915.8	167.0	265.9	48		42.9	13.3	55.6	592.8	4,509
2002	3,158.2	4,363.6	187.6	293.3	59	0.1	37.3	14.5	54.8	646.3	5,010
2003	3,342.2	4,701.4	191.5	303.5	88	0.1	42.8	15.7	55.6	697.2	5,399
2004	3,383.1	5,266.9	177.3	297.5	123	0.3	44.3	17.5	53.8	713.2	5,980
2005	3,547.6	6,092.1	195.9	287.2	160	0.5	49.0	19.9	60.2	772.3	6,864
2006	3,837.9	7,122.7	196.2	291.5	201	0.7	51.1	23.2	73.6	836.8	7,960
2007	4,459.9	8,031.5	181.2	324.4	230	0.5	52.4	26.4	85.8	900.3	8,932
2008	4,956.8	8,133.2	140.4	315.6	238	0.2	42.6	29.0	78.2	844.0	8,977
2009	5,372.2	8,075.5	127.6	300.3	239	2.2	38.1	29.9	74.6	812.1	8,888
2010	5,481.4	7,866.4	115.9	216.8	241	3.6	34.5	30.0	65.5	706.9	8,573
2011	5,546.4	7,640.9	117.2	163.9	234	3.4	35.1	30.7	63.0	647.5	8,288
2012	5,656.7	7,511.3	142.4	127.9	234	3.8	40.4	32.6	66.4	647.0	8,158
2013	5,905.6	7,586.1	161.5	124.5	228	8.7	46.4	33.2	73.3	676.0	8,262
2014	6,008.4	7,592.4	178.9	136.5	216	25.6	52.1	34.8	79.9	724.2	8,317

Source: SIFMA (2015) Downloaded from <http://www.sifma.org/research/statistics.aspx>
 Shaded cells highlight declines over previous year (i.e. more securities retired than issued)

Table 2 European Asset-Backed and Mortgage backed Securities Outstanding (USD billions)

Year	Mortgage-backed (MBS)	Asset Backed (ABS)							MBS + ABS	
		Auto	Credit Cards	Consumer	Leases	SME	Other	Total ABS	Total for Europe	% of US outstanding
1985	0.1				0.0			0.0	0.1	0.0%
1986	0.1				0.0			0.0	0.1	0.0%
1987	1.1				0.0			0.0	1.1	0.1%
1988	6.7				0.0			0.0	6.7	0.7%
1989	9.7				0.0			0.0	9.7	0.9%
1990	13.6				0.0			0.0	13.6	1.0%
1991	18.8	0.4			0.0			0.4	19.2	1.3%
1992	20.1	0.7			0.0			0.7	20.8	1.2%
1993	21.1	1.4		1.1	0.3		0.1	3.0	24.1	1.4%
1994	26.0	1.0	0.4	2.0	0.7		0.4	4.5	30.5	1.6%
1995	25.7	0.7	1.3	3.2	0.9		0.6	6.7	32.4	1.5%
1996	24.8	2.1	2.1	4.0	2.0		3.2	13.5	38.2	1.6%
1997	39.7	2.0	2.8	4.4	2.4		3.4	15.0	54.7	2.1%
1998	45.5	1.8	4.6	4.8	3.4		6.2	20.7	66.2	2.2%
1999	68.1	4.0	6.5	6.1	4.2	3.4	17.9	42.1	110.2	3.0%
2000	110.8	5.1	9.4	7.1	4.0	4.7	19.1	49.3	160.2	4.0%
2001	163.9	6.9	10.0	9.7	6.6	14.7	31.6	79.4	243.3	5.4%
2002	229.9	12.9	13.9	12.8	12.4	17.6	33.6	103.2	333.2	6.7%
2003	345.9	15.0	19.8	20.5	14.9	24.9	34.6	129.8	475.7	8.8%
2004	466.0	20.8	27.1	17.6	22.9	35.6	50.4	174.4	640.5	10.7%
2005	631.7	22.7	39.1	17.8	28.2	68.8	66.5	243.1	874.8	12.7%
2006	910.5	30.7	39.9	28.8	31.1	92.2	86.3	309.0	1,219.5	15.3%
2007	1,334.4	42.1	33.1	37.2	29.3	164.5	89.6	395.8	1,730.2	19.4%
2008	2,020.0	51.2	39.9	63.2	40.5	196.7	80.9	472.3	2,492.3	27.8%
2009	2,145.1	57.6	34.3	79.2	43.5	228.0	86.2	528.7	2,673.8	30.1%
2010	2,022.3	50.6	27.9	72.8	36.3	220.2	77.3	485.1	2,507.4	29.2%
2011	1,863.9	50.3	23.7	79.1	38.8	238.6	77.3	507.9	2,371.9	28.6%
2012	1,512.6	64.1	29.4	70.5	30.3	209.1	73.6	477.1	1,989.7	24.4%
2013	1,320.0	66.3	37.3	66.2	23.2	162.6	78.9	434.4	1,754.4	21.2%
2014	1,261.1	73.7	35.9	57.6	17.6	142.9	74.6	402.4	1,663.5	20.0%

Source: SIFMA statistics downloaded from <http://www.sifma.org/research/statistics.aspx>
 Shaded cells highlight declines over previous year

Table 3 **Proceeds from newly issued securities by type, geography and year**

Mortgage and Asset-Backed	2007	2008	2009	2010	2011	2012	2013	2014	Average
Total Global issuance (EUR billions)	€1,652.7	€338.0	€418.3	€670.7	€591.6	€633.0	€640.6	€597.9	2007-2014
US share	72%	66%	82%	76%	70%	73%	77%	71%	73%
Europe share	22%	19%	5%	15%	17%	13%	10%	11%	14%
Asia share	5%	10%	12%	7%	11%	11%	11%	17%	10%
Ratio of US/Europe Issuance	3.2	3.4	14.9	5.0	4.0	5.4	7.9	6.2	6.3
Investment grade corporate bonds	2007	2008	2009	2010	2011	2012	2013	2014	Average
Total Global issuance (EUR billions)	€1,314.4	€1,242.6	€1,927.5	€1,474.2	€1,438.9	€2,062.7	€1,956.5	€2,221.3	2007-2014
US share	43%	35%	26%	24%	25%	25%	28%	27%	29%
Europe share	39%	43%	47%	40%	32%	31%	30%	29%	36%
Asia share	13%	17%	21%	26%	33%	34%	32%	35%	26%
Ratio of US/Europe Issuance	1.1	0.8	0.6	0.6	0.8	0.8	1.0	1.0	0.8
High-yield corporate bonds	2007	2008	2009	2010	2011	2012	2013	2014	Average
Total Global issuance (EUR billions)	€194.1	€73.2	€181.5	€301.2	€252.9	€359.4	€404.0	€390.2	2007-2014
US share	51%	45%	50%	54%	50%	59%	49%	48%	51%
Europe share	20%	24%	20%	22%	26%	22%	30%	31%	24%
Asia share	11%	16%	16%	14%	13%	9%	10%	10%	12%
Ratio of US/Europe Issuance	2.6	1.9	2.5	2.5	1.9	2.6	1.7	1.5	2.2
Initial public stock offerings	2007	2008	2009	2010	2011	2012	2013	2014	Average
Total Global issuance (EUR billions)	€215.9	€53.9	€79.0	€210.3	€120.6	€96.6	€130.0	€199.7	2007-2014
US share	19%	36%	15%	14%	22%	33%	33%	23%	24%
Europe share	33%	17%	7%	13%	21%	11%	20%	26%	19%
Asia share	26%	26%	63%	66%	48%	42%	33%	43%	44%
Ratio of US/Europe Issuance	0.6	2.0	2.3	1.1	1.1	3.2	1.6	0.9	1.6

Source: Dealogic

Table 4 **Size and Number of Loans pooled, by type of security**

Type of Securitization	Size of Loans backing security (\$s)	Number of Loans needed for \$1 billion issuance
Consumer and Residential Mortgages		
Credit Card Receivables	\$1,500-3,000	330,000-500,000
Auto Loans	\$20-30,000	33,000-50,000
Student Loans (private)	\$15-20,000	50,000-70,000
Non-Agency RMBS (sub-prime)	\$150-200,000	5,000-7,000
Agency RMBS	\$170-250,000	4,000-6,000
"Commercial"		
Collateralized Loan Obligations	\$3-10 million	100-300
Aircraft leases	\$20-50 million	20-50
Non-Agency Commercial MBS	\$3-100 million	10-300
Agency Commercial MBS	\$50-100 million	10-20

Source: Interviews with investors and analyses of prospectuses of recent "on-the-run" issues (considered to be the most liquid in the category).

Notes:

1. I have "normalized" issues size to \$1 billion for comparability.
2. The "normalized" \$1 billion includes all tranches. Therefore, the amounts in each tranche is much smaller.

Table 5 **European to US Securities Outstanding (percent)**

Year	MBS	Credit cards	Other Unsecured consumer credit	Auto Loans	SME loans
1987	0.1%				
1988	0.7%				
1989	0.9%				
1990	1.1%				
1991	1.3%			1.4%	
1992	1.3%			1.8%	
1993	1.3%			3.3%	
1994	1.5%	0.4%	43.4%	2.6%	
1995	1.4%	1.0%	37.4%	1.4%	
1996	1.2%	1.3%	21.3%	3.1%	
1997	1.7%	1.5%	13.8%	2.6%	
1998	1.7%	2.3%	13%	2.1%	
1999	2.1%	3.0%	15%	3.7%	35%
2000	3.2%	4.0%	15%	3.6%	41%
2001	4.2%	3.8%	19%	4.1%	110%
2002	5.3%	4.8%	21%	6.9%	121%
2003	7.4%	6.5%	23%	7.8%	158%
2004	8.8%	9.1%	14%	11.8%	203%
2005	10.4%	13.6%	11%	11.6%	345%
2006	12.8%	13.7%	14%	15.7%	397%
2007	16.6%	10.2%	16%	23.2%	622%
2008	24.8%	12.6%	27%	36.5%	677%
2009	26.6%	11.4%	33%	45.1%	761%
2010	25.7%	12.9%	30%	43.7%	733%
2011	24.4%	14.5%	34%	42.9%	776%
2012	20.1%	23.0%	30%	45.0%	641%
2013	17.4%	30.0%	29%	41.0%	490%
2014	16.6%	26.3%	26%	41.2%	410%

Source: SIFMA reports for US securitization and AFME reports for European securitization

Notes:

1. European securitized loans outstanding after 2009 significantly overstated by securities “issued” for the purposes of “repo-ing” with ECB but not sold to investors.

2. US SME loans comprise mainly SBA guaranteed loans.

3. It would be misleading to infer from the table however that securitization of small loans is significantly greater in Europe. For one thing, categorizations of small business loans are not precise: For instance, neither US nor European tallies include securitized leases and equipment loans that may be extended to SMEs. And, the majority of SME loans securitized after 2009 in Europe have been “repo-ed” with the ECB rather than placed with arm’s length investors. The lower ratios in earlier periods are therefore more representative.