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Information Technology and Non-Legal Sanctions in Financing Transactions

Ronald J. Mann

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This Essay investigates the effect of advances in information technology on the private institutions that businesses use to resolve information asymmetries in financing transactions. The first part of the Essay discusses how information technology can permit direct verification of the information, obviating the problem entirely; the Essay discusses the example of the substitution of the debit card for the check, which provides an immediate payment that obviates the need for the merchant to consider whether payment will be forthcoming when the check is presented to the bank on which it is drawn.

The second part of the Essay discusses how advances in information technology can solve information problems indirectly: leaving the problem in place to some degree but mitigating its severity. The Essay uses three examples. First, it discusses how advances in information technology improve the functioning of reputational verification systems, with a special emphasis on the dis-intermediation of securities issuance. Second, the Essay discusses the rise of intermediation by pooling in the area of securitization. The Essay closes by discussing how information technology has facilitated the rise of the information merchant, which can sell information directly to those who need it for their transactions.

Information Technology and Non-Legal Sanctions in Financing Transactions

Ronald J. Mann*

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The problem of information asymmetry is at the core of all financing transactions. It is almost inevitable that the party seeking funds will possess information not already known to the parties that might provide funds. Because the information asymmetry increases the costs of the transaction—the lender should charge more to accommodate the risks associated with the borrower's informational advantage—any arrangement that mitigates the information asymmetry has the potential to lower the costs of the transaction.

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Parties faced with that problem can respond in any number of ways. The simplest response would be to leave the problem unresolved, accepting the premium that the lender would charge as a cost of the transaction. Alternatively, the lender might expend funds to ascertain the relevant information directly (through a tedious process of "due diligence").

Often, however, businesses can use mechanisms to verify the truth of the borrower's assertions, mechanisms that generally might be called verification institutions.¹ From the perspective of the legal system as a whole, those institutions range along a spectrum from mechanisms provided by the law—a suit for misrepresentation or fraud, for example²—to mechanisms that operate almost completely outside the law, such as reputational sanctions.³ In between those two mechanisms fall such institutions as secured credit, for which legal recourse is formally part of the arrangement, but not demonstrably crucial to the effectiveness of the institution.⁴

If we believe that commercial enterprises in the longer run generally design their transactions so as to minimize the costs of such information problems, then the parties to those transactions generally should select the mechanism that best resolves the information problem at the lowest cost.⁵ Thus, two features of the current environment suggest that the current set of institutions is unstable. The first of those is a general rise in the costs of legal sanctions, reflected both in the increasing pecuniary costs of litigation and slowing rates of resolution of civil disputes presented to the courts.⁶ The second is a general decrease in the cost of acquiring, processing, and analyzing information. Taken together, those two effects would presage a significant shift in the balance of institutions away from formal legal sanctions—which apparently are be-

1. For a thorough analysis of those institutions as they currently exist, see Ronald J. Mann, *Verification Institutions in Financing Transactions*, 87 GEO. L.J. 2225 (1999).

2. See *id.* at 2248-49 (discussing the suit for misrepresentation as a type of verification institution).

3. See *id.* at 2252-57 (discussing the mechanics of reputational sanctions).

4. See Ronald J. Mann, *Strategy and Force in the Liquidation of Secured Debt*, 96 MICH. L. REV. 159, 221-32 (1997) (discussing case studies illustrating the generally limited usefulness of foreclosure and repossession on secured loans).

5. The assumption of rational transaction design obviously is less plausible for consumer transactions than for commercial transactions. But even in consumer transactions, there is reason to expect some rationality in transaction design given the relatively competitive markets for providing financing to consumers.

6. That point, of course, is well-known. See, e.g., Gillian K. Hadfield, *The Price of Law: How the Market for Lawyers Distorts the Justice System*, 98 MICH. L. REV. 953, 957-61 (2000). I will not discuss it further here, but simply assume it as part of the background against which I work.

coming more expensive and less effective—to non-legal sanctions—which should become more effective as information-related costs continue to fall.⁷

This Essay does not attempt to prove that point by examination of the non-legal sanctions that appear in a random sample of financing transactions or by case studies drawn to represent all major types of financing transactions. On the contrary, this Essay has a much more modest scope. It provides illustrations drawn from four separate areas in which advances in information technology already have begun to alter the traditional institutions, leading in each case to a rise in transactions that depend less heavily on the traditional legal sanction associated with the older arrangement. Because those illustrations are selected primarily because of their visible conformity to my thesis, it is entirely likely that other observers could locate contrary examples from sectors with which I am not familiar. The illustrations remain valuable, however, for what they do show, which is the powerful potential for information technology to substantially restructure transactional design in ways that have nothing whatsoever to do with the legal system or the effectiveness of legal sanctions.

I begin by discussing the possibility that decreased information costs will allow creditors to obtain information directly, removing the uncertainty that created the information problem. Next, I discuss how falling information costs support a general increase in the feasibility of reputational sanctions. My third topic is the rise of securitization, which essentially uses information technology to lower the costs of uncertainty through the pooling and spreading of ever-greater risks. Finally, I discuss the rise of the information merchant, specializing in the collection and sale of information of value to the prospective lender.

From a wholly economic perspective, the general effectiveness of those various institutions is a cause for celebration: it is difficult to see why they would succeed and spread if they did not function by lowering the costs of information problems, thus lowering the costs of funds to risky enterprises, and thus, in the end, fostering the development and success of those businesses. One possible concern, however, is that the spread of those institutions increases the value of ever more detailed information that might be

7. For a spirited paean to the increasing significance of information, see Peter F. Drucker, *The Rise of the Knowledge Society*, WILSON Q., Spring 1993, at 52.

relevant to the assessment of the creditworthiness and more general reliability of individuals and their enterprises.⁸

The message of this Essay is that the privacy implications of the Information Age cut in two directions. We all share an interest in limiting the intrusive collection and dissemination of information about our affairs,⁹ but rules that hinder the flow of that information easily can hinder the development of the less expensive financing institutions that cheap information has fostered. In an era filled with lamentations about the high costs and inefficiency of conventional litigation, we should think twice before stifling nascent institutions that provide cheaper and more effective devices for resolving information problems.

I. DIRECT VERIFICATION OF INFORMATION

The most obvious effect of information technology is to lower the costs of obtaining and analyzing information. Although cost reductions have a variety of less direct effects, the most obvious one is that sometimes they permit direct verification of information. Thus, in some cases, a business now will be able to design a transaction in a way that permits it to verify directly information that, in an earlier time, could not practicably have been acquired contemporaneously with that transaction. For those transactions, the need for a verification institution (and its attendant costs) drops out entirely.

The checking system offers a fine and fluid example of that process. Merchants that accept checks, for the most part, have to rely on the check-writer's assertions that the check-writer's account contains sufficient funds to cover the check and that the check-writer will permit use of those funds to cover the check. If those assertions turn out to be false—if the check bounces—the merchant will suffer a loss. It is not that the merchant has no remedy—if the

8. For a discussion of the types of information being collected, see *Privacy*, RED HERRING, Sept. 1999, at 92 (unattributed column) (detailing particular types of information collected by various websites); Peter P. Swire, *Financial Privacy and the Theory of High-Tech Government Surveillance*, 77 WASH. U. L.Q. 461, 464-69 (1999); Diogo Teixeira, *Customer Data Could Become Banks' Best Asset*, AM. BANKER, Aug. 19, 1999, at 10, 10 (suggesting that customer information related to Internet purchases has an aggregate value of about \$20 billion per year).

9. Recently collected data suggest that increasing familiarity with the Internet is increasing, not decreasing, consumer concerns about data privacy. See *Shopping the Web: A Detailed Look at the Online Buying Process*, in E-COMMERCE CONSUMERS: WHAT, WHERE AND WHY THEY BUY 12-13 figs.8-9 (The Standard and Odyssey ed., Spring 2000) (unpublished report, on file with author) (presenting survey results showing that 82% of all online shoppers, 86% of female shoppers, and 88% of experienced online shoppers would be "much more likely" to buy from a Web retailer that promises not to share personal information).

merchant has performed its role in the transactions, the merchant can file an action against the customer seeking to recover the amount of the check.¹⁰ Alternatively, the merchant can pay a third party (a lawyer or collection agent) to attempt to obtain the funds from the check-writer. The sad truth, though, is that neither of those courses of action is likely to leave the merchant in a position as good as the position that he would have occupied if the check had been paid in the first instance. The loss to the merchant from the bounced check—the unpaid amount and the costs expended in collection efforts—arises inevitably from the merchant's failure to verify the check-writer's assertions at the point of sale.

Because those costs are significant, many retail merchants use a common verification institution to lower their net losses from nonpayment of checks. Specifically, they pay a third party a small portion of every payment to verify the likelihood of payment by determining whether the check-writer is reliable.¹¹ For example, in 1999, U.S. merchants verified 8.3 billion checks worth a total of about \$428 billion.¹² The process is a simple one: at the point of sale, an employee swipes the check (capturing the customer's bank account information) or driver's license and transmits the information over a telephone connection to the verification service, which examines whatever information sources it maintains to determine if the transaction should be authorized.¹³ Those sources sometimes include merely negative information (past bad checks and the like), but in other cases they also include positive past credit information or, in some cases, more sophisticated scoring systems.¹⁴ That serv-

10. See U.C.C. § 3-310(b) (2000) (permitting holder of bounced check to pursue drawer on underlying obligation); *id.* § 3-414(b) (permitting holder to pursue drawer on bounced check). If that is impractical given the amount of the check (as it often must be), the merchant's recourse might be limited to referring the bad-check writer for criminal prosecution, a course that costs the merchant less but also is directed less pointedly at recovery of the merchant's loss.

11. It is not clear to me why those services have not developed a way to verify the account balance directly at the time of the transaction. My best guess is that banks would be unwilling to release that information to third parties, although banks are happy to use it to implement their own debit-card products, which are discussed below.

12. *Check Authorization 1999*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), May 2000, at 1, 8-9 tbl. That reflects a market penetration of just over 28%, given the 29.35 billion checks written in retail purchase transactions in 1998 (1999 statistics not yet being available). See *Payment Systems*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), Dec. 1999, at 1, 6. Interestingly, the market penetration is increasing rapidly—the number of verified checks rose 25% between 1998 and 1999. *Id.*

13. See *Check Authorization 1999*, *supra* note 12.

14. See *id.* at 9 tbl.

ice is relatively inexpensive, generally costing about fifteen to twenty cents per check.¹⁵

Some services, however, go farther to include not merely an assertion regarding past check-writing habits, but also a guaranty: the service agrees that it will bear the loss that arises if the check in fact is dishonored. In 1999, check guarantee services covered 907 million checks worth a total of \$81 billion.¹⁶ The process works much the same way as the verification process, except that the service agrees to bear the loss if the check bounces. That service, however, is much more expensive, ranging from a low end of 1 percent to 2 percent of the face amount of the check at a high-volume and relatively low-risk merchant (such as a grocer), to a high end of 5 percent at a casino or other high-risk merchant.¹⁷ Although those services do not remove the cost entirely, merchants use them because the net effect of the service reduces the aggregate losses from the unverified information more effectively than the traditional method of a post-hoc lawsuit.¹⁸

Even the check-guaranty service, however, leaves the merchant with a substantial loss from the incompletely verified information (the cost of the service and the merchant's share of any remaining bad checks). New technologies, however, have made it practicable to reduce the losses from unverified payment commitments much more completely by providing payment systems in which the consumer's assertions about willingness and ability to pay can be verified directly at the time of sale. Although the options are evolving rapidly,¹⁹ the most prominent success to date is the point-of-sale debit card.

15. See *id.* at 8-9 tbl. (reporting revenues of \$1.43 billion to verify 8.3 billion checks worth \$428 billion).

16. See *id.* at 9 tbl. Those statistics also reflected a 16% increase over the previous year. *Check Authorization 1998*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), May 1999, at 1, 8. Not surprisingly, the average check for which a merchant sought a guaranty is significantly larger than the average verified check (\$89 versus \$52). See *Check Authorization 1999*, *supra* note 12, at 9 tbl. Those statistics also reflected a significant increase over the previous year. See *Check Authorization 1998*, *supra*.

17. *Check Authorization 1998*, *supra* note 16, at 8.

18. Doubtless there is also some element of insurance, using third parties to spread the in-eradicable element of the bad-check risk. Given the large size of many of the most prominent American retailing chains, however, I suspect that the risk-spreading element is a relatively small part of the transaction.

19. Two additional options that I do not discuss here are the stored-value card and electronic money. Although the stored-value card has become reasonably popular in Europe, see *Britain Sets Smart Card Plan To Beat Fraud*, REUTERS, Mar. 15, 1999 (reporting plans for the issuance of 100 million smart cards in Britain); *Norway Group to Use Proton's Technology*, AM. BANKER, Sept. 22, 1999, at 12, 12 (reporting programs using Proton brand smart cards in Nor-

A debit card appears indistinguishable from a credit card, but the practical and legal consequences of a debit card transaction are quite different from those of a credit-card transaction. Technologically, the merchant that accepts a debit card uses an on-line connection to the check-writer's financial institution to obtain a contemporaneous verification of the customer's willingness and ability to pay. Thus, the merchant knows before the consumer leaves the register that it will obtain payment for the transaction without further costs or effort.²⁰

Even more importantly, the network agreements among the merchant, the merchant's financial institution, the card network, and the card-issuing bank do not provide any right of chargeback.²¹ Applicable federal statutes draw a similar distinction between the Electronic Funds Transfer Act permitting finality in debit-card transactions and the Truth-in-Lending Act barring finality in credit-card transactions.²² Hence, unlike a credit-card transaction (or, for that matter, a check transaction),²³ the debit-card transaction is functionally final at the moment of sale, with no party hav-

way, Belgium, the Netherlands, and Switzerland), available at 1999 WL 21143501, it has not yet become a significant general payment device in this country. See RONALD J. MANN, PAYMENT SYSTEMS AND OTHER FINANCIAL TRANSACTIONS 256-67 (1999) (providing a general discussion of stored-value cards). Electronic money is still further from practical realization, but at least in theory it would provide merchants in Internet transactions the same kind of immediate verification of payment as the text discusses for debit cards. See *id.* at 272-80; Jane Kaufman Winn, *Clash of the Titans: Regulating the Competition Between Established and Emerging Payment Systems*, 14 BERKELEY TECH. L.J. 675, 691-702 (1999) (discussing reasons why electronic payment systems have been slow to gain market share in this country).

20. See MANN, *supra* note 19, at 141-53 (providing a general discussion of the mechanics of debit-card transactions).

21. See *id.* at 116-21, 124-38, 146-53 (discussing chargeback provisions in credit-card and debit-card network agreements).

22. See *id.* at 116-21, 144-48. I criticize that distinction in a manuscript addressing the policy implications of technology changes for consumer rights in payment systems. See Ronald J. Mann, A Payments Policy for the Information Age 10-14, 17-25 (1999) (unpublished manuscript, on file with author).

23. See U.C.C. § 4-403 (2000) (describing the customer's right to stop payment). The customer's right to stop payment terminates when the customer's bank makes final payment of the check. See *id.* § 4-403(a) (limiting the issuing bank's obligation to stop payment to situations in which it receives notice "at a time and in a manner that affords the bank a reasonable opportunity to act on it before any action by the bank" that would obligate the bank to pay the item under U.C.C. § 4-303). Hence, the decline in the time that it takes to collect checks, especially local checks, has diminished considerably the value of the stop-payment right in ordinary consumer retail transactions. See AM. BANKERS ASS'N, CHECK FRAUD SURVEY REPORT: 1998, at 20, 32 tbl.6 (1998) (reporting 1997 statistics indicating that 89% of banks make funds from local checks available to business accounts on the same day or the next day after the deposit); MANN, *supra* note 19, at 42-54 (describing procedures that collect many local checks in a single day). Nevertheless, the right that remains still seems significantly more favorable than the immediate finality that characterizes debit-card transactions.

ing a later right to retrieve the payment from the merchant except through the cumbersome device of a suit claiming that the merchant breached its obligations in the transaction.

The debit card, as an idea, has existed for decades.²⁴ But it had little practical significance at the point of sale until the last few years during which debit-card usage has skyrocketed. Thus, debit cards were used for less than one percent of consumer payment transactions in 1994, but almost five percent in 1998.²⁵ To put that in sharper perspective, during that same period, debit-card usage rose from five percent of card-based transactions to twenty-one percent.²⁶ Industry analysts expect that rise to continue with debit-card usage expected to overtake credit-card usage by 2007.²⁷ Even more importantly, the last few years have seen the introduction of the first general-use debit cards, operating under the Visa and MasterCard logos. Those cards have contributed to most of the rise in debit-card usage. Indeed, starting from less than 400 million transactions in all of 1994 worth only \$5 billion, the Visa and MasterCard systems already had grown to more than 42 million active accounts, used during the first half of 1999 to complete about 1.8 billion transactions worth more than \$70 billion.²⁸ It is difficult to identify all the causes for the timing of the recent rise in debit-card usage, but it does seem clear that it is attributable largely to the effects of information and communications technology that have made it more and more practical for merchants to maintain point-of-sale terminals with contemporaneous dial-up connections on a register-by-register basis.²⁹ Because the cards bring merchants a shorter checkout time than checks and cheaper discounts than

24. See DONALD I. BAKER & ROLAND E. BRANDEL, *THE LAW OF ELECTRONIC FUND TRANSFER SYSTEMS* ¶ 7.02[1][a], at 7-2 to 7-5 (rev. ed. 1999) (discussing point-of-sale debit systems as early as 1966).

25. *Consumer Payment Systems*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), July 1995, at 1, 6; *Payment Systems*, *supra* note 12, at 6.

26. See *Card Transactions*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), Dec. 1999, at 1, 8-9; *Debit Cards Defined*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), Feb. 1995, at 1, 5.

27. See *Card Transactions*, *supra* note 26, at 9.

28. See *U.S. General Purpose Cards*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), Aug. 1999, at 1, 9-10; see also *Visa and Mastercard—US 1998*, NILSON REP. (HSN Consultants, Inc., Oxnard, CA), Apr. 1999, at 1, 5-7 (providing more detailed statistics for the full 1998 year).

29. See DAVID S. EVANS & RICHARD SCHMALENSEE, *PAYING WITH PLASTIC: THE DIGITAL REVOLUTION IN BUYING AND BORROWING* 306-10 (1999) (documenting the rise of PIN-pad merchants and offering possible explanations for its rapidity and timing).

credit cards, it is easy to see why merchants choose to accept them.³⁰

As a practical matter, then, the advances in infrastructure and technology that have fostered the broad rise of the debit card have lowered merchant verification costs by permitting the merchant to substitute certain knowledge of contemporaneous payment for the uncertain assertion of future payment that accompanies the checking system. Conceptually, that direct verification removes the need both for the third-party verification provided by the existing check-guarantee services and for the more primitive after-the-fact verification available to the merchant doughty enough to sue the bad-check writer. Although it is difficult to quantify the cost advantages of that shift, the rapid appearance of the soon-to-be ubiquitous point-of-sale debit-card terminals suggests that the savings are substantial.

It is difficult to move from the checking example to a broader generalization about areas in which information technology will lead to direct verification of information, but it is easy to see two limitations. The first is the nature of the transaction. Direct verification of information can be helpful only in transactions in which the information already exists at the time of the transaction: transactions in which the assertion relates to present or past occurrences. Thus, it cannot directly improve the verification of assertions about future performance (most frequently a feature of credit transactions).

That is not to say that information technology cannot improve verification in future-performance situations. For one thing, the example I used above is one in which information technology

30. Even at the most highly favored merchants (e.g., grocery stores), charges on credit cards, including both the interchange fee and the charges of the acquiring bank, are approximately 1.4% of the purchase price, while charges on traditional debit cards are in the range of 3 to 11 cents. Charges on the newer off-line debit cards offered by MasterCard and Visa are somewhere in between, but still significantly higher than traditional debit-card charges. See *id.* at 132; Charles Keenan, *Debit Card Acceptance Heats Up Feud over On-Line vs. Off-Line Versions*, AM. BANKER, Mar. 13, 1998, at 1, 12. Perhaps the most unclear thing about the debit card is why it is attractive to consumers. Compared to the credit card or the check, the consumer loses the float on the transaction. Debit cards also tend to have considerably smaller affinity programs. See Helen Stock, *In Debit Card Market, Loyalty Programs Are Shaping Up as the Next Battleground*, AM. BANKER, Feb. 25, 2000, at 1, 10 (discussing the relative rarity of debit-card affinity programs). Finally, although most consumers doubtless are unaware of it, the protections for unauthorized transactions under the Electronic Fund Transfers Act for debit cards are considerably less generous than those for credit cards under the Truth-in-Lending Act. Compare Electronic Funds Transfers Act § 909, 15 U.S.C. § 1693g (1994) (establishing protections for debit cards), with Truth-in-Lending Act § 133, 15 U.S.C. § 1643 (1994) (establishing protections for credit cards). For a general discussion, see MANN, *supra* note 19, at 125-38, 148-53. See also Mann, *supra* note 22 (criticizing the formal legal distinction).

dispensed with the need for future performance entirely.³¹ More generally, institutions that improve the investor's ability to assess the present facts relevant to the future performance—credit scoring and the pooling discussed below, for example—plainly improve the investor's ability to verify the target's assertion of future performance. The information technology, however, cannot speak directly to the future performance (as it can to the historical-fact issues discussed above) and thus must leave the information problem at least partially in place.

The second limitation is less definitive, a perception that information technology is likely to permit direct verification only in transactions involving relatively simple and objective information (Is the check good or bad?). If the information is more complicated or subjective (Is this company a good investment? Is this the best mountain-bike on the market for my needs?), information technology is less likely to result in direct verification of the information because the costs to the individual user of verifying the information are likely to remain higher than the value of the information. That does not mean that the information cannot be verified. It only means that the merchant will rely on a third party that specializes in assessing the point in question, most commonly one of the so-called "information merchants" that I discuss below. Thus, even in an information-technology age, there is good reason to believe that information users will continue to rely on institutions for verifying all but the simplest information. The question, then, is what those institutions will be, the topic of Part II of this Essay.

II. INDIRECT EFFECTS: ENHANCING VERIFICATION INSTITUTIONS

Although the range within which information technology can foster direct verification of information by the parties to financing transactions is relatively limited, the range within which it can lower the costs of the information asymmetry is quite broad. That is because the general decrease in the cost of information should enhance the functioning of many types of verification institutions. Using those enhanced institutions, the net costs of the asymmetry

31. The genius of the debit-card example is that it uses technology to convert the future performance implicit in the paper-based processing of the check transaction to contemporaneous performance based on electronic processing. That is not feasible in lending transactions, because deferred performance is the central purpose of the transaction, not simply an unfortunate side effect of ineffective clearance institutions.

(that is, the costs of any ineradicable information asymmetry plus the costs of the institutions used to manage it) can be reduced farther than they could through the use of less sophisticated institutions. This part of the Essay discusses three separate areas in which those developments have appeared already: reputational verification; intermediation by pooling; and professional collection and sale of information. In each area, I argue, those developments presage an enhancement in the importance of non-legal sanctions and other privately arranged institutions with a corresponding stagnation or decrease in the importance of legal and other publicly devised institutions.

A. Reputational Verification Systems

The most general effect of information technology arises ineluctably from the decreased cost of collecting and analyzing information: a general enhancement of the effectiveness of reputational verification, the simplest information-based sanction.³² It is easy to see several reasons why reputational verification should work better as information becomes less costly.³³ For one thing, enhanced information flows make it much easier for a lender to be sure that it has obtained (and can count on continuing to obtain) reliable information about reputation-relevant events.³⁴ Similarly, by lowering the costs of analyzing information, information technology makes it easier for the lender to assess the significance of the information that it has obtained. That effect plays out in several ways. For example, it is easier for the lender to match particular pieces of information with particular transactions. Also, it is easier for the lender to develop reliable methods of quantifying less objective events, which makes it easier for a lender to rely on such events in assessing the reputation of a borrower or potential borrower.³⁵

Those effects are crystallized in the rise of computerized systems for routinely collecting and evaluating publicly available in-

32. For a general discussion of the mechanics of reputational verification, see Mann, *supra* note 1, at 2252-57.

33. For a similar perspective focusing on the venture-capital industry, see D. Gordon Smith, *Venture Capital Contracting in the Information Age*, 2 J. SMALL & EMERGING BUS. L. 133, 156-70 (1998).

34. See Mann, *supra* note 1, at 2256 (explaining why reputational sanctioning works better when it is easier for lenders to obtain information about their borrowers).

35. See *id.* at 2256-57 (discussing the importance to a system of reputational verification of objective indicators of misconduct by the borrower).

formation about potential borrowers.³⁶ Some of the effects are simple information-sharing arrangements. Major telephone companies, for example, have an information clearinghouse that makes it easier to identify consumers who fail to pay their telephone bills in a timely manner.³⁷ With more complexity, lenders in an increasingly broad range of transactions use credit-scoring systems to enhance their underwriting practices. Those systems rapidly (in a matter of minutes) collect and evaluate information about a particular borrower, reducing the information to a single number that provides a statistically valid prediction regarding the likelihood that the borrower will default if the proposed loan is granted.³⁸ Indeed, companies now are aiming for something even more valuable, models that can predict which customers are most likely to file for bankruptcy!³⁹

Lenders also are using similar technology to evaluate existing borrowers. In that context, the early-warning system periodically collects publicly available information, sorts through it for information relevant to the lender's portfolio, and then alerts individual officers about warning signs relevant to a particular loan.⁴⁰ Those systems make reputational enforcement much more effective than it could have been just a few years ago because they accelerate the point at which negative information reaches the responsible officer of the lender.⁴¹

36. For a lucid and impressively prophetic discussion of the effects of improved information flows on investors, see Donald C. Langevoort, *Information Technology and the Structure of Securities Regulation*, 98 HARV. L. REV. 747, 757-59 (1985).

37. See *Who Watches Your Credit?: Agencies You've Never Heard of Are Keeping Tabs on Your Spending Habits*, at http://cnnfn.cnn.com/1999/06/02/life/q_creditaccess/ (June 2, 1999).

38. See Ronald J. Mann, *The Role of Secured Credit in Small-Business Lending*, 86 GEO. L.J. 1, 30-34 (1997) (discussing the mechanics of credit-scoring and its importance to small-business lending); Judith Trotsky, *Quick Credit Scoring and Decision-Making Are Critical*, FUTUREBANKER, June 1999, at 34, 34 (discussing importance of credit-scoring for small-business lending).

39. See Lisa Fickenscher, *Eyes on Credit: Software to Predict Bankruptcies in Demand*, AM. BANKER, Mar. 4, 1999, at 9, 9, available at 1999 WL 6033085.

40. See Mann, *supra* note 38, at 34-36 (discussing early warning systems).

41. The efficacy of those systems is evident from the persistent trend in the consumer credit-card markets towards ever riskier groups of borrowers. As those systems increase in sophistication, they allow their users to make ever more reliable judgments about the relative creditworthiness of quite risky borrowers. See, e.g., Lisa Fickenscher, *Specialty Issuers Buffer Big Banks Easing into Subprime Card Market*, AM. BANKER, June 3, 1999, at 1, 12 (describing the process by which "[c]ustomers once considered eligible only for secured cards are now being offered standard credit cards"). As one banker explained, credit scoring allows the bank "to distinguish between highly and mildly risky customers. There is a difference between a doctor who filed for bankruptcy and an immigrant who has come over here to go to graduate school." *Id.* at 12 (internal quotation marks omitted).

The obvious conclusion to draw from the foregoing is that reputation will become a more widespread verification device than it has been in the past. To offer just one possible significant result, consider the use of reputation in the public credit markets.⁴² I have argued that investors in publicly issued debt obligations rely heavily on the reputation of the issuer, and that one of the key determinants of the ability of an entity to sell such obligations at a reasonable price (a price that produces savings on interest costs that exceed the higher transaction costs of the public debt issuance) is the issuer's ability to offer a significant reputational bond.⁴³ Because only the largest companies return to the markets with sufficient frequency for their reputational bonds to be adequate to support that kind of debt, the public debt markets are generally limited to a small portion of the economy, only the very largest companies.⁴⁴

The decreasing cost of information and the corollary increasing effectiveness of reputational sanctions do suggest, however, that the lower limit on reputational enforcement should fall significantly, permitting marginally smaller firms to begin to issue public debt. Moreover, as noted in the first part of this Essay, any such shift would be accelerated by a decline in the costs of direct assessment of information about the party issuing the debt.⁴⁵

It is easy, however, to overstate the effects of that shift. The most prominent arena in which that shift has started to bear fruit is in the area of the direct public offering (commonly referred to as a DPO). The last few years have seen the creation of several services allowing small businesses to issue securities directly over the Internet without the intermediation of any investment bank.⁴⁶

42. For a generally approving discussion of reputational sanctions in that market, see David A. Skeel, Jr., *Shaming in Corporate Law* (2000) (unpublished manuscript, on file with author).

43. See Ronald J. Mann, *Explaining the Pattern of Secured Credit*, 110 HARV. L. REV. 625, 671-74 (1997).

44. See Mann, *supra* note 1, at 2254-55 (discussing the link between size of the borrower and efficacy of the reputational bond).

45. I do not mean to suggest that the markets providing that information are, or will become, perfect. For criticism of some existing practices in the ratings industry, see Mark R. Patterson, *Coercion, Deception, and Other Demand-Increasing Practices in Antitrust Law*, 66 ANTITRUST L.J. 1, 42-48 (1997) (analyzing allegations that Moody's uses threats of bad ratings to force debt issuers to purchase Moody's ratings services). For a more optimistic view about the competitive state of the ratings agencies, see Richard Cantor & Frank Packer, *Differences of Opinion and Selection Bias in the Credit Rating Industry*, 21 J. BANKING & FIN. 1395, 1396-1400, 1405-16 (1997) (concluding that issuers do not use differences among agency rating scales to mislead investors).

46. See Stephen J. Choi, *Gatekeepers and the Internet: Rethinking the Regulation of Small Business Capital Formation*, 2 J. SMALL & EMERGING BUS. L. 27, 37 (1998); Jill E. Fisch, *Can Internet Offerings Bridge the Small Business Capital Barrier*, 2 J. SMALL & EMERGING BUS. L. 57, 75-77 (1998); Donald C. Langevoort, *Angels on the Internet: The Elusive Promise of "Techno-*

Hundreds of companies, going directly to the capital markets without any intermediary, have taken advantage of that opportunity.⁴⁷ Similarly, companies are now trying to use the Internet to solicit potentially interested investors without issuing securities.⁴⁸ Supporters of those systems herald an age of direct transactions between the investors and portfolio companies without the use of any intermediaries.⁴⁹

At least to date, however, the results of those direct stock markets have been disappointing to their supporters. Generally, they have attracted a relatively small number of issuers, who have succeeded in raising only the most modest sums of money.⁵⁰ The analysis above, however, offers a simple explanation for the disappointing results those markets have faced. As I emphasized above, information technology does not magically produce a world of perfect information. Rather, it produces incremental (albeit large) reductions in the cost of information, reductions that incrementally

logical Disintermediation" for *Unregistered Offerings of Securities*, 2 J. SMALL & EMERGING BUS. L. 1, 11-12 (1998); Andrew R. Thompson, Note, *Taming the Frontier?: An Evaluation of the SEC's Regulation of Internet Securities Trading Systems*, 1999 COLUM. BUS. L. REV. 165, 167 (discussing such sites). Those systems follow in the footsteps of a number of pre-Internet systems (most prominently ACE-Net) that also tried to produce disintermediated investments in small businesses. For a good summary of those earlier systems, see Langevoort, *supra*, at 7-9.

47. See Elizabeth Brandon-Brown, *Direct Public Offering—A Viable Financing Option for Small Businesses* (reporting 358 offerings by 185 companies in 1996), at <http://www.directstockmarket.com/DSMExt...asesList/5B11EEB53E393D1882564D4006094B2> (last visited Oct. 21, 1997).

48. See Langevoort, *supra* note 46, at 9-10.

49. See, e.g., John C. Coffee, Jr., *Brave New World?: The Impact(s) of the Internet on Modern Securities Regulation*, 52 BUS. LAW. 1195, 1200 n.21 (1997) (listing such statements); see also Direct Stock Market, *The Direct Stock Markets Technology* (stating that DPOs through DSM empower investors, giving them the ability to communicate directly with company principals, view Virtual Roadshows, and evaluate company information), at <http://www.directstockmarket.com/html/how/forpartners.shtml> (last visited Mar. 26, 2001); DPOCentral International, *What Is a DPO?* ("The Internet offers a tremendous new medium for DPOs . . . [T]he Internet [is] the perfect tool for offering stock to the public."), at www.dpocentral.com/Resources/Education/DPOs/whatis.htm (last visited Mar. 17, 2001); Drew Field Direct Public Offerings, *What Are the Advantages of a Direct Public Offering?* ("DPO's offer a competitive advantage in the marketplace by strengthening customer loyalty."), at www.dfdpo.com/aboutdpos.htm (last visited Mar. 17, 2001). For an early, guarded statement to that effect, see Langevoort, *supra* note 36, at 764.

50. See Fisch, *supra* note 46, at 79; Thompson, *supra* note 46, at 167; James Kim, *Net Breathes New Life into Old Concept: Direct Public Offerings Let Investors Act Like Venture Capitalists*, USA TODAY, July 20, 1999, at 01B (reporting that 321 companies filed for direct public offerings in 1998, but that analysts expected only a third to complete their offerings successfully), available at 1999 WL 6848342; Jennifer Mann, *Specialists Offer Advice on How To Raise Money*, J. REC., July 6, 1999, 1999 WL 9846989 (reporting that direct public offerings to date have raised only \$1 billion, from 800 successful offerings, while angel investors fund about \$20 billion each year); Brandon-Brown, *supra* note 47 (reporting that only 30% of 1996 direct offerings succeeded, while about 95% of stock-exchange and NASDAQ IPOs succeeded).

enhance the efficacy of reputational sanctions. Those incremental enhancements, though, are least likely to be effective in the area of initial public offerings by extremely small enterprises, because those companies often have no track record to support an existing reputation and insufficient size to support a large reputational bond without such a record.⁵¹ Rather, those are precisely the types of companies likely to benefit most from the ability to use the reputational bond of a third party.⁵² Thus, those planning on lending to (or investing in) such companies are likely to retain considerable skepticism about the information problems associated with those companies, even in a world of improved information technology.⁵³

The basic problem is that the direct stock markets have set themselves too hard a task. Advances in information technology are likely to lower the size hurdle for posting significant reputational

51. See Bernard S. Black, *Information Asymmetry, the Internet, and Securities Offerings*, 2 J. SMALL & EMERGING BUS. L. 91, 92-95 (1998) (discussing the limited usefulness of the Internet for small companies in reducing information transfer costs between issuer of securities and investor); Fisch, *supra* note 46, at 78; Langevoort, *supra* note 46, at 14-15. To get a sense for the tiny size of the offerings, the statistics reported in Mann, *supra* note 50, suggest an average size for a successful offering of only \$1.25 million. By contrast, the first 361 conventional public offerings in 2000 raised a total of \$66.9 billion for an average offering amount more than one hundred times as large at about \$185 million. See *Catch of the Day: IPO Buyer's Market*, at <http://www.redherring.com> (Sept. 14, 2000) (on file with author).

52. See Mann, *supra* note 1, at 2269-71 (discussing reputational intermediation in the issuance of securities).

53. There are, of course, other difficulties in disintermediated investments in those companies. One is the obvious potential for fraud, which is aggravated by the influx of unsophisticated Internet day-traders. See Choi, *supra* note 46, at 37-38; Coffee, *supra* note 49, at 1222-27; Fisch, *supra* note 46, at 80-83 (discussing increased risk of fraud with Internet postings); Brian E. Tapchich, *Microbes Invade the Net*, RED HERRING (reporting that microcap-stock scams have quadrupled in the last five years and discussing various schemes for fraud and manipulation), at http://www.redherring.com/index.asp?layout=story&doc_id=1590012759&channel=70000007 (Nov. 1, 1999).

On the other side of the coin is the problem that many of the companies in question would benefit both from sophisticated guidance in the listing process and from careful monitoring. Thus, as Don Langevoort reasons persuasively, the promise of the Internet for those companies is much more likely to be a promise of an easier time locating angel and venture-capitalist-type investors than a promise of a prompt public offering. Langevoort, *supra* note 46, at 16-19; see Fisch, *supra* note 46, at 84-88 (suggesting that small businesses using disintermediated fundraising channels would suffer from the lack of advice that they would get if they used conventional intermediated channels); Ronald J. Gilson, *Understanding the Choice Between Public and Private Equity Financing of Early Stage Companies: A Comment on Barry and Turki*, 2 J. SMALL & EMERGING BUS. L. 123, 126-29 (1998) (suggesting that the monitoring and governance structure of venture capital companies explains the greater returns obtained by development-stage companies that have venture-capital support, as compared to those that obtain equity from public offerings). The recent widely noted success of "incubators" illustrates the importance to start-ups of the advice and contacts available only through intermediaries that bring relations with the money they provide. See generally Peter D. Henig, *And Now, Econets*, RED HERRING, Feb. 2000, at 96 (discussing the rapid rise of venture incubators and their development into broader, more enduring economic networks).

bonds, so that the next tier of smaller companies—those just beneath the smallest traditional public issuers—should develop reputations sufficient to support the issuance of underwritten public securities. The credibility associated with these small issuers will be bolstered by the traditional reputational intermediation provided by investment banks.⁵⁴ Similarly, but at a larger level, the same factors eventually should allow relatively smaller issuers to issue public securities directly *without* the assistance of that intermediation.

Those developments nonetheless provide little help to the issuers that currently appear on the direct stock markets. Those markets currently are populated by so-called “micro-cap” investments, very small companies seeking very small amounts of money.⁵⁵ Their initial efforts did not succeed well because they were far smaller than the smallest companies that typically issue intermediated securities, to say nothing of their minuscule size compared to those companies readily able to issue disintermediated securities. Thus, where others view the limited success as proof that information technology will bring few changes to the institutional arrangements of public fund-raising, I view the more recent evidence of an upward trend in direct public offerings⁵⁶ as surprisingly positive given the obstacles to those offerings discussed above.⁵⁷

The harder question, for which I have no persuasive answer, is why so few large companies have taken advantage of those institutions to issue disintermediated securities. My analysis suggests that those institutions should work well for companies large enough to dispense with intermediation, especially in high-tech markets likely to attract computer-literate investors. Although I cannot yet explain that phenomenon, my general impression is that it arises from a combination of three factors. First, a variety of SEC-imposed rules limit the usefulness of the Internet-based markets by making it difficult to use those markets to raise large sums of money.⁵⁸ Sec-

54. It is difficult to evaluate that question empirically, because numerous other factors are likely to affect the size of initial public offerings, the most prominent being the supply of money into the market for such offerings and the general level of optimism in the market at the time in question.

55. Thompson, *supra* note 46, at 167 n.11.

56. See Kim, *supra* note 50, at 01B (presenting recent data from www.dsm.com, indicating 321 direct public offerings in 1998).

57. See *supra* note 53.

58. See, e.g., Coffee, *supra* note 49, at 1210-13 (analyzing how the SEC should respond to direct stock offerings); Fisch, *supra* note 46, at 64-65 (explaining the traditional SEC limitations on direct offerings).

ond, successful companies may be reluctant to expose themselves to the possible adverse reputational effects of adopting novel methods of financing. Why take a risk on market reaction to a novel financing method if current financing is not a problem?⁵⁹ If the incremental cost advantages are small,⁶⁰ even a slight adverse reputational effect might be enough to deter a shift in financing method in the short run. Third, because fewer investors purchase in the direct markets than in the traditional markets, it will continue for some time to be difficult for large issuers to obtain financing at rates as low as the rates that they can obtain in the more populated conventional public debt markets.

In my view, however, none of those obstacles can long withstand the basic cost advantage of disintermediating a substantial portion of the transactions. First, the SEC has shown every intention of facilitating Internet transactions in a safe way, so it seems unlikely that it will adopt a regulatory posture that makes those transactions permanently difficult.⁶¹ Second, the last few years

59. As Jill Fisch explains:

Investors may also view the absence of outside expert involvement in Internet offerings as a negative signal. Investors may reasonably perceive that an issuer who bypasses the traditional underwriter route does not meet the quality standards of the investment banking community. After all, if an issuer can raise more money through a traditional IPO, why would a company that qualifies to do an IPO choose a DPO instead?

Fisch, *supra* note 46, at 79; see Coffee, *supra* note 49, at 1204 (suggesting that such an issue might be "a desperate gamble by an issuer with no other alternatives").

60. On that point, I do not think it is a coincidence that one of the main forces driving direct public offerings is a perception that the fees charged by investment bankers are excessive. See Drew Field Direct Public Offerings, *supra* note 49 ("Direct public offerings are considerably less expensive than traditional underwritten offerings . . ."); Gregory M. Kratofil, Jr., *Internet Can Serve Your Company's Capital Needs*, KANSAS CITY STAR, June 29, 1999, at D12 (reporting costs of traditional intermediated offering as 15% while costs of a direct disintermediated offering are only 6%), available at 1999 WL 2422779; David Lipschultz, *Wide Open*, RED HERRING, June 2000, at 387, 392-96 (discussing how the high costs of traditional IPOs are spurring the search for successful models for Internet-distributed IPOs); Mann, *supra* note 50 (reporting that direct public offerings are relatively cheap, because "using underwriters also adds 7 percent to 10 percent to the cost of an offering"); *More Companies Than Ever Do Their Own IPOs*, BUS. WIRE, Apr. 2, 1999 (reporting that the cost of a traditional IPO usually is about 15% of the total amount raised, compared to 3% on a typical \$1 million direct public offering).

61. See, e.g., Coffee, *supra* note 49, at 1215-16 (discussing the SEC's response to Wit-Trade's unauthorized bulletin-board trading system); Fisch, *supra* note 46, at 69-75 (discussing the SEC's beneficent attitude to Internet securities trading). That is not to say that the SEC is sanguine about the Internet as a securities market. On the contrary, the SEC seems quite alert to the possibility—indeed, the reality—that Internet transactions will lead to fraud and sharp dealing to the detriment of investors. See Ianthe Jeanne Dugan, *Levitt Warns Traders of Online Excesses*, WASH. POST, May 5, 1999, at E03 (reporting broad SEC investigation of disclosure compliance by online trading firms), available at 1999 WL 17001260; Fisch, *supra* note 46, at 81-82 (discussing SEC responses to Internet-related securities fraud); Gretchen Morgenson, *Online, Day Trading Subject of Federal Probe*, SEATTLE POST-INTELLIGENCER, Aug. 30, 1999, at C5 (reporting SEC probe of adherence of online brokerages to regulations regarding short sales), avail-

have seen a huge increase in the number of investors that populate the Internet markets, which, at this point, seems quite adequate to provide sufficient capital for even the largest issuers.⁶² Thus, although the process has gone slowly to date, I continue to believe that the coming years will witness a rapid increase in disintermediated issuances and in intermediated public issuances by ever smaller companies. The deeper point for this Essay, though, is the motive force behind that trend, the increased effectiveness of the non-legal reputational sanction.

B. Intermediation by Pooling

The previous Section analyzed how advances in information technology enhance the ability of a first-party verification system—the ability of the borrower to use a reputational bond to mitigate information problems in its financing transactions. Information technology also has fostered the growth of securitized transactions in which a large group of information-problematic transactions can be verified through the intervention of an intermediary that pools the transactions and sells small interests in the pool as a whole. The key to that process, from my perspective, is the way in which information technology has made it feasible for the intermediaries that pool the transactions to provide en masse assessments of transactions for which the most cost-effective practice formerly was case-by-case, lender-by-lender examination.

To understand the magnitude of the advance in information verification, consider the information problem presented by the individual home-mortgage transaction.⁶³ The key piece of information in that transaction is the likelihood that the borrower will repay the loan as agreed. The relatively low credit standing of the average home-mortgage borrower makes it difficult for the borrower to use its reputation or anything else to verify that assertion.⁶⁴ Accord-

able at 1999 WL 6600302; *SEC Charges 44 with Internet Securities Fraud*, REUTERS, Oct. 28, 1998 (reporting SEC prosecutions for Internet securities fraud).

62. See, e.g., *A Play for the Big League*, GUARDIAN, Feb. 9, 1999 (discussing comments by Alan Greenspan and Bill Gates about the "irrational exuberance" and "gold rush" mentality of investors rushing to Internet-related investments), available at 1999 WL 12070147.

63. I use that example because (as explained below) that is the context in which this type of pooling securitization first succeeded. See *infra* note 74 and accompanying text (discussing the early history of home-mortgage securitization).

64. I do not mean to suggest that home-mortgage borrowers are less creditworthy than other individuals, only that they generally are less creditworthy than the large corporations that

ingly, the potential investor in such an obligation must resort to some other device for assessing the reliability of that assertion. As it happens, a thorough assessment of the assertion involves a considerable body of information, ranging from objective items like the borrower's income and outstanding debt, and the value of the home in question, to more subjective items such as the possibility of undesirable future events like a default or prepayment by the borrower.

The market for such obligations traditionally operated on a case-by-case basis with each lender evaluating each transaction and advancing funds at a price (interest rate) that reflected the lender's assessment of all of the relevant information regarding the likelihood of repayment. That case-by-case process was relatively expensive both because it was time-intensive and because the idiosyncrasy of the resulting obligations made them relatively illiquid.⁶⁵

Developments in information technology, however, have completely transformed that market. In the current economy, home-mortgage notes are issued through a sophisticated set of institutions that dramatically lower the transaction costs of assessing information and produce highly standardized obligations of great liquidity. The result is a significantly more efficient market for investment in home mortgages in the sense that the cost of borrowing is significantly lower than it otherwise would be⁶⁶ and also, perhaps more significantly, in the sense that the market now includes a

typically borrow in the public debt markets in which mortgage-backed securities now are bought and sold.

65. See Ronald J. Mann, *Searching for Negotiability in Payment and Credit Systems*, 44 UCLA L. REV. 951, 969 (1997) (describing transactions in traditional home-mortgage markets).

66. It is difficult to quantify the degree of cost savings, but the figures certainly are substantial. See STEVEN K. TODD, *THE EFFECTS OF SECURITIZATION ON CONSUMER MORTGAGE COSTS* 5 (Social Science Research Network, Working Paper No. 223585, 2000) (concluding that origination fee costs in the home-mortgage market are reduced by about 0.5 basis points, approximately \$2 billion, per year), at http://papers.ssrn.com/paper.taf?abstract_id=223585. A variety of studies have reached varying conclusions regarding interest savings, but the most conservative suggest a long-term interest-rate savings in the range of 20 basis points. See *id.* at 6-7 (reviewing studies examining the effect of securitization on mortgage market). The most sophisticated analysis with which I am familiar concludes that borrowers in the home-mortgage market realize some substantial savings from the process. Frank Byrt, *Underwriting Software Turning Small Lenders into Bigger Competitors*, AM. BANKER, Aug. 26, 1998, at 5, 5 (reporting Fannie Mae estimate that adoption of automated underwriting would save borrowers \$100 million per year in interest payments); see Karen Talley, *Citi Sees Itself Securitizing Corporate Debt Worldwide*, AM. BANKER, Mar. 16, 1998, at 17, 17 (reporting that Citicorp's corporate securitizations usually bear interest rates about 50 basis points cheaper than conventional long-term financing).

wide range of different submarkets with different rates and terms for borrowers of differing credit quality.⁶⁷

The first advance comes at the point of issuance, where the credit-scoring systems discussed above generate relatively accurate predictions of the risk of default based on a relatively small number of data points.⁶⁸ Thus, the costs of collecting information have shrunk considerably, while the accuracy of the resulting assessment has remained more or less the same (with your opinion on the relative accuracy depending on your relative faith in the skill of experienced loan officers versus the skill of sophisticated computer programs).⁶⁹

The more important piece of the picture, however, is what happens to the obligation once it has been issued. The changes in the process of issuance have resulted in a set of standardized obligations for which a set of standardized data points has been collected.⁷⁰ Information technology works in several different ways to make it practicable for an intermediary to collect a large number of those obligations, to pool them, and to issue securities representing very small shares of the pool of obligations.⁷¹ First and most obviously, it would not be practicable without relatively advanced information technology for the intermediary to perform the ministerial tasks of dividing the pool of obligations into huge numbers of separate shares, monitoring the sums due to the holders of the separate shares, and delivering payments to those holders. Moreover, the ability to perform computerized analyses of large pools of

67. For a general discussion of the newly developing sectors of the home-mortgage financing market, see CHARLES W. CALOMIRIS & JOSEPH R. MASON, *HIGH LOAN-TO-VALUE MORTGAGE LENDING: PROBLEM OR CURE?* 15-34 (1999).

68. See Mann, *supra* note 38; text accompanying note 38 (discussing the advent of credit-scoring systems). The dependence of securitization on credit-scoring is suggested by the link between the recent spread of small-business credit-scoring software and the rise of small-business loan securitization. See Sara Nathan, *Scoring, Underwriting Software Being Linked to Spur Securitization*, AM. BANKER, Nov. 17, 1997, at 10, 10.

69. Another advantage of that software is that it considerably diminishes the advantage of large issuers by lowering the entry barriers to the industry. The enhanced competition also should work to bring down the costs of lending in the area. See Byrt, *supra* note 66, at 5 (reporting Fannie Mae estimate that the spread of automated underwriting would lower closing costs by \$2 billion a year and interest payments by \$100 million a year).

70. The homogenization of the obligations has been accomplished by the almost universal use of a single standard-form home mortgage. Information technology had nothing to do with that process, which occurred simply because the standardization makes the pooling process much simpler.

71. See Ann M. Burkhart, *Lenders and Land*, 64 MO. L. REV. 249, 279-80 (1999) ("Technology . . . has facilitated the rapid sale of loans from their originators to the secondary market."). For a thorough and informed summary of the securitization process, see Claire A. Hill, *Securitization: A Low-Cost Sweetener for Lemons*, 74 WASH. U. L.Q. 1061, 1066-77 (1996).

obligations allows the intermediary to rely on the law of large numbers to minimize the significance of any deviations from expected performance, thus limiting the costs of inaccurate information.⁷² Finally, because of the liquidity of those small standardized shares, investors accept a much lower return on those shares than they would on individual underlying mortgages of a similar face value.⁷³

The effectiveness of that process is not purely hypothetical. Since its introduction in the early 1970s by the Federal Home Loan Mortgage Corporation, that process has spread to a number of related quasi-governmental agencies (the Federal National Mortgage Association and the Governmental National Mortgage Association) and more recently to several large private financial institutions.⁷⁴ It now completely dominates the home-mortgage industry, being used to finance more than three-quarters of all new home mortgages issued in this country.⁷⁵

That percentage should continue to rise as the technology matures sufficiently to function effectively for less reliable transactions (the so-called "subprime" market).⁷⁶ The system has the po-

72. See CALOMIRIS & MASON, *supra* note 67, at 36 (explaining that pooling of loans increases the predictability of average loan performance); see also MICHAEL O. FINKELSTEIN & BRUCE LEVIN, STATISTICS FOR LAWYERS 117-22 (1990) (explaining statistical rules that limit variations from expected amounts in large normally distributed populations).

73. For a basic discussion of the benefits of liquidity in this context, see MANN, *supra* note 19, at 469-70.

74. See 2 GRANT S. NELSON & DALE A. WHITMAN, REAL ESTATE FINANCE LAW § 11.3, at 70-78 (3d ed. 1993) (Practitioner Treatise Series) (discussing the growth of the market for mortgage-backed securities); Burkhart, *supra* note 71, at 275-76 (discussing the rise of private issuances since the mid-1980s); Michael H. Schill, *The Impact of the Capital Markets on Real Estate Law and Practice*, 32 J. MARSHALL L. REV. 269, 270-76 (1999) (same). See generally PETER J. WALLISON & BERT ELY, NATIONALIZING MORTGAGE RISK: THE GROWTH OF FANNIE MAE AND FREDDIE MAC (2000) (documenting and discussing dominance of Fannie Mae and Freddie Mac in residential mortgage market).

75. See Burkhart, *supra* note 71, at 274-77 ("By the mid-1990s, more than three-quarters of the new single family residential mortgages were being securitized."); Schill, *supra* note 74, at 271 (presenting recent statistics on this phenomenon). As of December 1998, Federal Reserve statistics indicated that securitized mortgage pools held about 53% of the total outstanding mortgage debt on one- to four-family residences in this country. *Mortgage Debt Outstanding*, 84 FED. RES. BULL. A35 (Dec. 1998) (noting that there was \$2,232,659,000 combined total of mortgage pools or trusts for one- to four-family residences out of a total of \$4,195,738,000 for that same residence category).

76. See, e.g., Karen Talley, *Small Banks Stepping up High-LTV Securitizations*, AM. BANKER, Jan. 20, 1998, at 7, 7 (discussing the increasing success of securitization by small banks of high-LTV home mortgages); Heather Timmons, *Pioneer of High LTVs Is Still the One To Watch*, AM. BANKER, Nov. 19, 1997, at 12, 12 (discussing the nascent use of securitization of home mortgages issued in amounts that exceed the value of the home). The decline in the quality of loans being securitized is epitomized by the SEC's recent decision to permit securitization of packages of loans with up to twenty percent of the loans delinquent at the time the securities are issued. See Aaron Elstein, *SEC Shifts To Allow 20% Delinquencies in Asset-Backeds*, AM. BANKER, Oct. 21, 1997, at 1, 26; see also Karen Talley, *To Russia with Securitization: Fannie Is*

tential to be unusually valuable in that area because of the relatively higher variability of return associated with loans of greater risk. The problem risky loans present to investors is not just that the likelihood of nonpayment is higher (something for which a higher interest rate could compensate), but that the lender's estimate of the likelihood of nonpayment on any given loan is less likely to be accurate. Pooling provides a substantial response to that difficulty by allowing each lender/investor to obtain a share in a pool of loans for which a large percentage deviation from the anticipated rate of default is much less likely than it would be for any single loan in the pool.⁷⁷

A central part of the pooling system is the willingness of the intermediary to make representations about the obligations contained in the pool that backs the securities. The investors do not themselves examine the underlying obligations in any substantial way. Instead, they rely on assertions by the intermediary as to the general quality, geographical diversity, and aggregate payment terms of the entire pool of obligations.⁷⁸ The reliability of those assertions, in turn, is verified by two separate institutions: the intermediary's reputational bond and a limited form of guaranty.

The most obvious is the guaranty; many intermediaries that package such securities offer some guaranty of performance on the securities.⁷⁹ Although a law-centered view of the process might view that guaranty as much more important to the system than the informal reputational sanction, I am convinced that the customary limitations on the guaranty leave considerable work for the reputational sanction to do. For one thing, guaranties are not universally provided, and, even when they are provided, they do not always ap-

Helping Moscow Establish a 'Natasha Mae,' AM. BANKER, Apr. 4, 1997, at 10, 10 (discussing plans to securitize Russian loans despite the "steep" economic problems in Russia). Although that market has experienced considerable dislocation as it has grown, *see, e.g.*, Heather Timmons, *Subprime Lender Files for Ch. 11 Reorganization*, AM. BANKER, Oct. 5, 1998, at 16, 16 (discussing those problems), current conditions suggest that it will grow significantly in the immediate future. *See* Heather Timmons, *High-LTV Securities Coming Back, with New Buyers*, AM. BANKER, Apr. 27, 1999, at 9, 9.

77. *See* Hill, *supra* note 71, at 1074-75.

78. *See, e.g.*, KENNETH G. LORE & CAMERON L. COWAN, MORTGAGE-BACKED SECURITIES: DEVELOPMENTS AND TRENDS IN THE SECONDARY MORTGAGE MARKET 4-105 to -106, 4-111 to -114 (1999) (describing customary disclosures of information related to pooled mortgages); Hill, *supra* note 71, at 1074-75.

79. *See* 2 NELSON & WHITMAN, *supra* note 74, at 72-75 (discussing guaranties of mortgage-backed securities by the quasi-governmental entities that issue them).

ply to the lower tiers of securities.⁸⁰ The most direct evidence to support my view is the considerable disclosures the intermediaries provide regarding the underlying obligations.⁸¹ If the intermediary's guaranty made payment adequately certain, then the investor would have no need for that information; it would care only about the payment terms of the security and the reliability of the guarantor.

More generally, it is easy to see four concerns about the securities that the guaranty does not assuage. First, the guaranties are not costless to enforce; it is cheaper for an investor to receive a payment in the ordinary course of business than to coerce payment through exercising its rights on a guaranty.⁸² Second, payment is not sure even under a guaranty because of the possibility that the intermediary will fail (a possibility that increases as a larger group of purely private institutions begin to issue such securities).⁸³

Third, the terms of the guaranties typically do not require timely compliance with all payments due under the securities; thus, even if the guarantor promptly complies with its obligations, the investor may suffer some loss from deferred payment.⁸⁴ That is not a mere technicality; knowledgeable observers believe that the market discounts the prices of the securities that include such provisions to account for that problem.⁸⁵

Finally, in most cases, the guaranties do not protect the investor from the risk of prepayment. The "pass-through" structure commonly used for those securities leaves investors exposed to a relatively unattractive risk of prepayment. As homeowners make payments on the underlying mortgages, the payments are pooled, allocated, and passed through to the securities holders. Thus, when individual homeowners repay their mortgages before their maturity

80. E-mail from Claire A. Hill, Assistant Professor of Law, Chicago-Kent College of Law, to Ronald J. Mann, Professor of Law, The University of Michigan Law School (Aug. 20, 2000) (on file with author).

81. See *supra* note 78.

82. See Mann, *supra* note 1, at 2248-49, 2260 (discussing the difficulties of relying on legal action as a method of verifying the truth of assertions made by guarantors).

83. See sources cited *supra* note 74 (discussing privately issued securitized home-mortgage obligations). It is also worth noting that there is some credit risk even among the government-issued securities because, unlike Ginnie Mae securities, Fannie Mae and Freddie Mac securities are not backed formally by the full faith and credit of the federal government. See 2 NELSON & WHITMAN, *supra* note 74, at 75; MARCIA STIGUM, *THE MONEY MARKET* 63-64 (3d ed. 1990). The significance of the separate credit strength of Fannie Mae and Freddie Mac is evident from the close oversight Congress gives to the financial position of those entities. See 2 NELSON & WHITMAN, *supra* note 74, at 73.

84. See STIGUM, *supra* note 83, at 63-64.

85. See *id.* at 64.

dates (typically upon a sale of the home or refinancing of the mortgage), holders of the securities receive payments on their securities sooner than the contractually required dates;⁸⁶ because prepayments tend to come at times of low market interest rates, prepayments that come sooner than expected are costly to the investor.⁸⁷ Again, that is not a purely theoretical problem; for example, one series of GNMA securities was prepaid in its entirety after only two years because of underlying home-loan prepayments sparked by falling interest rates in the 1980s.⁸⁸

From my perspective, the reason that the unreliability of the guaranty does not seriously trouble investors in home-mortgage securities is that other information-based mechanisms are relieving their uncertainty, the most important of which is the reputation of the intermediary. The intermediaries function in a market ideally suited for reputational verification. They are large entities that return frequently to the market with new issues of securities. Thus, their reputations are quite valuable, probably essential to their continued existence. Furthermore, it is easy to assess their reputations at any time. Events that should undermine their reputations are objectively easy to identify—defaults on securities that they have issued, defaults on their guaranties, or excessive prepayments on securities that they have issued—and the information regarding those events is rapidly and easily accessible to everybody involved in the industry.⁸⁹ It should come as no surprise, then, that industry periodicals publish statistics evaluating the quality of the under-

86. See *id.* (explaining the prepayment risk inherent in a pass-through securities structure). As Stigum explains, the likelihood of prepayment gives the typical thirty-year home mortgage an expected life in normal interest-rate environments of only twelve years. Volatility in interest rates, however, can alter that period significantly. See *id.* Interestingly, the subprime market mitigates that problem by imposing prepayment fees on borrowers in their portfolios. See Heather Timmons, *Subprime Lenders Use Prepayment Fees To Protect Their Portfolios*, AM. BANKER, Jan. 9, 1998, at 8, 8. Mainstream lenders resort to that device relatively rarely because it generally would drive off borrowers at a rate unjustified by the savings to the lender. For examples, see ROBIN PAUL MALLOY & JAMES CHARLES SMITH, *REAL ESTATE TRANSACTIONS* 820 (1998) (stating that lenders commonly trade 0.25% per year in annual interest-rate reductions for a waiver of the right to prepay); Jim Gallagher, *Mortgage Gymnastics Can Keep Rate Low*, ST. LOUIS POST-DISPATCH, Aug. 8, 1999, at E1 (reporting that a bank was offering a 0.38% to 0.58% discount on annual interest rates if borrowers accepted a two-percent prepayment penalty for the first three years of the mortgage), available at 1999 WL 3035756.

87. The connection between low interest rates and refinancing is oft noted, see, e.g., 1 NELSON & WHITMAN, *supra* note 74, § 6.1, at 482; STIGUM, *supra* note 83, at 64, but low interest rates also should spur prepayment caused by sales, because of the increased purchasing power potential home purchasers acquire when interest rates fall.

88. See STIGUM, *supra* note 83, at 64.

89. See Mann, *supra* note 1, at 2254-57 (identifying those factors as crucial to the success of reputational sanctioning).

writing of the various issuers in the market.⁹⁰ Hence, it is easy to see why investors prudently would rely on the assertions of the pooling intermediaries, even as to matters for which the intermediaries had not accepted any formal legal liability.⁹¹

The power of that technology is illustrated not only by its spread into the sub-prime market for home mortgages, but also by its steady spread into completely different types of obligations, the most interesting of which has been credit-card receivables.⁹² The most striking thing about those transactions is that the average credit-card receivable is one of the least liquid obligations imaginable. Its quality depends upon the creditworthiness of the cardholder and the quality of the goods or services provided in the underlying sales transaction out of which the receivable arose.⁹³ Yet, pooling arrangements modeled on the mortgage-backed securities described above have succeeded in providing low-cost financing for literally hundreds of billions of dollars of securitized credit-card receivables.⁹⁴ As with the home-mortgage market, it is difficult to quantify the overall amount of the reduced interest costs, but the rapid growth of the market suggests that they are substantial.

Another interesting feature of the credit-card securitizations suggests that reputation appears to be particularly important to investors in that market. Credit-card securities typically deal with the high credit risk of the underlying receivables⁹⁵ by providing for

90. See, e.g., Joshua Brockman, *Moody's Says Credit Risk Varies Among Issuers of Securitised Loan Pools*, AM. BANKER, Sept. 25, 1998, at 6, 6 (reporting varying assessments of the credit quality of eleven prominent issuers of asset-backed securities).

91. One prominent executive explained: "[T]he banking company knows that its name is on the deal, and that blow-ups will tarnish its reputation [even if all investors are repaid in full] I wouldn't want to have to explain to investors I sold a deal that didn't work." Talley, *supra* note 66, at 17.

92. See CALOMIRIS & MASON, *supra* note 67, at 13 (discussing the relative size of credit-card securitization and other areas other than the government-underwritten conventional home mortgages); see also Claire A. Hill, *Latin American Securitization: The Case of the Disappearing Political Risk*, 38 VA. J. INT'L L. 293, 304-11 (1998) (discussing the rise of "future-flows" securitization in Latin America, transactions which cover not-yet generated receivables).

93. If the goods or services were not satisfactory to the cardholder, the cardholder has a variety of rights to withhold payment under the Truth-in-Lending Act. See MANN, *supra* note 19, at 116-21, 124-25 (discussing rights under Sections 161 and 170 of the Truth-in-Lending Act). Perhaps just as significant, the individual dissatisfied with the goods or services might refuse to pay even if the Truth-in-Lending Act does not excuse payment. That is a much less likely scenario in the case of a home mortgage, particularly one that has been outstanding more than a few months.

94. See Aaron Elstein, *Chargeoffs Raise Specter of Early Investor Payouts*, AM. BANKER, Feb. 18, 1997, at 1, 1 (reporting more than \$100 billion of such sales in the early 1990s, making credit-card securities at that time the "largest sector in the asset-backed securities market").

95. The receivables pooled into securities are not immune from the general riskiness of credit-card receivables. See *id.* at 30 (discussing chargeoff rates of 4-6% in securitized credit-card

an early repayment of the securities if the value of receivables in the pool deteriorates below a certain trigger level.⁹⁶ That mechanism does protect investors from the risk of nonpayment, but it also leaves them exposed to a substantial risk of prepayment, a risk that imposes its own costs on the investors.

Given the general riskiness of credit-card receivables, it is not surprising that, on several occasions, the value of the receivables in a securitized credit-card pool has fallen below the trigger level. In every case except one (a 1991 incident involving a minor issuer), however, the issuer has responded promptly and voluntarily to replenish the pool of receivables so as to prevent an early payout.⁹⁷ Thus, at least one industry observer believes that an early payout would have a sufficiently bad impact on an issuer's reputation that issuers would prefer to replenish pools voluntarily rather than suffer the ensuing harm to their reputations.⁹⁸

* * * * *

The story of pooling is a telling one because it illustrates the power of transaction design to provide opportunities for substantial reductions in information costs. The subject transactions are, as noted above, conspicuous for their illiquidity and for the unimpressive credit strength of the borrowers liable on the underlying obligations. Yet, by the device of intermediated pooling, the market can bring into play powerful non-legal reputational sanctions to verify information at costs that—if market success is an informative indicator—are significantly lower than the costs incurred under less sophisticated arrangements.

The relation between legal sanctions and non-legal sanctions is less direct here than it was in the prior sections of this Essay because none of the developing institutional arrangements directly alter the sanctions that the lenders use against the defaulting bor-

pools). As if that risk were not enough, an increasingly common transaction securitizes future receivables: credit-card receivables from *future* sales transactions. See Hill, *supra* note 92, at 300-04; Aaron Elstein, *Mexican Banks Use a Guarantor To Securitize Future Card Sales*, AM. BANKER, Jan. 17, 1997, at 24, 24.

96. See CALOMIRIS & MASON, *supra* note 67, at 43 (discussing mechanisms for early payout); Elstein, *supra* note 94, at 1 (same); Aaron Elstein, *Investors Shrugging off Concerns over Banc One Card-Backed Security*, AM. BANKER, Jan. 29, 1997, at 24, 24 (explaining that those "securities come with self-destruct mechanisms that automatically pay investors if the portfolio deteriorates too far").

97. See Elstein, *supra* note 94, at 30 (discussing practice of replenishment); Elstein, *supra* note 96, at 24 (discussing cases of replenishment by Mercantile Bancorp and Chase Manhattan Corp.).

98. Elstein, *supra* note 94, at 30; Elstein, *supra* note 96, at 24.

rower. The structures of the transaction itself—all of the steps from the originator to the investors—depend heavily both on sophisticated information technology and on reputational sanctions. It is those stages that have produced the staggering influx of money into the fields in question, an influx that has come despite the stagnant nature of the formal legal institutions available to solve information problems endemic in the underlying financing transactions.

C. Direct Sales of Information

This part started by discussing improvements in the simple two-party institution of reputational verification, and continued with the quasi-intermediated institution of pooled securitization. It closes in this subpart with consideration of the effects of information technology on third-party verification. On that point, the most likely effects appear to come in the area of information merchants: commercial enterprises that sell information that partially or completely resolves the information asymmetry that confronts the lender.⁹⁹ As I have explained in earlier work, third-party verification institutions face an inherent difficulty. If the third party inserts itself into the transaction as an intermediary, it has a conflict of interest that undermines the credibility of its assertions.¹⁰⁰ In some cases that can be overcome if the lender and the third party have some basis for “trust”—a phenomenon that occurs most significantly in this country in the context of angel investing¹⁰¹—but those kinds of relationships depend on contextual factors that are difficult to replicate on a widespread basis.¹⁰²

Conversely, several basic strategic problems make it difficult for an unbiased third party to collect the information itself and to

99. The organization builds on a general discussion and typology of third-party verification institutions that appears in Mann, *supra* note 1, at 2257-71.

100. See *id.* at 2269 (discussing that problem for reputational intermediation in the securities industry). For empirical evidence that the conflict is significant enough to affect market prices and other practices, see Paul Gompers & Josh Lerner, *Conflict of Interest in the Issuance of Public Securities: Evidence from Venture Capital*, 42 J.L. & ECON. 1, 20-24 (1999) (presenting evidence indicating (a) a positive relation between the amount of underpricing of initial public offerings and the relation that the underwriter has to any preexisting venture-capital investor; and (b) that investment banks respond to that problem by targeting their investments at less “information-sensitive” issuers).

101. See Mann, *supra* note 1, at 2265 (discussing angel investing as an alternative to traditional venture capital investments and the less adversarial relationship maintained between the investor and the entrepreneur).

102. For a wide-ranging discussion of the effectiveness of trust-based institutions in the information age, see Paul S. Adler, *Market, Hierarchy, and Trust: The Knowledge Economy and the Future of Capitalism*, ORG. SCI. (forthcoming 2001) (on file with author).

profit by selling it to the lender. One problem, commonly referred to as Arrow's information paradox, makes it difficult for the information merchant to persuade the lender that its information is valuable without disclosing the information.¹⁰³ Another problem is the low cost of replicating and disseminating the information: once the third party discloses the information to the lender, it is difficult for the third party to prevent the lender from transmitting the information rapidly to others who would not have to pay the third party for the information.¹⁰⁴

It seems likely, however, that advances in information technology will allow information merchants to defeat those problems so that the provision of information for a fee will become much more practicable than it has been in the past. Because the feasibility of charging for raw information fosters a rapid specialization in the collection and analysis of information, it should, in turn, foster a considerable advance in the feasibility of all forms of information-based sanctioning in commercial transactions.¹⁰⁵

As with the comments on pooling, that discussion is not entirely hypothetical. On the contrary, anecdotal information suggests that the process already has begun. The rapid rise of a population of almost innumerable Internet retailers of widely varying capacities has spurred a secondary industry of "infomediaries" such as Epinions, ConsumerReview.com, and Deja.com.¹⁰⁶ For example, in the consumer credit area, a wide variety of sites have developed for the express purpose of collecting, analyzing, and selling information likely to be useful to potential creditors.¹⁰⁷ Similarly, creditors whose businesses allow them to collect large amounts of informa-

103. See Mann, *supra* note 1, at 2267-68 (explaining Arrow's information paradox).

104. See *id.* at 2267 (discussing "free-rider" problem where lenders resell information obtained from third party at profit).

105. Cf. Choi, *supra* note 46, at 45-46 (predicting Internet-based certification services aiding investors in publicly traded securities).

106. See Peter Rojas, *The Buying Game*, RED HERRING, Feb. 2000, at 48, 48 ("The Web has made many users wary, and with good reason."); Bob Tedeschi, *Comparison-shopping Sites Have Felt the Shakeout but Hope that a Diversified Source of Revenues May Serve as a Buffer*, N.Y. TIMES, Feb. 5, 2001, at C6 (discussing the difficulty such sites face in developing practicable business models).

107. Any list of such sites would be doomed to be outdated by the time this document was printed from my computer, but a sense for the burgeoning industry is evident from the following sources. *Who Watches Your Credit?*, *supra* note 37 (discussing the rise of new kinds of specialized credit agencies such as tenant screening services, check guarantee and verification companies, debit-credit bureaus, and telephone credit clearinghouses). A partial list of sites that already are up and running would include www.knowx.com, www.informus.com, www.advsearch.com, www.people-wise.com, and my favorite at least based on name alone, www.digdirt.com.

tion about individual consumers are recognizing the value of that information and refusing to allow broad industry use for free as they customarily have in the past.¹⁰⁸

Although that process has not yet gone as far in the commercial lending context, it does seem to be starting. For example, one site called Bestcalls.com collects information about stock analyst conference calls with publicly traded companies and disseminates the information to investors.¹⁰⁹ Other services are starting to provide information about customized portfolios in a "streaming" format similar to the familiar Pointcast service, but specializing in financial information.¹¹⁰ A more telling anecdote came to me in an interview with an executive of a nascent Internet initial-public-offering service.¹¹¹ As explained above, my analysis suggests that the Internet stock markets will have difficulty in raising large sums of money without some mechanism to satisfy investors regarding the credibility of the issuers whose stocks they list.¹¹² The individuals who operate those markets recognize the investors' desire for verification of information about the potential investments that those markets offer.¹¹³ Given the tiny size of most current issuers in that market, it is not practical to rely on the classic securities-market device of obtaining verification by intermediary investment banks. The transactions of the micro-cap issuers that currently populate those markets are too small to bear the large fixed costs of a traditional investment-bank supported transaction (a transaction

108. See Lisa Fickenscher, *Lenders Hiding Credit Data, and Regulators Object*, AM. BANKER, July 7, 1999, at 1, 7 (describing the withholding of credit information from credit bureaus).

109. See Megan Barnett, *Startup Bestcalls.com Dials for Dollars* (discussing the launch of that service, which currently is free), at <http://www.thestandard.com/articles/display/0,1449,3952,00.html> (Mar. 24, 1999). It is possible, however, that the recently proposed SEC Regulation FD—which would require that material information disclosed to analysts be simultaneously disclosed to the public—would foster the development of such services, or at least the regulation would permit dissemination over such a service simultaneously with a conventional disclosure. See Selective Disclosure and Insider Trading, Securities Act Release No. 33-7787, Exchange Act Release No. 34-42259, Investment Company Act Release No. IC-24209, [1999-2000 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 86,228, at 82,847-859 (Dec. 20, 1999), 1999 SEC LEXIS 2696.

110. See Carol Power, *Internet Start-Up Offering Market Data at a Discount*, AM. BANKER, Jan. 19, 1999, at 17, 17 (discussing a new software product designed to facilitate the use by banks of market information about their clients), available at 1999 WL 6031730; Megan Barnett, *Quote.com Mulls Merger* (summarizing a site that provides financial information and predicting that this site would begin providing streaming information by the end of 1999), at <http://www.thestandard.com/articles/display/0,1449,2910,00.html> (Dec. 18, 1998).

111. See Telephone Interview with Clay Womack, President, Direct Stock Market (Nov. 12, 1997) [hereinafter Womack Interview].

112. See *supra* notes 50-56 and accompanying text.

113. See Womack Interview, *supra* note 111.

in which the quality of the investment is verified by the investment bank's insertion of itself into the transaction as a reputational intermediary).¹¹⁴

Responding to that difficulty, one vendor decided to persuade analysts to provide information for a fee without intermediation. Thus, investment banks do not obtain a share of the offering that they are in a position to resell to their customers. Instead, analysts could examine information related to the issuer and post a report at a button on the issuer's home page at Direct Stock Market. For a nominal fee (in the range of five dollars), a potential investor could click on the button and obtain the analyst's assessment of the issuer.¹¹⁵

An analogous device appears at www.iexchange.com. At that site, individuals post their views regarding stocks that are likely to rise or fall. The site tracks the accuracy of the picks and ranks the most accurate predictors based on past performance. Those who visit the site can download current picks for a fee. The system works by rewarding most profitably those whose predictions appear to be the most accurate.¹¹⁶

When I first learned of those programs, I thought little of it. It seemed to me nothing more than a less grand device to provide intermediation to small companies, solving the information verification problem without the large fees and expenses associated with traditional investment-bank reputational intermediation.¹¹⁷ Upon further thought, however, the shift seems to provide a pointed illustration of why those types of mechanisms are ideally suited to developing conditions: they provide more effective verification of the relevant information, and highly sophisticated information technology is required for those mechanisms to function successfully. The following Sections elaborate on those two points.

1. Enhancing the Effectiveness of Verification

On the first point, a comparison between the traditional intermediation arrangement and direct sale of the information suggests that direct sale of the information is superior in two respects.

114. *See id.*

115. *See id.*

116. For a discussion of that site, see Telephone Interview with Clay Womack, President, Direct Stock Market (Nov. 29, 1999).

117. *See supra* note 60 (citing information about the size of traditional investment-bank intermediation fees).

First, from the perspective of the potential lender or investor, direct sale of the information provides a better product because the motives of the information merchant are not contaminated by the intermediary's financial interest in the issue.¹¹⁸ When investors purchase from an investment bank that is underwriting an issue, investors have to worry about the investment bank's motivation to suppress negative information that might harm the prospects of a successful issuance.¹¹⁹ Similarly, although less seriously, free information—not backed by a reputational sanction—is unlikely to be adequately reliable to alter significantly the structure of transactions.

In contrast, when an investor purchases information directly from a disinterested third party, the investor has little reason to worry about mixed motives. The merchant's primary incentive must be to sell information of sufficient accuracy to support a reputation for accuracy and to avoid legal liability for misrepresentation. The merchant will suffer much more from a perception of poor judgment or misrepresentation than it will if an offering that the merchant assesses fails because of negative information provided by the merchant. That situation is directly contrary to the situation that faces an investment bank intermediary.¹²⁰

Of course, the investor might not have access to the advantageous remedies that the securities laws afford against an intermediary like an investment bank, but then there are good reasons

118. Of course, the customer also does not have the comfort of knowing (as he or she does in a transaction with an intermediary) that the information comes from somebody who has put his or her own money in the same investment.

119. For one particularly disappointing story, see KURT EICHENWALD, *SERPENT ON THE ROCK* (1995) (recounting story of Prudential-Bache's misuse of investor funds for personal expenses). Even if reputational constraints can solve that problem, a less direct conflict arises when (as often happens) the investment bank has a venture-capital subsidiary that has invested in the issuer. The available evidence suggests that the marketplace perceives a substantial conflict of interest in that arrangement, which is reflected in relatively greater underpricing of such stock issues. See Gompers & Lerner, *supra* note 100, at 20-22. That problem seems to be mitigated, however, by the investment banks' tendency to select a less information-problematic portfolio of issuers in which they are both an equity investor at the venture-capital stage and an underwriter at the IPO stage. See *id.* at 22-24.

120. For trenchant criticism of investment-bank conflicts, see Marguerite Reardon, *Analyst Owns \$9M in ONI Systems Stock*, at http://www.lightreading.com/document.asp?doc_id=1664 (Sept. 12, 2000). One might think that the information is less reliable because the information supplier is not putting money on the line. But that is true only if the possibility of a loss on the intermediary's investment in the target is a more effective sanction than the loss of a reputation of credibility for the information merchant. Obviously those two effects will have differing relative weights in differing circumstances. My point here is that it is easy to believe that in many contexts the reputational sanction that verifies information provided by an information merchant will be more effective than any sanction available against the conflicted intermediary.

to doubt the general effectiveness of such remedies.¹²¹ Thus, it seems quite plausible to me that a professional, Internet-based information merchant would be at least as motivated by pure reputation-based sanctions as a traditional investment bank would be by the combination of legal sanctions and reputation-based sanctions.¹²²

To be sure, it is easy to imagine situations in which the motives of the information merchant could be contaminated. For example, consider the outcome of an arrangement in which a direct-stock-market issuer could prevent analysts from posting negative reports on the issuer's home page.¹²³ In that arrangement, the analysts would have a significant financial incentive to produce positive reports because only positive reports would be posted so as to provide revenue to the analyst. For the information merchant to provide information that has a credibly high quality, the arrangement has to limit such contrary incentives. That suggests, in turn, that the arrangements will function most effectively if they include credible disclosures of the relations between the information merchant and those about whom the information merchant provides information. With information technology, those disclosures readily could be made effective through the development of a third-party verification service.¹²⁴

Direct sale of information also fosters a more competitive market for the provision of information by unbundling the sale of information from other services. In the traditional intermediary situation, the investment bank provides an array of services to the issuer including such things as advice on structuring the issue and expertise at marketing the issue. Thus, there is no separate charge to the issuer for the service of reassuring investors regarding the reliability of the issuer's assertions about its operations.

121. See Mann, *supra* note 1, at 2248-49, 2262 n.142 (summarizing some of those difficulties).

122. That view is supported, of course, by my view that reputational sanctions generally are enhanced by the advances in information technology discussed in Part II.A of this Essay.

123. The direct-stock-market issuer might wish to prevent negative comments because negative comments would be likely to harm the prospects for the issues as to which the negative comments were made. If the direct-stock-market issuer depends on fees from issues posted on its network, it might wish to deter those negative comments. Those types of conflicts have become increasingly controversial as the importance of website information has grown. See, e.g., Michelle V. Rafter, *Cheap, Cheaper, Cheapest* (discussing controversies about finder's fees that Amazon.com receives from those to whom it gives favorable site placements and reviews), at <http://www.thestandard.com/articles/display/0,1449,3003.00.html> (Dec. 31, 1998).

124. The obvious model would be something like TRUSTe, which is being developed to satisfy privacy concerns raised by the Federal Trade Commission. See *Industry Hopes Seal-of-Approval Programs Will Meet Privacy Self-Regulation Challenge*, 67 U.S.L.W. 2396 (1999).

Hence, it is not clear that the investment bank provides such a service. Large, blue-chip companies, for example, have little need for verification of their assertions by an investment bank because their own reputations provide an adequate mechanism for verification. Accordingly, a competitive market would drive total investment-bank charges to those companies down to a level that included nothing for reputational intermediation. Yet, the current bundled charge for all investment-bank services makes it difficult to tell if that occurs because the bundled charge obscures both the provision of information by the intermediary and the charges imposed for the service of providing it.

By contrast, when verification is provided directly by a disinterested third party, all parties know exactly what is being paid for the information and precisely the format in which the information is being provided. Although it is possible that market will suffer from defects of its own—those discussed above and others I do not foresee¹²⁵—the transparency of that arrangement should lead to a much more competitive market than the currently bundled and opaque arrangements, and thus in the end to more effective provision of information.¹²⁶

2. The Effect of Information Technology

The preceding Section explains why it might be better to have information merchants instead of information intermediaries, but it does nothing to explain why advances in information technology might support the growth of information merchants. The free-rider problem that afflicts traditional information merchants¹²⁷ continues just as surely in this context. For example, returning to the

125. See Choi, *supra* note 46, at 50-54 (noting the superior abilities of public regulators to provide certain kinds of information); see also Bob Tedeschi, *Some Online Sellers Are Hiring Prominent Auditors to Their Verify Privacy Policies and Increase Trust*, N.Y. TIMES, Sept. 18, 2000, at C12 (discussing problems with TRUSTe and the increasing competition TRUSTe faces from Big Five accounting firms).

126. See Langevoort, *supra* note 46, at 15. That assertion rests in part on my view that the rapidly decreasing cost of information in Internet markets already has produced visibly enhanced competition in a variety of markets related to financing transactions, such as the markets for home-mortgage loans and for certificates of deposit. For example, www.lendingtree.com provides a marketplace in which home-mortgage borrowers can comparison shop for loans from a large group of mortgage lenders physically located over the entire country. For statistics, see Hala Habal, *Study Sees Steady Growth for Internet-Only Lenders*, AM. BANKER, Oct. 15, 1999, at 9, 9. The continuing emergence of new formats like www.priceline.com can only enhance the general level of competitiveness.

127. See Mann, *supra* note 1, at 2267-69 (discussing "free-rider" problem).

anecdote from the preceding Section of the Essay, suppose that an analyst expends resources analyzing a potential issuer and developing a succinct description of the issuer's prospects. The analyst then posts that description at a prominent location on the Internet, where potential investors can purchase it for five dollars. After the first purchaser pays five dollars for the information, what is to stop the purchaser from reselling the same information for one dollar to those who inquire later, or, indeed, from giving the information away for free?¹²⁸ If that free-riding problem offers a substantial explanation for the general rarity of information markets in the pre-information technology environment, the low cost of disseminating stolen information in the information age has the potential to make the free-riding problem even worse.

Information technology, however, offers three advantages to those trying to solve that problem and to develop functional information markets. The first point arises from the direct lowering of information costs.¹²⁹ As information technology lowers the cost of information (so that the user need only push a button on a home page instead of placing a telephone call or ordering the information through the mail), the transaction costs of purchasing the information directly can fall below the transaction costs of obtaining it from a pirate. To put it another way, when you can obtain information legitimately and directly by typing in a URL and clicking on a button at the corresponding Internet site, how much effort will you expend to locate an information pirate that will give you the information for a lower price (or for free)?

Similarly, given a perception that it is at best marginally honest to purchase or obtain information from the pirate, norms of honesty may limit the likelihood that investors will patronize information pirates when they can obtain the information legitimately for a nominal fee.¹³⁰ Although that might sound rather implausibly trusting, one of my interview subjects in the direct stock market area assured me that the norm against free riding appears to be the primary backstop on which he is relying in designing the system described in the previous Section of the Essay. He simply

128. See Choi, *supra* note 46, at 47 (noting "free-rider" problem).

129. This point is borrowed directly from Esther Dyson, *Intellectual Value*, WIRED, July 1995, at <http://www.wired.com/wired/archive/3.07/dyson.html>.

130. For a prominent articulation of that point, see Robert Wright, *Dead Head*, SLATE (explaining that the cost of stealing information includes "informal punishments such as being labeled a cheat or a cheapskate" and that "[t]he size of th[ose punishments] will depend on how norms in this area evolve"), at <http://slate.msn.com/earthling/96-10-03/earthling.asp> (Oct. 3, 1996).

does not believe that a significant number of investors will download and repackage the information available from the analysts' buttons. Only time will tell if he is correct.

The second advantage is a partial technological solution to the free-rider problem. By the use of so-called "trusted systems," an information merchant can limit the ability of the pirate to undercut the merchant's market by making it difficult for the pirate to save the information or to print it out for dissemination to other potential customers.¹³¹ Those systems have much the same effect as copy protection had for software in the early 1980s and as Macrovision has for VCR tapes now.¹³² Essentially, those systems provide information in an encrypted form that can be read only on a terminal that has special decryption software provided by the merchant. If the user has a key that can be obtained from the merchant on a case-by-case basis, the software decrypts the requested information so that the user can view (but not save or print) the information. Without the key, the user cannot even view the information.¹³³

Those systems cannot solve the free-rider problem completely—the user could photograph the monitor screen, transcribe the information, or perhaps compromise the software¹³⁴—but they do substantially raise the transaction costs of piracy. In particular, they counteract the cost-reducing effects of the Internet and computerized information processors because now the information thief must reenter the information manually and upload it to the Internet before disseminating it. The costs of that operation substantially increase the marginal cost of the information to the thief,

131. See Mark Stefik, *Trusted Systems*, SCI. AM., Mar. 1997, at 78, 79-80 (discussing the technology of trusted systems). I thank Paul Resnick for help on that topic.

132. See Stephen A. Booth, *Copy-proof CDs*, POPULAR SCI., Oct. 1, 1999, at 59, 59 (discussing Macrovision technology and its coming extension to music CDs); Gordon Brockhouse, *Under Wraps—New Encryption Systems Could Spell the End for Many Types of Home Recording*, STEREO REV., Nov. 1, 1998, at 38, 42 (discussing Macrovision technology and its coming extension to home taping of movies and music); see also ROBERT A. GORMAN & JANE C. GINSBURG, COPYRIGHT: CASES AND MATERIALS 513-14 (5th ed. 1999) (discussing provisions of the Digital Millennium Copyright Act that will limit home recording of most programming not disseminated by free over-the-air television).

133. See Stefik, *supra* note 131. Digital watermark technology has a similar purpose, but it does not prevent copying. Instead, it allows the owner of the stolen information to identify the source of the stolen information by examining unique marks placed in the authorized distributed copies of the information. See Alan Zeichick, *Digital Watermarks Explained*, RED HERRING, Dec. 1999, at 270, 270.

134. As it happens, Congress recently criminalized the act of compromising such software. See GORMAN & GINSBURG, *supra* note 132, at 773-76 (discussing provisions regarding copyright management information). That strikes me, however, more as evidence that hackers frequently attempt to compromise such software than as evidence that such attempts promptly will cease in response to the statute.

substantially limiting the thief's ability to ruin the market of the information merchant. Taken with the low cost of the information and the intangible costs of violating anti-piracy norms discussed above, the further hurdle posed by the trusted systems diminishes the potential for piracy further.

The third advantage is also technological: the ability of the merchant to charge for the information on a bit-by-bit basis. As discussed above, one of the key features that should bolster the efficiency of information markets is the transparency of the pricing arrangements. Under traditional payment systems, however, it would not be cost effective for the merchant to charge a large number of users separate five-dollar fees for each item of information that the users obtain. The transaction costs of any of the traditional systems for remote payment (with credit cards being the best existing candidate for instant completion of remote payment transactions) are too high for such a system to function effectively.¹³⁵ Thus, to the extent that information merchants have begun imposing fees for their information (as a few news providers have done), they generally obtain payment on a subscription basis, where the user makes a single monthly payment that allows the user free access to all of the merchant's information.¹³⁶

For many users, the fixed monthly subscription fee might be an optimal arrangement—how many of us prefer an Internet service provider that offers unlimited access for a fixed fee?—but it is unlikely to be an optimal solution for all users because the fixed fee is likely to exceed the value that the merchant can provide to low-volume users. Thus, the system probably would work more effectively, attracting a larger volume of customers, if it were practical for the merchant to offer metered pricing plans that allowed some users to pay for each item of information that they obtain.

Information technology offers electronic money as a nascent solution for that problem. Essentially, electronic money is a payment system in which the currency is encrypted "ecoins" that a purchaser can provide to a merchant as payment in remote Internet transactions, and for which the merchant can obtain credit in ordi-

135. See MANN, *supra* note 19, at 270-72 (discussing the reasons for the current dominance of credit cards as a payment device in Internet transactions).

136. For general discussion of subscription-based merchants, see Maureen A. O'Rourke, *Fencing Cyberspace: Drawing Borders in a Virtual World*, 82 MINN. L. REV. 609, 627, 629-30 (1998). As I write, prominent examples of the subscription-fee model include *ESPN Insider* (at www.espn.com) and *TheStreet.com*. On the other hand, the *New York Times* (www.nytimes.com) currently charges \$2.50 on a per-article basis.

nary funds from the operator that issued them.¹³⁷ Electronic money is designed specifically to provide payment for very large numbers of micro-payment transactions (eventually as low as small fractions of a single penny) and thus offers negligible per-item transaction costs.¹³⁸ Hence, it is an ideal mechanism for merchants that wish to offer per-item pricing for the information that they sell. By facilitating per-item pricing, electronic money can allow such systems to gain ever larger user bases, which in turn should lower their average per-item costs of providing information.

To be sure, it remains to be seen whether there is a sufficient need for that kind of micro-payments system,¹³⁹ but the basic point seems sound: notwithstanding the inability of the parties to an information transaction to meet face to face, the technology is available to facilitate reliable and inexpensive payment for even the smallest transactions. That can only foster the spread of the information merchant.

III. CONCLUSION

Information technology is a literally Protean feature of our current economic arrangements. As quickly as we understand how it solves one problem, innovators apply it to solve a different problem or engineers develop a better technical device that collects or analyzes information still more quickly than any previous device. Thus, this Essay cannot hope to provide an explanation for where information technology will take us. I only hope to offer a preliminary sense of how it will take us there.

The main point of this Essay is to highlight one important aspect of the changes that information technology will bring to financing transactions, the increasing efficacy with which it will transmit and process information that affects reputation. Information technology does not seem likely to lower the cost of enforcement through the legal system, but it will bring a substantial reduction in the costs of the various information-based mechanisms

137. For a general discussion of electronic-money systems, see MANN, *supra* note 19, at 272-80.

138. *See id.* at 272.

139. *See* Winn, *supra* note 19, at 691-702 (discussing the obstacles that have impeded the spread of electronic-money systems); Alex Gove, *Mad Money* (quoting a leading venture capitalist analyst as arguing that electronic money is unnecessary because "content providers will find that it is cheaper to give away content than to charge minuscule amounts; customers who make larger purchases will either pay on a subscription basis or use their credit cards to make immediate purchases"), at http://www.redherring.com/index.asp?layout=story&doc_id=570016257-&channel=70000007 (Feb. 1, 1997).

that provide alternate sanctions. As those sanctions improve, they will bear more and more of the weight of the task of resolving and mitigating the information asymmetries that are endemic to all financing transactions.¹⁴⁰

That has two implications. First, it suggests that scholars trying to understand those transactions should spend a greater portion of their efforts studying the private arrangements reflected in the design of those transactions and a lesser portion of their effort studying the formal legal rules that purport to govern those transactions. Second, and more chillingly, the information-based mechanisms function well only with free flows of information. As we are just beginning to understand the privacy issues raised by those free flows,¹⁴¹ it is disconcerting to understand the importance to the financial sector broadly of maintaining and even enhancing those flows. Abrupt termination of those flows—not nearly as far-fetched a concern as you might think¹⁴²—would have far broader consequences than a minor lowering of bank-industry profits.

140. I do not mean to suggest that there is no role for government. Curtis Milhaupt suggests that the SEC's activities in the area could develop into something truly useful. See Curtis J. Milhaupt, *The Small Firm Financing Problem: Private Information and Public Policy*, 2 J. SMALL & EMERGING BUS. L. 177, 191-93 (1998) (describing the important functions of regulation in the venture capital market). Also, as Peter Swire has shown, the government can play a key role in facilitating those sanctions by providing for the standardization of mandatory information flows that private parties can analyze. See Peter Swire, *Public Feedback Regulation: Learning To Govern in the Age of Computers, Telecommunications, and the Media* (1993) (unpublished manuscript, on file with author).

141. For a few critical comments, see Don Clark & John R. Wilke, *Firms To Unveil Plans To Protect On-Line Privacy*, WALL ST. J., June 9, 1997, at B9 (discussing consumer-privacy advocates' criticisms of consumer information-service companies), available at 1997 WL-WSJ 2423452; Peter Huber, *Tangled Wires: The Intellectual Confusion and Hypocrisy of the Wired Crowd*, SLATE ("Information wanting to be free doesn't seem so appealing when it includes details about all your flesh and frailties—credit history, shopping habits, records of where you've been, what you asked for, and what you took."), at <http://slate.msn.com/features/tangledwires/tangledwires.asp> (Oct. 18, 1996). For more nuanced views, see Swire, *supra* note 8, at 477-507 (analyzing government access to information). See generally PETER P. SWIRE & ROBERT E. LITAN, *NONE OF YOUR BUSINESS: WORLD DATA FLOWS, ELECTRONIC COMMERCE, AND THE EUROPEAN PRIVACY DIRECTIVE* (1998) (analyzing the difficulties of implementing the European Privacy Directive in our economy).

142. See Dean Anason, *Administration Insists Customers Get a Say in All Data-Sharing*, AM. BANKER, July 22, 1999, at 2, 2 (discussing Clinton administration proposals that apparently would allow consumers to veto all information-sharing about their transactions with banks).