Examining the Microfoundations of Market Incentives for Asset-Backed Lending

by Charles T. Carlstrom
and Katherine A. Samolyk

Charles T. Carlstrom and Katherine A. Samolyk are economists at the Federal Reserve Bank of Cleveland. The authors wish to thank Joseph G. Haubrich, Anjan Thakor, and James B. Thomson for helpful comments.

Introduction

The past two decades have witnessed a virtual revolution in financial intermediation. One innovation is securitization: the packaging of loans into pools that are funded by marketable securities. At the same time, the selling of individual loans has itself grown tremendously over this period. While individual loans are primarily sold to other depository institutions, securitization involves the sales of securities to nonbank investors as well. Both loan sales and securitized loan pools are broadly identified as *asset-backed lending*.

A financial asset is a claim to future cash flows as stipulated by the issuer. What distinguishes asset-backed lending is that the securities involved are backed by specific financial assets and then sold. Alternatively, these financial assets might have been pooled and funded by issuing general claims on the firm. Instead, when a loan is either securitized or sold individually, it is funded separately rather than with the other assets on the balance sheet of the loan originator.[1] Hence, loan sales and securitization, from the perspective of the seller of the asset-backed securities, are a means of *off-balance-sheet finance*.

The proliferation of asset-backed lending has been commonly viewed as a response to competitive and regulatory pressures, which have prompted institutions to participate in credit markets in ways that are not directly reflected on their balance sheets. In particular, capital requirements are cited as reducing the profitability of funding certain investments on-balance-sheet with deposit liabilities. However, nonbank firms that are not subject to the regulations associated with the federal safety net are also engaging in asset-backed financing. This indicates that there are important nonregulatory incentives for loan sales and securitization.

Asset-backed lending has become an important mode of funding for particular types of credit. Though depository institutions are the primary originators of home mortgages, more than 40 percent of these claims are ultimately financed through the government-sponsored secondary mortgage market. In the past several years, however, asset securitization has spread beyond government-sponsored sales of mortgage-backed

■ 1 Although securitized loan pools are funded separately, they are frequently sold with some type of recourse, which means that they are partially backed by the general claims of the firm that originated the loan.

securities to include private pools that are backed by increasingly diverse types of loans, from credit-card receivables to Third World debt. Currently, more than 15 percent of consumer installment credit is funded through securitization.[2]

The evolution of financial market innovations in tandem with changing banking regulations makes it difficult to assess what is driving the trends in asset-backed markets. Because we wish to evaluate why asset-backed lending occurs in the absence of regulations, we examine how successful economists have been in applying formal models to this phenomenon. Although off-balance-sheet funding can arise for either market-based or regulatory-based reasons, we focus on four papers that attempt to model asset-backed lending in the absence of government-sponsored insurance and regulations.

We first outline the general nature of intermediation and describe asset-backed markets in this context. Information costs have long been viewed as a rationale for financial intermediation. The literature on asset-backed lending has picked up on this theme to argue that loan sales and securitization are also best understood as a means of minimizing information costs. Therefore, in order to understand some of the models that have attempted to formalize asset-backed lending, we first discuss several models of financial contracting under imperfect information, which have been useful in characterizing the roles that financial intermediaries play in channeling credit.[3] Finally, we analyze how existing government policies may affect the incentives for firms, primarily banks and thrifts, to engage in these activities.

I. An Overview of Intermediation

In a decentralized economy with significant information and transaction costs, the financial sector affects how resources are channeled from lenders to borrowers. As financial conduits, intermediaries pool lenders' resources to fund a portfolio of claims on many, often diverse, borrowers. In doing so, intermediaries are said to conduct *indirect finance,* allowing them to issue indirect claims with cash flows that differ in varying degrees from those of the borrowers. Thus, intermediaries perform *asset transformation* in making their investment and funding choices.

To the extent that information is costly to obtain, financial contracts and institutions also can reduce the information costs associated with channeling resources to the most productive investment opportunities. Thus, intermediation yields more attractive portfolio choices for investors while facilitating a more efficient flow of credit to borrowers.

Intermediation and Asset Transformation

Three of the types of asset transformation produced by intermediaries are 1) denomination transformation, 2) credit risk transformation, and 3) maturity transformation. How effectively these methods can mitigate information costs is an important part of our subsequent analysis.

Denomination transformation allows intermediaries to lend to borrowers with large credit needs by issuing smaller-denomination claims to many savers. For example, mutual funds that invest in government bonds and Treasury bills pool the funds of a group of small investors to fund a portfolio of relatively similar claims. Denomination transformation also allows small savers to diversify by enabling them to hold a wider variety of investments.

Credit risk transformation pools the resources of many lenders to fund several projects. This allows intermediaries to diversify the risks of the assets in their portfolios, and thus to issue indirect claims to investors with a more predictable return than the individual assets being funded. This is the main role of stock or bond mutual funds, although most intermediaries engage in credit risk diversification.

Finally, intermediaries also perform maturity transformation by issuing indirect claims that offer a pattern of promised cash flows different from those promised by borrowers. Banks and thrifts are noted for the degree of maturity transformation in their portfolios. They fund medium- and long-term projects by issuing short-term liquid deposits that serve as close substitutes for legal tender.[4] Contractual savings institutions, such as insurance companies and pension funds,

■ 2 See *Federal Reserve Bulletin,* Domestic Financial Statistics, Table 1.55, Consumer Installment Credit, March 1993.

■ 3 Two important papers surveying this literature are Gertler (1988) and Bhattacharya and Thakor (1991).

■ 4 McCulloch (1981) emphasizes that this degree of maturity transformation is actually "misintermediation" that reflects the regulatory incentives for banks to assume credit risks as well as the risk associated with mismatching the durations of their assets and liabilities.

produce a very different sort of cash flow transformation. They fund portfolios of assets by selling contracts promising cash flows that are contingent on specific events, such as property loss, death, or retirement.

Much of the intermediation associated with these types of asset transformation channels funds to borrowers who place debt or equity directly in credit markets. A distinguishing characteristic of some intermediaries is that they specialize in lending to borrowers who would find it prohibitively costly to obtain funds through direct market placements because of the relative costs associated with screening, monitoring, and servicing their claims. Depository institutions and finance companies, for example, profit by developing a comparative advantage in lending to small or information-intensive borrowers. Thus, some intermediaries are *special* in the sense that they provide lenders with new investment opportunities—that is, they are asset originators.

An Overview of Asset-Backed Markets

In contrast to funding a portfolio of assets by the issue of unsecured claims, asset-backed lending is an alternative funding mode by which an asset or set of assets is sold by its originator. We use the term asset-backed lending to refer to both securitization and individual loan sales.

A loan sale is usually made by a bank to another bank, and involves no asset pooling in and of itself.[5] However, the process of making loans marketable, by increasing the access of other lenders to investment opportunities, can improve the allocation of credit. Loan sales involve transactions between two (or more) financial institutions, whereas securitization generally involves the sale of claims (against the securitized asset portfolio) to individual investors who hold these in their portfolios for investment purposes. Consequently, securitized claims are priced like other capital-market instruments, but loan sales are priced based on bilateral (multilateral) negotiations.

Alternatively, nonmortgage securitization usually takes the form of a bank or nonbank firm funding a pool of similar assets by forming a subsidiary that markets claims to the pool to nonbank investors. These pools are generally originated by large firms. From the perspective of the pool originator, however, nonmortgage securitization is basically a means of separating the financing of certain assets from that of its general portfolio.

Finally, securitization of mortgages takes place in the secondary market in order to fund pools of insured mortgages. These pools include claims from many, often geographically diverse, mortgage originators. This form of securitization simultaneously creates a pool of similar loans (mortgages) purchased from loan originators in different localities. Hence, a unique characteristic of mortgage-backed securities is that they are collateralized by loans from various financial firms.

Loan Sales versus Securitization

A major difference between loan sales and securitization is that loan sales usually provide no recourse for the party buying the loan. Most view this as the result of regulators' treatment of loan sales in their assessment of capital adequacy requirements for depository institutions. Banks and thrifts are not required to hold capital against loans sold, except for those sold with recourse, which are treated as if they are on-balance-sheet items in determining capital adequacy. Thus, given the incentives to maximize leverage, these institutions tend to sell loans without recourse to truly "get them off the regulatory books."

Securitization, on the other hand, is generally associated with the provision of some form of credit enhancement that increases the marketability of the asset-backed securities. One common form of enhancement for securitized assets is backing by a bank-issued standby letter of credit (SLC). For a stipulated fee, banks issue SLCs, which are promises to insure the purchasing party up to a prespecified amount for losses incurred on the securitized loans. Before a loan pool is funded, both the loans and the bank issuing the SLC are rated. Because the rating of the pool is affected by the rating of the bank issuing the guarantee, the extent to which this method of credit enhancement is used is limited. Moreover, to avoid regulated capital assessments, a bank securitizing a pool of loans usually does not issue the credit-enhancing SLC. Thus, the originator of the pool is generally not also its guarantor.

An increasingly popular enhancement, the cash-collateral-account method, has the pool

■ 5 For a comprehensive overview of the loan sales market, see Gorton and Haubrich (1990).

originator covering potential losses with cash placed in an escrow account. Another method to enhance loan quality is to overcollateralize the loan pool. That is, extra loans are included in the pool so that the value of the loans exceeds the value of the securities issued to fund it.

Why Fund Off-Balance-Sheet?

Given the attributes of asset pooling, it is natural to question the benefit of funding a loan or pool of loans off-balance-sheet. The answer, of course, is that this method is more efficient—less expensive—than on-balance-sheet funding. As we have asserted, asset-backed lending is commonly viewed as a response to both regulatory costs and market incentives.

In its early years, regulations were clearly an important factor motivating securitization via the secondary mortgage market.[6] Regulated branching restrictions in tandem with information costs caused banks and thrifts to operate in relatively localized markets. The government-sponsored secondary mortgage markets allowed these institutions to hold portfolios from many different parts of the country. These regulatory restrictions are less important today. This suggests that information costs are becoming the more relevant determinant of interregional lending.

A fundamental role of intermediation is to produce the information involved in channeling credit in the most cost-effective way. In particular, lenders do not always have good information about the risk and return of borrowers' investment opportunities. Intermediaries specialize in producing this information, as well as in structuring and servicing contracts. Therefore, in order to understand why off-balance-sheet funding may be more efficient, it is useful to examine the roles of both financial contracts and intermediation in mitigating information costs.

Here, the primary focus is on market incentives—specifically due to information costs—as a motive for asset-backed lending. In the following section, we discuss several models of financial contracting and intermediation. We then proceed to examine why asset originators might choose asset-backed lending as an alternative to on-balance-sheet funding.

■ 6 See Pavel (1986) for a comprehensive description of the historical evolution of this market.

II. Financial Structure in Response to Information Costs

Even in a world where there is complete information about available investment opportunities, credit intermediation can occur if individuals without wealth have more profitable projects than do those with greater financial resources. However, while intermediation can help in diversifying the portfolios of the individuals supplying financial resources, the nature of the claim on these investment projects is uncertain. In particular, as Modigliani and Miller (1958) state, it is not clear why a project should be funded via a *debt contract*, which stipulates a predetermined promised cash flow and default (should that cash flow not be met), versus an *equity contract*, which promises only to pay a cash flow that is contingent on the project's return—precluding the event of default. Modigliani and Miller show that in a world without taxes, transaction costs, and information costs, entrepreneurs would be indifferent between funding projects with debt or equity.

Debt versus Equity Contracts

Information costs thus play an important role in explaining the structure of the contracts between borrowers and lenders that we observe in reality. One model of financial contracting under imperfect information is presented in Townsend (1979). He demonstrates that when it is costly for lenders to monitor the performance of a borrower's project, debt contracts allow lenders to minimize monitoring costs.[7] In his model, borrowers can observe the proceeds of their investment opportunities, while lenders can do so only by paying a fee. In this setting, an equity-type contract stipulating a payoff that always depends on the project's realization implies that investors will always have to expend resources to monitor the project's outcome.

Alternatively, debt contracts minimize these monitoring costs by specifying a contractual interest payment to lenders. Borrowers pay this prespecified amount except when default is declared. In that situation, lenders receive the realized value of the project (or firm), which they must ascertain

■ 7 This suggests that debt would be preferred to equity. One reason equity might be preferred is if bondholders cannot observe the riskiness of the investments undertaken by the firm's management. In that situation, the investments undertaken will be too risky, which transfers wealth from bondholders to equityholders.

by incurring monitoring costs. Here, debt contracts minimize monitoring costs because lenders must monitor investment outcomes only in the event of borrowers' default.[8]

Information Costs and Credit Risk Transformation

One function of financial intermediation, as mentioned earlier, is to pool assets in order to reduce portfolio risks, thus enabling investors with limited wealth to hold a diversified portfolio. Another, indirect advantage of diversification is that it helps to minimize information costs by decreasing the need for investors to monitor privately observed portfolio risks.

Diamond (1984) examines how asset diversification by banks mitigates the need for depositors to monitor the performance of bank investments. He describes a world in which information about realized project returns is costly. If many lenders are needed to fund one borrower, an intermediary could group these lenders to fund the project. However, because the project's return is costly to observe, each lender would in general have to monitor the intermediary's investment.

Diamond demonstrates that by diversifying across many projects, an intermediary can decrease the variability of the return on its portfolio, and thus the need for lenders to monitor the performance of the portfolio. Depositors in essence loan funds to the bank in exchange for debt contracts. A reduction in portfolio risks lowers expected monitoring costs by reducing the probability that the firm will default on its liabilities by not paying depositors their stipulated return. In the extreme case, complete diversification of asset returns eliminates portfolio risk and thus the need for depositors to monitor the bank. Hence, Diamond describes how asset pooling allows the monitoring function to be *delegated* to intermediaries.[9]

■ 8 This result is predicated on the assumption of deterministic auditing. That is, auditing occurs with a probability of either one or zero. Mookherjee and Png (1989) show that, in general, random auditing will be optimal. That is, even when bankruptcy occurs, the probability of being audited is less than one.

■ 9 Ramakrishnan and Thakor (1984) show that financial intermediaries will also arise with ex ante monitoring costs. Diamond's paper assumes ex post monitoring costs.

III. Asset-Backed Lending as a Funding Mode

Diamond's analysis illustrates an interesting point, but in more realistic settings, firms may be limited in how much they can benefit from asset pooling. This restriction is useful to consider in examining why loan sales and securitization may be efficient ways of funding certain investments. Asset-backed lending in its most general sense is the sale of an asset by its originator, which separates the financing of the asset from that of the originator's portfolio.

Imperfect information about the portfolio choices of intermediaries can help to explain market-based incentives for asset-backed lending. The first two papers we discuss below cite the inability of localized or specialized banks to diversify portfolio returns as a rationale for financial firms to engage in both loan sales and securitization. The models developed in these papers formalize this rationale, motivating asset-backed lending as a means for local borrowers to tap into nonlocal sources of funds. The second two models of asset-backed lending emphasize the differences in the information available to intermediaries versus the individuals who hold their debt prior to investment choices. These models formalize asset-backed lending as a means of collateralizing, thus enabling investors to obtain financing terms that better reflect the underlying quality of the projects being funded.

Portfolio Risks and Capital Constraints

While perfect diversification removes the need to monitor imperfectly observed portfolio risks, imperfect diversification creates the need for a more complicated financial structure. For example, when banks cannot perfectly diversify risks, the amount of their equity capital assumes greater importance. Without sufficient equity capital, banks may be unable to attract funding in order to finance risky investments. By buffering potential portfolio losses, equity capital serves as an alternative means of mitigating the need for lenders to monitor an intermediary: It cushions portfolio losses and thus protects depositors.

Bernanke and Gertler (1987) and Samolyk (1989a,b) show that when depositors' costs of monitoring an institution are prohibitive, intermediaries may face market-imposed capital constraints on the risks associated with their portfolio choices. Capital inadequacy arises when a bank is

unable to attract funds to finance profitable investments because it has inadequate capital to absorb possible portfolio losses.

The key to this result is that it is assumed to be extremely costly for depositors to monitor the outcome of a bank's portfolio. Depositors recognize that banks have the incentive to report large losses on their risky assets, in effect claiming that they are unable to meet depositors' claims. Hence, banks will not be able to attract depositors unless they have sufficient capital to cover potential portfolio losses on risky investments.[10]

Limits to the Benefits of On-Balance-Sheet Intermediation

Capital constraints can arise because banks are both unable and unwilling to diversify their portfolios adequately. Government policies have affected the incentives for intermediaries—especially banks and thrifts—to manage portfolio risks prudently. Portfolio and branching restrictions have limited the ability of banks and thrifts to diversify credit risks as well as the risks associated with maturity transformation. Regulatory limits on the types of depository lending, such as the "Qualified Thrift Lender Test," also constrain portfolio diversification.[11] Finally, the provision of federally sponsored deposit insurance creates moral hazard problems in both the management of credit risks and the interest-rate risks associated with maturity transformation. These policies reduce the potential for depositors (and regulators) to delegate the monitoring function.

Given the partial deregulation of the banking industry, these restrictions are probably not as important an impediment to diversification as they once were. Ironically, a major factor limiting intermediaries from diversifying and hence minimizing information costs is the very costs of identifying, monitoring, and funding borrowers that make financial contracts and intermediation important. These costs may cause intermediaries to specialize in lending to certain types of borrowers (industry versus consumers) or to borrowers in certain regions.

Asset-Backed Lending as a Response to Localized Capital Constraints

Carlstrom and Samolyk (1993) present a model in which capital constraints motivate one rationale for off-balance-sheet lending. Their model predicts that loan sales occur as a response to differences in project returns across regions that arise when some regions are capital constrained and others are not. Similar to the model used by Samolyk (1989b), banks operate in distinct, informationally segmented regions or markets. Bankers within a particular region have a comparative advantage in supplying loans there because they have better information about credit conditions or would-be borrowers. However, the inability of banks to diversify localized portfolios perfectly can cause some regions to be capital constrained.[12]

The authors demonstrate that in the absence of asset-backed lending, a region with a relatively large set of profitable—albeit risky—investment opportunities and limited bank capital can be constrained. That is, the region will be unable to attract sufficient deposits to fund all of its profitable investment opportunities. A constrained bank must channel resources instead into safer but less profitable investments.

Binding capital constraints cause interregional differences in returns on projects. These, in turn, create the incentive for banks in constrained markets to originate and sell unfunded profitable investments to banks in unconstrained regions. Unconstrained banks, though adequately capitalized, would not lend to constrained banks via deposit liabilities because these liabilities are claims on the constrained banks' entire portfolios, which nonlocal firms have no comparative advantage in monitoring. Alternatively, unconstrained bankers will purchase individual projects from these banks. They recognize that banks are constrained because of excess profitable investment opportunities in their region. Thus, binding capital constraints give rise to asset-backed lending by allowing a bank to separate the funding of certain projects from the performance of its portfolio.

■ **10** In this discussion, depositors should be understood as either uninsured depositors or banking regulators.

■ **11** The Qualified Thrift Lender Test refers to the regulation that requires thrifts to hold a certain fraction of their portfolio in the form of home mortgages.

■ **12** Capital constraints arise because of short-term variations in lending opportunities that do not create the incentive for a structural reallocation of bank equity capital.

Asset-Backed Lending as a Means of Delegating Nonlocal Monitoring

Carlstrom and Samolyk's model shows how capital constraints in informationally segmented banking markets can cause banks to sell loans, facilitating a more efficient allocation of resources. These capital constraints are one example in which capital markets may not be as efficient as suggested by textbooks. Loan sales may arise to help correct the associated regional imbalances.

Another potential problem with intermediation is that information costs may cause credit to be rationed for some borrowers. Credit rationing exists when someone is unable to obtain credit even though he or she is (ex ante) identical to a borrower who does obtain financing. When information is costless, economic theory predicts that credit rationing will not arise because loan rates will increase until the quantity of loans supplied equals the quantity of loans demanded.

Williamson (1986) demonstrates that it may be efficient for intermediaries that face monitoring costs to ration credit. As in Diamond, he characterizes banks as issuing claims to a large number of lenders and lending to a large number of borrowers. Because of ex post project monitoring costs, banks issue debt contracts to many ex ante identical borrowers, monitor projects only in the event of default, and pay a noncontingent return to depositors.

Unlike Diamond, who assumes that banks can fund any number of investments at a given cost of funds, Williamson analyzes an economy in which banks face an increasing marginal cost of funds: They must charge higher loan rates to offer returns that will attract the funds of investors with better alternatives. Higher loan rates, however, lead to greater monitoring costs because higher interest charges raise the probability that borrowers will default on their loans. Although lenders get all of a project's proceeds in the event of default, the increase in expected monitoring costs may actually decrease the expected return of a loan. In this setting, intermediaries may be unwilling to charge higher loan rates in order to fund more projects and instead choose to ration credit.

In a related paper, Boyd and Smith (1989) extend this analysis to show another way in which asset-backed lending may improve the performance of informationally segmented credit markets. As in Carlstrom and Samolyk, differences in interregional returns on projects lead to a type of asset-backed lending.

Boyd and Smith consider a variation of the contracting model described by Williamson (1987).[13] In their model, identical borrowers, whose projects require costly ex post state verification, contract individually with lenders to supply funds. To observe the ex post returns on borrowers' investments, lenders must incur monitoring costs, but such costs are assumed to be larger for lenders in other markets. Thus, like Carlstrom and Samolyk's model, there is a comparative advantage to funding projects within one's own region. Boyd and Smith consider two banking regions that differ in the local ratios of potential lenders to borrowers, creating a scenario in which a Williamson-type credit rationing occurs in only one of the regions.

Securitization allows lenders in unrationed markets to fund projects in rationed markets: An intermediary pools and monitors the loans of local borrowers, funding them by issuing claims to other markets. Like Diamond's model of intermediation, diversification by this intermediary allows the ultimate investors, lenders in the unrationed market, to delegate the monitoring to the intermediary in the market where the loans are being originated.

Lenders do not find it profitable to fund projects in other markets directly because of the large intermarket monitoring costs. However, asset pooling, which completely diversifies away the risk of the pool, eliminates the need for investors to incur the large intermarket costs of monitoring the underlying assets. All monitoring takes place locally by the coalition at the lower intramarket monitoring cost. Similar to Carlstrom and Samolyk's model, loan sales occur in order to equalize expected project returns across markets. Credit rationing, however, may still occur in markets where assets are being securitized.

How Well Do These Models Describe Off-Balance-Sheet Financing?

In Boyd and Smith's model, securitized loan pools are originated by a coalition of individual borrowers within one locality, but are funded by lenders in another. Most mortgage securitization takes place via an interregional intermediary, which pools loans from loan originators in many

■ **13** Williamson (1987) shows that credit rationing can occur in a model with debt contracts, where individual borrowers contract with individual lenders. This paper is similar to his earlier one (Williamson [1986]), except that there are no financial intermediaries.

localities. To the extent that interregional diversification is conventionally viewed as an important rationale for mortgage securitization, the Boyd–Smith model is limited in the extent to which it can be interpreted as a model of the secondary mortgage market.

Instead of being a model of regional mortgage securitization, their analysis is a better description of most nonmortgage securitization. They do not, however, depict an intermediary that funds a share of its projects off-balance-sheet through a subsidiary. Rather, each individual borrower (not a "bank") funds his entire project along with other borrowers.

Carlstrom and Samolyk depict loan sales and not securitization. However, they model one important aspect of nonmortgage asset-backed lending in the sense that banks fund parts of their portfolio on- and off-balance-sheet.

These models help explain some of the benefits of both loan sales and securitization. For two reasons, however, the models are limited in describing some dimensions of asset-backed markets. First, both the Carlstrom–Samolyk and Boyd–Smith models rely on regionally segmented banking markets to drive their results—an increasingly less likely scenario given the consolidation of the depository industry and the increase in nonbank intermediation. Second, as discussed earlier, securitized assets are usually backed by some type of credit enhancements or provide some sort of recourse for the purchasing party that helps make them marketable. Neither of these papers explains why credit enhancements might be an important part of the securitization process. The next two papers discuss the importance of credit enhancements in making risky bank assets attractive to nonbank investors.

Asset-Backed Lending as a Means of Signaling Credit Quality

Greenbaum and Thakor (1987) present a model in which the choice of on- versus off-balance-sheet funding (which they refer to as the deposit funding mode [DFM] and securitized funding mode [SFM], respectively) is a sorting mechanism whereby borrowers choose one or the other based on the quality of their project. If a borrower selects the SFM, he must also choose the degree to which the bank will provide recourse in the event of default. The degree to which a loan is collateralized signals the quality of the asset to nonbank investors. This eliminates the need for them to screen the borrower.

The model consists of borrowers with projects that differ in quality. Borrowers must choose between one of two funding modes. If a project is funded on-balance-sheet, a bank's entire stock of equity capital effectively collateralizes the project. The bank screens the borrower to ascertain the quality of his project, while depositors screen the bank. This redundancy is necessary because banks are unable to convey the outcome of their screening directly to depositors. Under the DFM, the value of the bank's collateralization and both of these screening costs are priced into the borrower's risk-adjusted loan rate.

Alternatively, under the SFM, a bank offers to fund the project off-balance-sheet by providing a credit enhancement in the form of bank collateralization. A borrower pays for the amount collateralized with an up-front fee. Banks screen borrowers and then announce a fee schedule associated with a borrower's choice of collateralization. As with insurance, lower-risk projects are charged less for any given level of coverage (collateralization). A borrower's choice of coverage is public information and thus can signal a project's quality, eliminating the need for the purchasing party also to screen the asset.

For higher-quality projects, the fee associated with the borrower's choice of bank collateralization is offset by the reduction in depositors' screening costs. For poorer-quality projects, however, the fee necessary to purchase collateralization is greater, outweighing the benefits from the elimination of screening by nonbank investors. Thus, poorer-quality borrowers forgo the fee and choose the DFM with full collateralization, although depositors' screening costs will be priced into their loan rates.

An important implication of this framework is that higher-quality assets will tend to be securitized, while lower-quality assets will tend to be held on-balance-sheet. The intuition is as follows: Higher-quality borrowers receive a lower interest cost than lower-quality borrowers under either funding mode. However, because the choice of collateralization under the SFM produces information about project quality and eliminates the need for asset-backed investors to screen the underlying assets, higher-quality borrowers can take advantage of low credit enhancement rates to obtain a better term of finance. Moreover, their cost of funding is lower despite the increased risk associated with less-than-full bank collateralization from the investors' perspective.

The Greenbaum–Thakor framework represents an important step in characterizing the

trends in securitization, especially to the extent that asset-backed lending separates the collateralization and monitoring of the underlying claims from their funding. Similar to the Boyd–Smith model, this model depicts asset-backed lending as a means of eliminating the need for investors to monitor the performance of the underlying asset(s). Here the reduction in monitoring costs occurs, however, because a borrower's choice to fund via a collateralized loan sale signals project quality and eliminates investors' need to screen. Alternatively, in Boyd and Smith, the diversification associated with borrowers' pooling of claims facilitates delegated monitoring.

Asset-Backed Lending as a Means of Securing Credit Quality

James (1988) presents a model that characterizes a different rationale for asset-backed lending. Specifically, he emphasizes that loan sales with recourse are a means of obtaining lower funding costs by separating the cash flows on a particular claim from those to the unsecured claimants funding a bank's balance sheet. He argues that loan sales with recourse are equivalent to a firm issuing secured debt. Because banks are prohibited from issuing secured claims, loan sales with recourse are likely to occur for the same reasons that firms issue secured debt.

Firms issue secured debt in part to mitigate an underinvestment problem that may occur with fixed-rate bond contracts. If firms with outstanding debt are constrained to raise funds by issuing additional unsecured claims, they may forgo financing certain new profitable projects—in particular, projects that would reduce the overall risk of the firm's portfolio. This occurs because banks cannot reprice existing unsecured claims to reflect accurately changes in the risk of their portfolio due to new asset acquisitions. Thus, if a firm chooses to issue unsecured claims to finance a project that reduces portfolio risk, existing bondholders receive a wealth transfer from stockholders as the risk-adjusted value of their claims increases.

James refers to the underinvestment problem that motivates the use of secured debt as the *collateralization hypothesis*. The key to this problem is that banks are locked into a fixed cost of funds on their liabilities. With secured debt, the existing bondholders do not have access to the newly acquired assets should the firm declare bankruptcy. Since regulations restrict banks and thrifts from issuing secured debt, loan sales with recourse—by separating the funding of new projects from that of a firm's existing investments—can mitigate a potential underinvestment problem.

Banks cannot issue secured debt, so the extent to which they fund their portfolios by issuing term liabilities such as certificates of deposit (CDs) may motivate them to finance certain assets off-balance-sheet with some form of recourse. Still, James' model may be limited as an explanation for asset-backed lending by banks and thrifts, because the bulk of their liabilities are short-term deposits. Such liabilities have a return that can be readjusted to reflect the risk of a bank's portfolio after new assets are acquired. Thus, any wealth transfers from bank equityholders to depositors (in an unregulated environment) could be mitigated by readjusting short-term deposit rates.

Regulatory Factors and Asset-Backed Lending

In reality, the fact that banks are insured, and that the FDIC (not insured depositors) must consider the risk of a bank's portfolio, complicates this analysis. As the residual claimant of a bank's assets, the FDIC, not insured depositors, bears the credit risk of these assets. If capital requirements and deposit insurance premiums were correctly priced (and effectively repriced) to reflect a bank's risk, the incentives for banks to engage in asset-backed lending would be reduced. To the extent, however, that the FDIC does not price the provision of insurance to reflect a bank's risk accurately, James' model motivates asset-backed lending. The interpretation here is that safer assets will be funded off-balance-sheet to maximize the value of FDIC insurance to bank equityholders.

The models in both James and Greenbaum and Thakor explain why firms would provide credit enhancements for their off-balance-sheet funding. In reality, these enhancements are generally issued by a third party—to some degree because of regulations. This is especially true for bank loan sales, as loans sold with recourse are viewed as on-balance-sheet assets in the assessments of capital requirements. In spite of these limitations, however, these frameworks are useful in characterizing a widely accepted rationale for the proliferation of nonmortgage securitization: to separate the securitized assets from the general portfolios of financial intermediaries.

The proliferation of asset-backed lending is merely one way that the financial scene is changing. As evidenced by nonbank activities in this market, securitization is both the result of technological innovations in information production and an artifact of banking regulations. In this paper, we have focused primarily on models that formalize market-based reasons for asset-backed lending. However, the existence of government regulations, in tandem with the provision of the federal safety net, is widely viewed as a significant factor impacting both the volume of securitization and the types of loans securitized.

IV. Regulatory Incentives for Securitization

Regulatory models of asset-backed lending generally focus on how regulations impact a bank's choice of funding. For example, Benveniste and Berger (1987) argue that credit enhancements for asset-backed securities allow banks to maximize the value of deposit insurance by issuing claims that are senior to those of the FDIC. Although their argument is similar to that posited by James, he argues that this adverse tendency is offset by the likelihood that loan sales backed by SLCs mitigate the underinvestment problem.

The incentive to shift risk to the FDIC is also limited by the marketplace. The creditworthiness of both the loans being securitized and the issuer of credit enhancements affects the rating of a pool. Thus, banks that issue SLCs are generally lower-risk institutions.

Other regulatory incentives for banks to engage in asset-backed lending are the regulatory taxes associated with on-balance-sheet funding. For example, capital requirements—the minimum legal fraction of an investment that must be held as equity capital—are popularly viewed as the primary regulatory incentive for banks and thrifts to sell assets. These requirements are designed to protect the FDIC and uninsured depositors in the case of bank failure.

Regulation-based models, however, emphasize that if capital requirements on a particular class of loans are greater than merited by the inherent risk of the claims, banks will have an incentive to either sell or securitize the loan.[14] That is, there will be an incentive to move a loan from on-balance-sheet, where it is subject to capital requirements, to off-balance-sheet, where it is not. This will be the case when the cost of the regulated equity buffer exceeds the cost of marketing the claims.

Two other regulatory taxes that have been cited as potential inducements for asset-backed lending are fractional reserve requirements and flat-rate FDIC insurance premiums on deposit liabilities. These assessments are viewed as raising the cost of deposit funding, thus encouraging depository institutions to fund loans off-balance-sheet. Yet, securitization has continued to expand in spite of decreases in the reserve requirements set by the Board of Governors of the Federal Reserve System. In addition, to the extent that deposit insurance is subsidized, flat-rate deposit insurance premiums are unlikely to be a major factor in the growth of securitization. For example, if the premiums charged to insure the deposits funding relatively risky loans allow an institution to obtain funds more cheaply than from other sources, then even though there are other costs associated with deposit funding, this may be a relatively cheap source of finance. Because deposit insurance premiums are currently not risk based, they may still have the undesirable effect of causing banks to securitize their safest and most liquid loans.

V. Conclusion

Although market-based reasons are an important factor driving off-balance-sheet lending, this type of lending may still impact the risk of lending that is funded on banks' balance sheets. For example, Greenbaum and Thakor's model predicts that the safest assets will be securitized while the risky assets will be held on-balance-sheet. Regulations provide similar incentives for securitizing the safest assets. Because these factors can clearly impact the exposure of the FDIC, policymakers are understandably concerned about the rapid growth of this practice.

In its role as an insurer, the government aims to maintain the solvency of the insurance fund by regulating deposit insurance premiums and capital requirements. But it is precisely these assessments that can affect the risks undertaken by depository institutions, as regulatory costs create an incentive for banks to shrink their balance sheets by securitizing loans.

However, the trend toward asset-backed lending should not be viewed as either a boon for nonbank competitors or the bane of the FDIC. Depository institutions can earn fee income for participating in various dimensions of the securitization process. Moreover, with prudent regulatory supervision of banks' off-balance-

14 See Pennacchi (1988).

sheet activities, asset-backed lending can mitigate the rising costs of the federal safety net as it reduces the share of credit funded on the books of depository institutions. Thus, securitization is better viewed as an important innovation in the financial sector—one that allows new suppliers of credit to enter the market and existing ones to intermediate credit more efficiently.

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