

The Economics of Asset Securitization

BY RONEL ELUL

Asset securitization — transforming illiquid assets into tradable securities — is a large and growing market, even rivaling the corporate debt market in size. While the underlying assets can be very different — ranging from song royalties to home mortgages — most asset-backed securities nevertheless share some distinctive features. In “The Economics of Asset Securitization,” Ronel Elul explains why asset-backed securities exist and discusses some reasons for their common structure.

In 1997 rock star David Bowie raised \$55 million by selling bonds backed by revenues from his first 25 albums.¹ This was the first application of securitization to intellectual property. Formally speaking, *asset securitization* refers to the process whereby nontraded assets — such as

¹ Despite initial predictions, this has not led to a wave of such issues, in part because the Bowie bonds themselves have not performed quite as well as expected (because online music piracy has curtailed revenues from music sales).



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song royalties — are transformed into tradable securities, called asset-backed securities, or ABS, through the repackaging of their cash flows. Some more mainstream examples of asset-backed securities include mortgage-backed securities (MBS) and secured credit card receivables.

Securitization is a large and growing market. Currently, it represents about 25 percent of new nongovernment borrowing.² To take just one of the sectors mentioned above, at the end of 2003 there was more than \$7 trillion in securitized mortgages, representing nearly three-quarters of all outstanding home loans.

While the underlying assets can be very different (in terms of maturity, collateral, and risk, for example),

² Further detail can be found in the Flow of Funds Accounts tabulated by the Federal Reserve Board.

ABS nevertheless tend to share some common features. These common elements, which we discuss in further detail below, include selling the underlying assets so that they are moved off the firm’s balance sheet, grouping individually illiquid assets into portfolios, taking steps to reduce the risk of default on the underlying assets (known as credit enhancement), and subdividing the assets into several classes of securities (tranching). Financial economists have attempted to explain the underlying reasons for securitization, as well as these common features.

MORTGAGE-BACKED SECURITIES: AN EXAMPLE OF ASSET SECURITIZATION

Consider, for example, a bank (the originator) that offers a \$200,000 mortgage to a home buyer (see Figure) with an interest rate of 6 percent. Rather than hold this loan in its portfolio and receive small monthly payments for a period of 30 years, the bank may prefer to move the loan off its balance sheet by selling it to an outside investor. In this way the bank receives funds today from selling the loan, so that it has the opportunity to profit further by originating even more loans; the reason is that the bank typically collects a fee (the origination fee) for each loan it originates.³ There are also other motivations for securitization that we will discuss below. But for now, let’s look at how the bank in our example might use securitization.

³ A typical fee is 1 percent of the loan amount.

The problem is that an individual loan is very illiquid, i.e., hard to sell, in part because potential buyers know much less about the homeowner than does the bank. For example, the bank probably knows more about its own underwriting standards than any potential buyer, or the bank may have had a prior lending relationship with the borrower. Instead of selling the entire loan to an individual buyer, the bank can agree to sell all or most of its loans to an issuer — typically a government sponsored enterprise (GSE) such as Fannie Mae or Freddie Mac — that pools these loans with ones made by other lenders (see Figure). For example, rather than a single \$200,000 mortgage, the pool may consist of \$600,000 in mortgages — that is, three such loans.⁴ This means that instead of buying 100 percent of a single mortgage, a potential investor who has \$200,000 to spend may end up with a claim on one-third of each mortgage.

The GSE will place these mortgages in a trust (also known as a *special-purpose vehicle*) (see Figure) and then insure the pool against default; this is a form of *credit enhancement*, a technique for improving the credit quality of one or more of the vehicle's assets. Credit enhancement can take several forms: overcollateralization (so that the dollar value of the assets in the pool exceeds the value of the securities issued), the use of a GSE or other outside insurer to guarantee payment, and tranching, which we discuss later. In many securitizations more than one of these may be used.

The trust then issues securities, known as *mortgage-backed securities* (MBS), against this pool. Like other bonds, these securities promise the

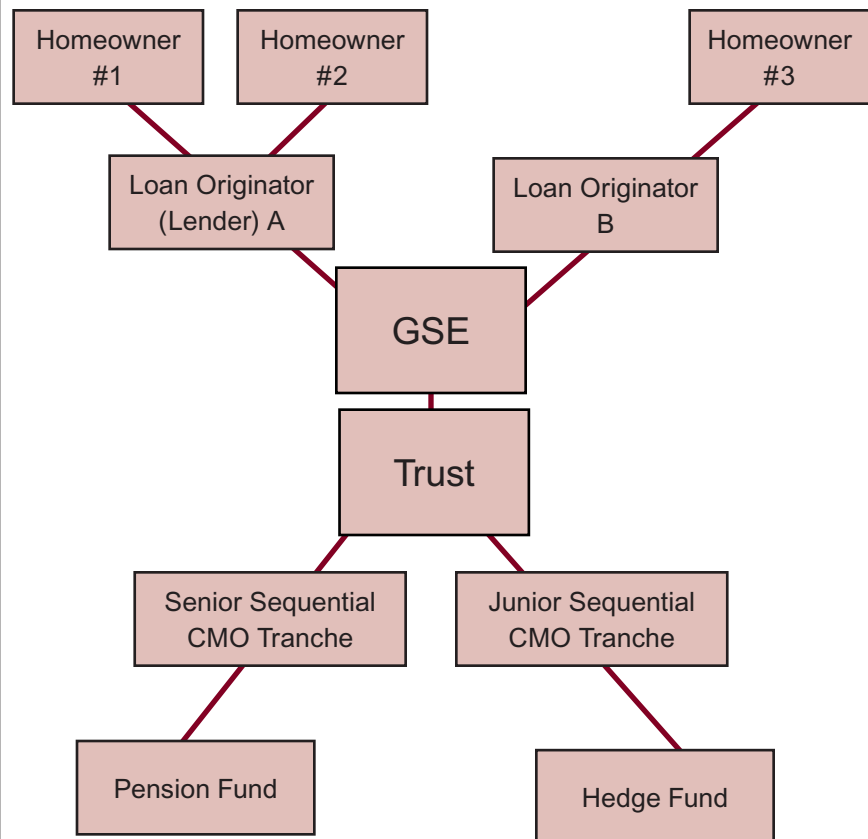
buyer regular interest payments and the return of principal at maturity, and they are financed from the cash flows of the underlying mortgages. Notice that when the assets are moved off balance sheet, they are legally separated from the bank that originated the mortgages, so that creditors of the bank (such as depositors and its bondholders) do not have any claims on these assets, and investors who receive mortgage payments do not have any claims on the originating bank. A certain amount is deducted from the monthly payments on the mortgages before they are passed through to the investor; this money covers the servicing of the mortgages (i.e., collecting the monthly payments, which is often

done by the issuing bank) and also serves as compensation to the GSE for its guarantee. For instance, in our example, although homeowners pay an interest rate of 6 percent, investors may receive only 5.5 percent.

Investors will usually find it more attractive to purchase an MBS than to purchase an individual mortgage loan. First, investors are exposed to much less risk because the pooling process diversifies away the impact of an individual mortgage's performance. For example, investors do not need to worry as much about an individual homeowner's behavior (although economy-wide disturbances that affect many homeowners at once will still be important). Second, the securities are

FIGURE

The Securitization of Mortgages



⁴ In practice, a typical pool may consist of several hundred loans and have a face value of \$50 million.

also much more liquid than individual mortgages because the pooling process makes each MBS much more similar to its peers; that is, pooling makes the characteristics of an individual loan much less important to potential investors. This reduces the amount of information potential investors need to collect before purchasing the security and thereby makes it easier to trade.

Finally, the issuer of the MBS may also further manipulate the cash flows from the pool of mortgages by splitting them into classes known as *tranches* (see Figure).⁵ The difference between one tranche and another varies depending on the type of asset securitized. In the case of mortgage-backed securities, tranches are often structured in terms of principal payments on the mortgages in the pool. That is, the structure is used to allocate *prepayment risk*, the risk that a security will pay off before its maturity date, thereby forcing the investor to reinvest his funds at a (possibly) lower rate. The simplest structure is known as “sequential pay” (more complex ones are also used). As the name suggests, in this case the tranches are retired in sequential order. That is, investors in the first — *senior* — tranche receive principal payments from the underlying assets first, those in the second tranche next, and so on. Investors in the last — most junior — *tranche* receive principal payments from the mortgages in the pool only when the tranches ahead of them in priority have been fully paid.

For instance, suppose that in our example, the \$600,000 pool consisting of three mortgages was divided into

⁵ In the case of mortgages, a tranching security is known as a REMIC (real estate mortgage investment conduit) or CMO (collateralized mortgage obligation).

two tranches: a senior one with a principal balance of \$200,000 and a more junior one with a balance of \$400,000. Then if all mortgages paid according to schedule, it would take 16.5 years for the senior tranche to be paid down.⁶ During this time, the senior tranche would receive all of the principal payments on the mortgages in the pool, as well as interest payments of 5.5 percent on its outstanding balance. The junior

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tranche would receive only its interest payments. After the senior tranche has been fully paid down, the junior tranche would then begin to receive principal payments and would be fully retired after 30 years.⁷

Now suppose that shortly after the mortgages are issued, one of the homeowners sells his house and pays off his mortgage. In this case, the senior tranche is paid off immediately. The junior tranche would then begin to receive principal payments as well; nevertheless, so long as the other mortgages do not pre-pay, it would still take 30 years to fully pay down this tranche. Notice that the junior tranche is thus much less sensitive to prepayment risk than the senior tranche.

⁶ This figure can easily be obtained from any online mortgage amortization calculator; several such calculators are available.

⁷ Notice that another implication of the sequential pay structure is that the senior tranche has a shorter maturity than the underlying mortgages; thus, tranching also facilitates participation in this market by investors with shorter investment horizons.

However, in other ABS, the absence of a GSE guarantee means that the determining factor in structuring the tranches is typically credit risk; that is, a senior tranche would have priority over a junior one in the event of a default, so that it has first claim on the securitization’s underlying assets. As a result, tranching can serve as a form of credit enhancement; in particular, it enhances the credit

quality of the more senior tranches at the expense of the junior ones (the senior tranche is typically AAA-rated in these cases).⁸

In this example we can see the key features of asset securitization: a sale of the underlying assets so that they are moved off the issuer’s balance sheet, the pooling of illiquid assets, credit enhancement, and tranching.

WHAT ASYMMETRIC INFORMATION CAN TELL US ABOUT ASSET SECURITIZATION

When Investors Are Uninformed, Capital Structure Matters.

A firm’s decision about whether — and how — to securitize assets can be viewed as a variant of the broader question of how a firm should finance

⁸ Bonds are rated according to their default risk by ratings agencies, the most prominent of which are Moody’s and Standard & Poor’s. Although each agency uses slightly different classifications, ratings are assigned in alphabetical order, with AAA being the least risky (Aaa for Moody’s) and D representing a bond that is in default. Bonds rated BBB or above by Standard & Poor’s (Baa for Moody’s) are termed “investment grade.”

itself. This is known as the capital structure decision.

In 1958, future Nobel Prize winners Franco Modigliani and Merton Miller showed that the form of financing a firm uses does not affect the total value of its assets under a number of particular assumptions. This is known as the Modigliani-Miller proposition. Some key assumptions — which we will revisit below — are that corporate bankruptcy is costless, that there are no applicable government regulations, and that all types of securities have similar tax treatment. Another important assumption is that outside investors are as well informed as the firm's insiders (such as management) about the firm's prospects. When this is true, insiders and outsiders are said to be *symmetrically informed*.

On the other hand, when insiders know more than outside investors (which is often a more realistic assumption), the mix of debt securities⁹ and equity (that is, stock) — and who holds each — can affect the firm's ability to secure funds from outside investors and, ultimately, the value of the firm itself. Two classic papers examine these issues, and the ideas in these articles can also be used to explain some of the key features of ABS.

In their article, economists Hayne Leland and David Pyle explain why insiders tend to retain an equity stake in their firm, rather than selling all of the firm's shares to the public. Insiders who believe that a firm's future profits are likely to be high would like to convince skeptical investors.

⁹ Corporate and government bonds are common examples of debt securities. A debt security represents the issuer's promise to repay the loan's face amount, with interest, in a set period of time. By contrast, the firm is under no contractual obligation to pay shareholders dividends of any set amount.

On the other hand, skeptical investors believe that talk is cheap. They reason that insiders are simply trying to sell stock in the firm at the highest possible price, whatever the firm's true prospects. However, insiders can credibly signal their information to the market by holding a larger share of the firm's stock. In effect, an insider who

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holds a significant ownership stake is putting his money where his mouth is. This allows the firm to sell its stock at a higher price but will leave insiders exposed to more risk because their ownership share in the firm keeps them from holding a well-diversified portfolio; this increased risk is the cost insiders must bear to gain credibility.

An article by economists Stewart Myers and Nicholas Majluf explains why firms often prefer to sell debt securities rather than issue equity to outside investors. The problem firms face when issuing equity is that outsiders are understandably suspicious that insiders know something they do not and that the stock is overvalued. As a result, the firm can increase the price investors are willing to pay for its securities by offering securities that are *informationally insensitive*, that is, securities whose payoffs do not depend on factors known only to insiders.

For example, since debt payments are contractually fixed whether the firm's profit is high or low, debt is less informationally sensitive than equity; therefore, the firm can secure outside funds at a lower cost by issuing bonds rather than stock.¹⁰

I'll now show how these ideas can help to explain some of the distinctive features of securitization.

Tranching Allows Issuers to Sell Safe Cash Flows and Retain Risky Ones. Suppose an issuer (for example, a bank) has a portfolio of assets such as credit card receivables, that is, expected payments on credit card bal-

ances. This portfolio is not as liquid as the issuer would like, and so the issuer might prefer to sell part of it for cash through a securitization. However, the issuer's information about the quality of its assets is superior to that of potential investors, perhaps because the bank has proprietary information about its customers that it has collected over a long period. Having such information makes any sale costly and difficult. The bank's goal is to structure the security so as to maximize its revenue from selling the assets.

Economists Peter DeMarzo and Darrell Duffie show that to maximize revenue, the issuer should sell a senior tranche backed by the assets while retaining the junior tranche. By analogy with the firm's capital structure

¹⁰ This is known as the Myers-Majluf pecking order theory because the firm has a "pecking order" of financing choices. It relies as much as possible on retained earnings (which bypasses outside investors completely). If retained earnings do not suffice to finance its projects, it issues debt. Only if the firm does not have the earnings to make debt payments does it issue equity to outside investors (a start-up firm might fall into this category).

decision, the most junior tranche is also often termed the *equity* stake. Moreover, they show that the higher the quality of the assets, the larger this retained *equity* stake. This follows the work of Leland and Pyle in that the issuer signals that its assets are of high quality by holding an equity stake; it is also reminiscent of Myers and Majluf's model in that an informationally insensitive security is issued to uninformed outside investors.

To take a recent example, which is fairly typical, in a 2002 credit card securitization by Fleet Bank (now part of Bank of America), the issuer retained an equity interest equal to approximately 10 percent of the total principal.

Peter DeMarzo further extends this model to explain why we often see pooling of assets (recall that this is a distinctive feature of many securitizations) before tranching occurs. DeMarzo shows that pooling assets involves a tradeoff. On the one hand, by selling different assets as a single unit, the issuer cannot signal information about the asset by retaining a specific amount of equity for each individual asset. On the other hand, to the extent that pooling diversifies idiosyncratic risk, it allows the issuer to sell a larger quantity of informationally insensitive securities.¹¹ When the benefits from diversification outweigh the limitations of selling the assets together (for example, when the issuer has many similar mortgages available), then pooling is beneficial.

Tranching Increases Information Production by Investors. While DeMarzo and Duffie's model provides

¹¹ Idiosyncratic risk is risk related to the unique circumstances of a specific loan or borrower, as opposed to overall market risk, which affects many assets at once.

useful insights, its underlying assumptions do not reflect significant parts of the ABS market. In many cases, investors may actually know at least as much about the assets as the issuer, and even more significantly, some potential investors may know more than others (this is the case for mortgage-backed securities, for example). Of course, investors do not receive this information for free. Hedge funds that

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specialize in buying mortgage-backed securities must pay substantial salaries to Ph.D.s who understand these securities.

Economists Arnoud Boot and Anjan Thakor develop a model in which sellers of ABS exploit the fact that potential investors may choose to invest in learning about the underlying assets. Boot and Thakor show that both the pooling and tranching of assets can encourage investors to learn about these assets, so that they are willing to pay more for them.

Their idea is that by separating the cash flows from the asset into senior and junior tranches, the issuer creates a highly informationally sensitive security — the junior tranche. Since a junior tranche is riskier, investors need to learn more about the assets underlying this junior security in order to determine whether it is worth

buying. By contrast, a high-rated senior tranche carries less risk, so that even uninformed investors can safely invest in it.

This structure maximizes incentives for sophisticated investors to become informed about the value of the underlying assets, since such investors can specialize in buying only this most informationally sensitive portion of the cash flows. Conversely, uninformed investors purchase the informationally insensitive senior tranche. Also note that unlike in DeMarzo and Duffie's model, the issuing firm itself does not need to retain anything, since it knows nothing more than investors do.

Boot and Thakor also offer a similar explanation for why securitizations often involve the pooling of assets. The reason is that the risks of the assets pooled in the ABS have two components: a common one (such as interest-rate risk or national price trends in the case of mortgages) and an idiosyncratic one (e.g., a particular borrower's individual default risk). Pooling assets makes acquiring information more effective because the idiosyncratic risk is diversified and investors can concentrate their efforts on learning about the common characteristics of these assets without worrying that their efforts will be undone by an individual homeowner's unpredictable finances.

Economist Guillaume Plantin provides evidence that in collateralized debt obligations,¹² it indeed appears as if sophisticated investors, such as hedge funds, purchase the more junior "equity" tranches, whereas relatively unsophisticated investors specialize in

¹² Collateralized debt obligations, or CDOs, are securities in which the underlying assets are themselves loans or bonds, most typically risky corporate debt ("junk bonds").

the high-rated senior tranches, commonly known as “A” tranches.¹³

Structures with Many Tranches.

In the models discussed above, the resulting structure of the securitization is very simple: usually only two tranches, one senior and one junior. In practice, most structures are somewhat more complicated and feature multiple tranches. For example, in the Fleet credit card securitization discussed earlier, there were actually *three* tranches: a senior AAA-rated “A” tranche, a more junior “B” tranche (which was A rated), and the unrated equity tranche. Plantin’s paper explains why these multiple tranches might arise; he also demonstrates that — as in the papers by Boot and Thakor and DeMarzo and Duffie — the optimal structure is a senior-junior securitization in which the higher-rated senior tranches have absolute priority over the low-rated junior ones in the event of a default.

Plantin’s model features multiple tranches because it includes several classes of potential investors with different degrees of sophistication (for example, hedge funds, pension funds, and individual investors). For Plantin, a sophisticated investor is more likely to discover when a given pool of assets is worth buying, whereas a less sophisticated investor is more likely to remain uninformed. Having multiple investors that differ in their sophistication allows for multiple tranches in the optimal structure.

¹³ For example, banks are among the most active buyers of higher-rated senior tranches. The reader may find it strange to think of banks as unsophisticated, but Jianping Mei and Anthony Saunders have demonstrated that — at least in the case of real estate loans — banks seem to act naively in lending on the basis of past returns rather than expected future performance. Of course, degrees of sophistication need not explain why banks favor the senior tranches — there are regulatory reasons for banks to invest in less risky securities.

Plantin produces useful insights by explicitly modeling the sale of ABS as an auction. Auctions are the common sales method when securities are privately placed (as opposed to being publicly issued).¹⁴ The auction may be informal, in which case the issuer privately consults each potential buyer before choosing the best offer. Alternatively, if there are many potential bidders, a formal auction may be used,

In an auction where each bidder has his own information about the true value of the items being sold, there is the risk that the buyer who wins the auction is the one who has overpaid.

typically a first-price sealed-bid auction.¹⁵ In either case, economists have a well-developed set of insights about the forces at play in an auction.¹⁶

In particular, in an auction where each bidder has his own information about the true value of the items being sold, there is the risk that the buyer who wins the auction is the one who has overpaid. This is known as the

¹⁴ In a private placement, securities are issued to “qualified institutional investors” (such as insurance companies), rather than to the general public, as in a public offering. The advantage is that there is much less regulation; the disadvantage is that since there is a very limited secondary market, the price received is typically lower. The “Bowie bonds” discussed earlier were privately placed; Prudential Insurance Company purchased the entire issue. More generally, private placements make up approximately 15 percent of all nonmortgage ABS issued.

¹⁵ In a first-price sealed-bid auction, each bidder submits a sealed bid to the seller (a bid that is hidden from other bidders). The high bidder wins and pays his bid for the good. Generally, a sealed-bid format has two distinct parts: a bidding period in which participants submit their bids, and a resolution phase in which the bids are opened and the winner determined.

¹⁶ See, for example, the book by Paul Klemperer and the book by Paul Milgrom.

winner’s curse. This problem should be familiar to anyone who has won an eBay bidding war, only to later discover that the item is available for retail purchase at a lower price. Note that the winner’s curse is not the result of bidders’ allowing their emotions to get the better of their reason. Rather, it arises because bidders are not equally well informed about the valuation of the object (in this example, the price for

which it can be bought elsewhere). A rational bidder takes this into account when bidding. As a result, instead of bidding his estimate of the object’s value, the bidder will shave down his bid to reflect the fact that he is likelier to win when he has overestimated the value of the object.

In Plantin’s model, the issuer would like to maximize participation in the auctions for the securities he offers. The reason is that the more potential bidders there are, the likelier it is that some bidder will receive information that confirms that these assets are indeed of high quality, in which case he would be willing to pay a high price. In particular, the issuer would like to encourage sophisticated investors to participate, since they are likeliest to receive information concerning the asset. On the other hand, the more sophisticated investors there are, the more severe the winner’s curse. The reason is that those investors who are not informed know they will win the auction only if none of the other investors learn that the assets are of high quality. If many of the other investors are sophisticated, the absence

of higher bids suggests that the assets are indeed of very low quality. Thus, the uninformed investors are timid in their bidding, which will reduce the issuer's revenue from the auction. Thus, designing the structure so as to encourage more sophisticated investors to participate in the auction creates a tradeoff: Sophisticated investors — who are likelier to be well-informed about the assets — will bid more aggressively and so will pay a higher price for high-quality assets. But they exacerbate the severity of the winner's curse for the uninformed investors and make them timid bidders.

Tranching plays a dual role in resolving this tradeoff. It draws in sophisticated investors by creating an informationally sensitive junior tranche, as in Boot and Thakor's model. Since Plantin assumes that sophisticated investors must bear a higher cost to participate in the auction for any given tranche, these investors focus their efforts only on the most junior tranche.¹⁷ By contrast, unsophisticated investors participate in the auctions for all of the tranches. Since the sophisticated investors bid for only the most junior tranche, the unsophisticated investors can bid aggressively for the senior tranches without fear of the winner's curse, which increases the issuer's revenue.¹⁸ While these unsophisticated investors also bid for the most junior tranches, the winner's curse means that they do so very conservatively and therefore are less likely to end up

¹⁷ Plantin argues that this is because it is difficult for sophisticated investors to find retail clients to ultimately hold these securities; for example, only wealthy "qualified investors" are permitted to invest in hedge funds.

¹⁸ The idea that creating a riskless security can encourage participation by uninformed investors was first used by Gary Gorton and George Pennacchi to explain how insuring bank deposits protects uninformed investors and thereby makes them willing to fund banks.

holding these tranches when the auction closes. This is consistent with the empirical evidence presented earlier: junior tranches do indeed seem to be held by more sophisticated investors.

REGULATION: ANOTHER DRIVER OF SECURITIZATION

Legal factors and government regulation are also important drivers of securitization. Three main regulatory and legal forces encourage securitization and determine some of its characteristics.

When a bank securitizes mortgages, investors in the mortgage-backed securities are virtually guaranteed that they will be paid in full, regardless of how the bank itself fares in the future.

Securitization May Reduce Bankruptcy Costs. As mentioned above, securitization is typically off balance sheet in that the underlying assets are legally separated from the firm so that the firm's creditors do not have any claim on these assets. Recall that the Modigliani-Miller proposition assumed that bankruptcy is costless. In practice, of course, it is not. Bankruptcy costs take two forms: direct costs, such as lawyers' fees and court costs, and indirect costs, which include difficulties in raising funds to make profitable investments, inefficient investments undertaken while in bankruptcy, and so on. These indirect costs may also affect a firm when it is in financial distress, that is, even when it is close to bankruptcy. Investors (both shareholders and creditors) will, of course, ultimately bear these costs because the value of their securities will be impaired in bankruptcy. Anticipating these costs, investors will be more reluctant to offer funds

in the first place, which will raise the firm's cost of financing (since they will obtain a lower price for any securities they offer).

Economists Gary Gorton and Nicholas Souleles point out that moving assets off balance sheet can be helpful because firms can mitigate these bankruptcy costs by precluding creditors' access to these assets.¹⁹ For example, when a bank securitizes mortgages, investors in the mortgage-backed securities are virtually guaranteed that they will be paid in full,

regardless of how the bank itself fares in the future. Consequently, they are willing to offer a high price for these securities. By contrast, if the bank retains the mortgages, investors will share in both the cash flows from the assets and the costs the issuer incurs should it find itself in financial distress. As a result, investors offer a relatively lower price for these securities. This is particularly true for risky, low-rated issuers. A classic example is Chrysler: It successfully used securitization in a period of financial distress (1990-91) when it could neither finance car loans in the commercial paper market nor issue long-term debt.²⁰

However, not every type of asset lends itself to securitization. Economists Kenneth Ayotte and Stav Gaon

¹⁹ Bankruptcy costs are also further reduced by the credit enhancement that is a feature of nearly all securitizations.

²⁰ See the article by Dennis Cantwell.

show that if the assets are essential for the firm's continuing operations, the firm's losing control over them through a securitization may imperil the firm's existence in case of financial distress. The reason is that the holders of the securitized assets have little interest in the firm's continued survival and may not be willing to compromise to help the firm avoid liquidation. Ayotte and Gaon offer the example of the bankrupt steel firm LTV, which made this argument as part of an attempt to regain control of inventory it had securitized.²¹

Securitization Can Lower Banks' Regulatory Capital Requirements. Some economists have argued that bank capital requirements are important drivers of securitization. This is also known as *regulatory arbitrage* because securitization might allow banks to shift assets to lower their minimum regulatory capital requirements. In particular, to the extent that minimum capital requirements do not assign to each asset the capital that would be held by an unregulated financial intermediary, it might be profitable for banks to sell off low-risk loans (such as mortgages) and retain high-risk assets. Note that for this to be an effective "arbitrage," the loan's buyer must have a lower capital requirement for holding that loan than the selling bank (for example, an unregulated hedge fund). As long as this is true, it is cheaper for the buyer to hold the loan on its books than for the bank, and both can profit from its sale.²²

²¹ Gorton and Souleles suggest that another reason firms may not want to securitize all assets is that interest payments on off-balance-sheet debt are not always tax-deductible to the issuing firm (although in practice lawyers have developed structures that allow the tax advantages to flow back to the issuer).

²² In addition to minimum capital requirements, bank regulators can also limit regulatory arbitrage through the examination process.

Consider the following example. A bank can make one of two \$100,000 loans, both of which require 8 cents of capital per dollar lent.²³ One loan is an adjustable-rate mortgage with an 80 percent loan-to-value ratio. In 2000 the interest rate on such a mortgage averaged 7 percent, and the default rate was approximately 0.5 percent. The other loan is a small-business line of credit, with an interest rate of 7.4 percent and a default rate of 1.5 percent.²⁴ Notice that the expected return on the mortgage can never be higher than 7 percent. By contrast, the small-business loan has an expected return that is at least 7.29 percent.²⁵ Given the regulatory capital requirements, the bank may prefer to hold the risky small-business loan and sell the safe mortgage. The reason is that under current minimum capital requirements, both loans require the bank to hold \$8,000 of capital, but the high-risk small-business loan has an expected return that is nearly 30 basis points higher.

The evidence as to whether regulatory arbitrage is an empirically significant driver of securitization is mixed. On the one hand, Brent Ambrose, Michael LaCour-Little, and Anthony Sanders do find evidence consistent with regulatory arbitrage in the mortgage market. By contrast, however, Bernadette Minton, Anthony

²³ In rough terms, the capital requirement means that for each dollar lent, the bank must secure at least 8 cents of funding in the form of retained earnings, stock, or long-term subordinated debt (i.e., debt that is junior to deposits).

²⁴ The data on small-business loans are from the paper by Sumit Agarwal, Souphala Chomsisengphet, and Chunlin Liu.

²⁵ Because the small-business loan repays 100-1.5 percent = 98.5 percent of the time. As a result, even if this loan returns nothing when it defaults, its expected return is at least 0.985×7.4 percent = 7.29 percent.

Sanders, and Philip Strahan provide empirical evidence that casts doubt on the importance of regulatory arbitrage and instead supports the hypothesis that securitization is motivated by a desire to reduce bankruptcy costs. In particular, they find that unregulated issuers (which are not subject to capital requirements) seem to be more active securitizers than banks. Moreover, it is the riskier firms (for which bankruptcy is obviously more of a concern) that use securitization the most.

Pension Fund Regulations Can Explain Credit Enhancement and Tranching. Finally, regulations governing pension funds are also important for securitization. The most prominent of these regulations are found in the Employee Retirement Income Security Act (ERISA). ERISA regulations govern pension funds' investment portfolios. Among these regulations are those that restrict funds' holdings of low-rated or very junior asset-backed securities in certain circumstances. This clearly encourages the use of credit enhancement in ABS structures and, in particular, the creation of high-rated senior tranches.²⁶ In light of the regulations' obvious importance, it is somewhat surprising that economists have yet to examine their relative weight in the growth of securitization.

IS SECURITIZATION EFFICIENT?

One important question we have not yet discussed is the social implications of securitization. That is, does it provide a net benefit to society or perhaps simply lead to a transfer of wealth from one party to another? Said differently, many of the models

²⁶ Many institutional investors also have self-imposed restrictions on the credit quality of their portfolio.

we have discussed involve the issuer's structuring the securitization so as to maximize his revenues. But is the issuer's gain merely the investor's loss?

Securitization Can Be Socially Beneficial. Recall that bankruptcy costs seem to be an important driver of securitization (explaining its off-balance-sheet feature as well as the credit enhancement). This ability to mitigate bankruptcy costs is certainly likely to be beneficial; we have already seen, for example, that securitization helped Chrysler Corporation continue operating during a time of financial distress.

In many of the other models we examined, securitization is also implicitly beneficial, since it is structured so as to reduce information asymmetries. That is, investors may be willing to pay more for certain tranches either because they are more confident that the securities they are buying are of high quality or because the structure makes it more profitable for them to become informed about the assets. In either case, this lowers the cost of financing for the firm and could allow it to fund profitable projects that might otherwise be infeasible. This is good for society; everyone can be made better off if profitable projects are not forgone.

Securitization May Sometimes Be Harmful. Having said this, however, securitization could potentially have social costs for several reasons.

To the extent that securitization permits firms to circumvent bankruptcy law or to circumvent banks' minimum capital requirements, it is unlikely to be socially optimal. In addition, the recent example of Enron has shown that securitization can sometimes be used to facilitate fraud. By moving assets and liabilities off its balance sheet, Enron was able to muddy investors' picture of the firm. Enron also implicitly guaranteed some of the assets it securitized, so that they

were not truly off balance sheet. As a result, the firm was actually much riskier than it appeared.

Finally, in some of our models, securities were structured so as to maximize the investors' incentives to become informed. While this may sometimes facilitate the funding of projects that otherwise would not be

tion is conducted off balance sheet and also why it commonly features credit enhancement.

Another set of explanations we have explored is based on the existence of differences in information about the underlying assets — either between issuers and potential investors or between different classes of

According to some theories, off-balance-sheet financing and, to a limited extent, tranching are responses to government regulations.


financed, it provides no net social benefit if the project would have been financed without securitization. Moreover, by driving potential buyers to spend money on acquiring information, the issuer would actually be encouraging unnecessary investment in information production.²⁷ To put it another way, society as a whole would be better off if the assets were simply sold without being subdivided into tranches, and as a result, investors did not need to invest the resources necessary to purchase these junior tranches.

CONCLUSION

Securitization is a large and growing area of corporate finance. Its key features are that it is typically off balance sheet, combines many small assets into a pool, and often divides this pool of cash flows into tranches.

According to some theories, off-balance-sheet financing and, to a limited extent, tranching are responses to government regulations. Bankruptcy costs also help explain why securitiza-

investors. These theories show that securities may be designed to alleviate these differences in information, so that outside investors are comfortable purchasing them, and they may also be designed to encourage investors to become better informed about the underlying assets. This is manifested in the pooling of assets and the subsequent division of these cash flows into tranches.²⁸

While there is a well-developed body of theoretical work that explores the determinants and structure of securitization, the empirical significance of these models, and in particular the impact of government regulation and bankruptcy law on securitization, remains a ripe area for future research. 

²⁷ This is similar to the argument often made against advertising.

²⁸ Information asymmetries and regulations are not the only explanations for why new securities are introduced. There is an interesting literature in which securities are designed to fill unmet needs for risk-sharing, that is, to *complete markets*. For example, a futures contract allows farmers to lock in a price for wheat so that they are not exposed to the risk that prices will collapse. For a model in which completing markets drives financial innovation, see Franklin Allen and Douglas Gale.

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