

Agency Conflicts in the Process of Securitization

Teodora Paligorova, *Financial Markets Department**

- *The misalignment of incentives among participants in the securitization process has been identified as contributing to the financial crisis.*
- *Recent evidence finds a positive association between the prevalence of loans of inferior quality and the growth in securitized products. Some argue that this is caused by the lack of incentives among lenders to screen borrowers, while others point to factors such as the specifics of balance-sheet management.*
- *Current initiatives to regulate securitization markets include greater transparency and standardization; requiring participants to hold an economic interest in the credit risk of securitized assets; linking the compensation of market participants to the long-term performance of the underlying loan; and regulation of credit-rating agencies.*

Securitization is the process of turning cash flows from a pool of non-tradable assets into tradable debt instruments. Major examples include the pooling of residential mortgage loans into residential mortgage-backed securities; consumer debt receivables such as leases and auto, equipment, and student loans into asset-backed securities; and bank loans, bonds, and mortgage- and asset-backed securities into collateralized debt obligations.¹ The misalignment of incentives among participants in the securitization process has played a major role in the ongoing turmoil in financial markets (Carney 2009). Many policy-makers have emphasized that the originators of loans lacked the incentive to act in the best interests of investors, the ultimate holders of loans, causing multiple agency conflicts.² Mishkin (2008), for example, argues that originators are motivated to maintain high volumes of loan issuance, but not to promote high-quality loans, since they no longer have any exposure to the pool of securitized assets.

Understanding conflicts of interest inherent in the securitization process is important for several reasons. First, levels of securitized debt grew tremendously in the past decade. In the United States, the share of outstanding asset-backed corporate debt increased from roughly 4 per cent of all corporate debt in 1985 to 40 per cent in 2007 (Federal Reserve Board Statistical Release, Flow of Funds Accounts). A similar, though less-pronounced, trend was observed

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1 Mortgage-backed securities include residential and commercial mortgage-backed securities. See Fabozzi, Davis, and Choudhry (2006) for details on securitized financial products.

2 An agency relationship is a contract under which a principal employs an agent to perform some service on their behalf, requiring the delegation of decision-making authority to the agent (Jensen and Meckling 1976). Principal-agent (agency) conflicts are prevalent; for example, managers may not always act in the best interests of shareholders, over whom they often have an informational advantage. Or, in financial contracts, lenders cannot directly observe the quality of borrowers and may lend to those who take risky actions, thus decreasing the probability of the loan being repaid.

in Canada, where outstanding asset-backed corporate debt was 6 per cent of all corporate debt in 1993 but 18 per cent in 2007.³ Second, this rise in the volume of securitized debt led to significant structural changes in capital markets.⁴ Specifically, traditional bank-based relationship lending was replaced by arm's-length contracting, with the owners of securitized products having little knowledge of the original loans or of the borrowers.⁵

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Third, securitization may affect the monetary policy transmission mechanism. On the one hand, securitization may strengthen the effect of monetary policy through the liquidity channel because, in theory, it should improve liquidity in credit markets, which can potentially contribute to the efficient allocation of credit. In addition, securitization transforms the underlying pool of bank loans into contingent claims that depend on asset prices in capital markets. The more closely the cost of securitized assets is linked to market interest rates rather than to the capital cost of bank lending, the stronger might be the impact of securitization on the relationship between market and short-term policy interest rates, thus enhancing the transmission mechanism. On the other hand, securitization may weaken the effect of monetary policy by providing an alternative source of funding. Under tight monetary policy, according to the theory of the bank-lending channel, banks may experience funding problems (Bernanke and Gertler 1995). By providing an alternative source of funding, securitization may resolve these funding problems and thus dampen the

effect of monetary policy. Overall, the effect of securitization on monetary policy remains ambiguous.⁶

Finally, securitization can also reduce funding costs by allowing originators to remove the pool of loans from their balance sheets and thus avoid regulatory capital charges (Acharya, Philippon, and Richardson 2009; Acharya and Schnabl 2009). Once the assets are no longer on their balance sheets, originators can use the proceeds to originate new loans. Pooling and tranching also permit the conversion of illiquid assets into tradable and divisible debt securities that better correspond to the investors' risk-return profiles, which improves overall liquidity in capital markets (Coval, Jurek, and Stafford 2009; DeMarzo 2005).

When the credit crisis began, however, it was evident that conflicts of interest among participants can potentially reduce the benefits of securitization and increase the risk to the system as a whole. This article discusses agency conflicts that occurred at different stages of the securitization process before the outbreak of the credit crisis in 2007. It focuses on the latest theoretical and empirical work on conflicts of interest related to moral hazard and adverse selection.⁷ In particular, studies on securitization and loan quality, screening incentives, credit ratings, risk taking by originators, and the incentives of servicers are reviewed. Various regulatory proposals and potential solutions for ameliorating agency conflicts in the securitization process are discussed as well.⁸

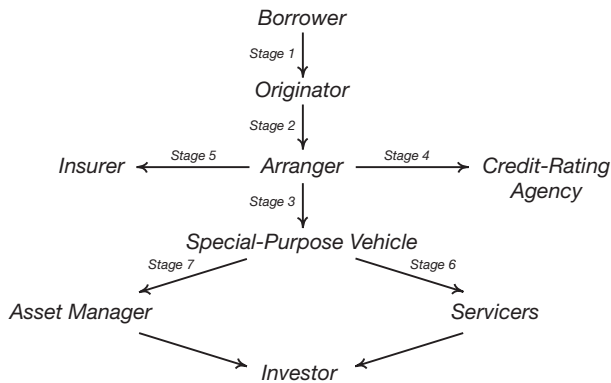
The Basics of Securitization

Securitization is a complex, multi-stage process involving various players. **Figure 1** shows a stylized representation of the various stages in the securitization process (the stages do not necessarily follow

3 Author's calculations, based on Bank of Canada data.
4 See Kiff et al. (2009) for an analysis of the issuance trends related to different securitization products. The overall trend is a large increase in volumes over the 2000–07 period followed by a sharp drop at the start of the crisis.
5 See Rajan (2005) for an overview of the changes in financial transactions over the past decade. In particular, the author notes that the typical financial transaction today is based on arm's-length contracting rather than on a long-term relationship between a client and financial institution. Financial transactions also depend on global liquidity, because the markets have become more integrated. Reintermediation has resulted in less direct investment by households and a rise in the number of institutional investors.

6 Estrella (2002) shows that, over the period 1966–2000, an increase in the federal funds rate led to a much stronger increase in mortgage rates under securitization than happened when there was no securitization.
7 Moral hazard occurs when an agreement creates an incentive for an agent to take more risks against the interests of the principal (or an issuer). For example, if policy-makers rescue some firms, other firms may take on more risk if this leads them to believe that the probability of being bailed out has increased. Similarly, a firm approaching insolvency with only a low probability of survival may take extremely large risks in an attempt to benefit from the situation. Adverse selection occurs when one of the parties to a transaction has more information than the other. For example, if there are two groups of assets, only one of which is defective, and the seller can identify their quality but the buyer cannot, then an adverse selection problem arises in which buyers suspect that all assets are defective and discount their value.
8 Table A1 in the Appendix provides a summary of recent regulatory recommendations, their purpose, and potential flaws. Some of them will be described in the text below.

Figure 1: Major players in the securitization process



sequentially, but may often take place simultaneously). The stages, along with the main responsibilities of the players, are discussed below.⁹

Stage 1: *Borrowers* apply for loans, which are initially funded by an originator, usually a bank or savings institution.

Stage 2: The *originator* identifies and pools assets into a portfolio, which may consist of any of the following assets: mortgage, bank, auto, home equity, student, or equipment loans; bonds; consumer debt; or trade or lease receivables. The pool of assets is sold to a *special-purpose vehicle* (SPV), a thinly capitalized entity whose ownership and management are independent of the originator (Gorton 2008). The SPV is usually established as a trust whose main purpose is to purchase the assets and realize their off-balance-sheet treatment for legal and accounting purposes. Originators receive an origination fee paid by the borrowers plus the difference between the values of originated and sold loans (Ashcraft and Schuermann 2008).

Stages 3–5: *Arrangers*, usually investment banks, are involved in all aspects of the deal structure and are compensated through fees paid by investors. Their responsibilities are to create the SPV, fund the assets until the securitization deal is closed, and underwrite the issuance of asset-backed securities. They consult *credit-rating agencies* (**Stage 4**), which assign ratings

⁹ See Ashcraft and Schuermann (2008) for a more detailed presentation of the players and the typical incentives in a securitization transaction involving residential mortgages. Note that securitization deals are typically not standardized, except for mortgage-backed securities, and the originators may play multiple roles (arranger, underwriter, and servicer), which further complicates the agency conflicts in the structure.

based on the credit risk of the asset-backed securities, measured in terms of the probability of default. Since the arrangers are responsible for the design of the security, they are key players in financial innovation.

The security design involves the division of the pool of assets into several slices, called *tranches*, each of which has a different level of risk and is sold separately. The least risky tranche, for example, will be the first to receive proceeds from the income generated by the underlying assets, while the riskiest tranche has the last claim on that income. The conventional securitization structure assumes a three-tier security design: junior (equity, or first-loss), mezzanine, and senior tranches. This structure concentrates expected portfolio losses in the junior position, which is usually the smallest of the tranches but the one that bears most of the exposure to credit risk and is thus expected to receive the highest return.

The initial risk level of each tranche determines the amount of additional credit needed to reach a higher rating. Arrangers help to reduce the credit risk of the pool of securitized assets by requiring collateral, insurance, or other agreements to reassure the investors that they will be compensated if the borrower defaults. Arrangers devise ways to enhance credit (i.e., improve the credit rating) from either internal or external sources. Internal sources include the subordination of the tranches (imposing constraints on the payment of interest and principal for the various tranches) and/or overcollateralization of the asset pool (where the value of the issued securities is lower than the value of the underlying assets).¹⁰ Alternative internal sources of credit enhancement are a reserve fund (a separate fund created by the issuer that reimburses the trust for losses up to the amount of the reserve) and an excess spread (the difference between the proceeds from the underlying assets and the coupon on the issued security). Among a variety of possible external sources, the arrangers (on behalf of the issuers) can

¹⁰ In this type of structure, some tranches are subordinated to others with the goal of obtaining a high investment-grade rating for the other tranches in the deal. In theory, the subordinated structure must reflect the credit quality of the underlying pool of assets. There is a cascade payment if some of the underlying assets default, with losses allocated to subordinated tranches in a waterfall structure. The equity tranche investors will be paid only after all the other tranches have been paid off. For example, if a \$100 million asset-backed transaction is financed with a \$96 million senior tranche, \$3.38 million mezzanine, and \$0.62 million equity tranche, the subordination level of the senior tranche is 4 per cent, which suggests that if the default loss is less than 4 per cent, the senior tranche is shielded from it.

purchase letters of credit or a credit default swap (CDS) from a *monoline insurance company* (Stage 5), so that if the issuer fails to make a payment, the guarantee provided by the insurers comes into effect.¹¹

Stage 6: Arrangers delegate the portfolio management to *asset (collateral) managers*, who ultimately represent investors. By trading the assets in the portfolio and replacing non-performing assets, managers make decisions on the risk-return characteristics of the portfolio. A manager's compensation includes fees as well as incentive pay linked to the returns of the different tranches.

Stage 7: *Master servicers* are employed by the SPV to collect loan payments, make advances to the trust of unpaid interest by borrowers, and provide customer service to the borrowers (although the originator frequently performs some of these functions). Compensation for master servicers consists of a percentage of the outstanding balance of the loan, plus float.¹² In the event of delinquency, the master servicer may decide to transfer the underperforming loan to *special servicers*, who work out these loans by making decisions on whether to modify or foreclose the loan, and when to do so. Special servicers receive a fixed fee and a percentage of the outstanding loans. If a troubled loan is liquidated, they receive an additional fee.

Investors, at the end of the securitization process, are the ultimate holders of the loan. Households, pension funds, hedge funds, and various financial intermediaries hold the equity, mezzanine, or senior tranches.

Agency Problems

The rather complicated process just described involves many principal-agent relationships, which provide numerous opportunities for agency problems. Agency problems that can occur at each stage of the securitization process are described below, with a discussion of how they may have contributed to the recent financial crisis.

¹¹ A credit default swap is a type of insurance contract against credit risk. For a fee, the buyer secures a promise from the seller of the swap to pay the buyer a stated amount in the event of the borrower's default. See Kiff (2003) and Garcia and Yang (this issue) for a description of this derivative. The International Swaps and Derivatives Association reports that the international CDS market grew from \$631 billion in 2001 to \$54.6 trillion in 2008. Acharya, Brenner, and Engle (2009) provide a brief overview of the CDS market and the financial crisis.

¹² Float is the return that master servicers earn between the time when the borrower advances payment on its obligation and when the servicer passes the payment to investors.

Origination and structuring (Stages 1–3) Adverse selection

Asymmetric information (adverse selection) occurs when, *ex ante*, one of the participants in a financial transaction is better informed than the other about certain aspects of the product's quality.¹³ With traditional lending, banks have a comparative advantage in collecting proprietary information about borrowers (Diamond 1984), which reduces informational asymmetry about the probability of loan repayment. Under the originate-to-distribute model, however, where originator banks remove loans from their balance sheets by selling them to investors, there may be a reduced incentive for the banks to collect information, since they are partially separated from the consequences of the borrower's default and may therefore lack the incentive to develop a long-term relationship with potential borrowers. A major concern about securitization is that it has weakened banks' incentives to screen borrowers, which allowed a higher percentage of bad-quality loans to enter the credit market over the 2000–07 period (Mishkin 2008).¹⁴ The question of whether securitization has diluted screening incentives has been of great importance to policy-makers since the start of the credit crisis in 2007 (e.g., Shin 2009). The problem of asymmetric information may operate throughout the securitization process, in that the originator of loans may have more information about the quality of the assets than arrangers do; similarly, arrangers may be better informed than asset managers.

Assessing whether securitization has led to the lowering of lending standards or whether lax lending standards have contributed to the growth of securitization is a challenging task, the results of which

¹³ Akerlof (1970) refers to the market for used cars, which is characterized by substantial asymmetric information. Assuming that the market price of a used car is the price of a car in average condition, only sellers of cars in equal or worse condition will have an incentive to trade. Because the buyers do not have sufficient information to distinguish between cars with different qualities, the pricing policy deters good-quality buyers and attracts only bad-quality buyers. By lowering standards and prices, only poor-quality cars ("lemons") will be left. This situation is inefficient because, initially, there were buyers who wished to purchase cars at a higher price; however, due to the low quality of the cars, they left the market.

¹⁴ Originators of subprime mortgages face different levels of supervision in the United States. Deposit-taking institutions, such as banks, are supervised by the Federal Reserve Board and the Federal Deposit Insurance Corporation, among other bodies, while non-bank originators, such as mortgage brokers, undergo less supervision. An interesting question, which is beyond the scope of this article, is: To what extent does the regulatory environment affect the incentives of originators for screening and due diligence? See Keys et al. (2009), whose results on the effects of regulation on loan quality show that subprime mortgages originated by banks tend to default more than those originated by less-regulated institutions.

could imply different policy responses. In the former case, regulators and policy-makers should focus on fixing securitization per se, while, in the latter case, the need for screening incentives should be addressed. Ideally, to determine whether securitization has caused lax screening behaviour, securitized and unsecuritized loans with identical loan characteristics should be compared. If no dilution effect is observed, the reason for lax lending standards may be the prevalence of specific types of loans, rather than securitization. The significant differences between securitized loans and non-securitized loans in terms of a borrower's quality, as measured by loan-to-value ratios and FICO scores, implies that originators have securitized only a particular group of loans.¹⁵ Thus, the impact of securitization on screening behaviour may be the result of these differences in loan characteristics, rather than the securitization process itself.

Whether securitization has diluted screening incentives has been of great importance to policy-makers since the start of the credit crisis.

Keys et al. (2010) use data on more than two million subprime mortgages for the period 2001–06 to establish the effect of securitization on screening. They find that the number of loans that are easier to securitize and do not require the collection of costly (unobservable) information about borrowers is more than double (110 per cent) the number that are more difficult to securitize and require the collection of hard-to-verify borrower information. The probability of default within two years of origination is 20 per cent greater for the former than for the latter. The authors take this as evidence that securitization has led to laxer screening standards, which suggests the presence of an adverse selection problem. Demyanyk and Van Hemert (2009) find that the growth of the subprime mortgage market is associated with a decrease in loan quality adjusted for observed loan characteristics and macroeconomic circumstances from 2001 to 2007. The authors of this study conclude as well that issuers were aware of the decrease in loan quality, since mortgage rates continued to rise

while the loan-to-value ratio (which measures a borrower's riskiness) increased over the 2001–07 period.

Another way to determine whether securitization has led to the origination of bad loans is to analyze the trading activity in loans before and after the crisis. Using the sudden freeze in the secondary market in 2007 to identify the effect of securitized lending on mortgage quality from the third quarter of 2006 to the first quarter of 2008, Purnanandam (2009) finds that banks with a large quantity of loans originated before the first quarter of 2007 (before the onset of the credit crisis) could not sell them in the immediate post-crisis period. The author attributes this to the inferior quality of these loans, which is confirmed by observing that the loans had high mortgage charge-off and default rates. After ruling out the effect of different loan characteristics and the liability structure of banks, Purnanandam (2009) concludes that securitization contributed to the origination of inferior loans. This finding is observed to be stronger in banks with relatively low capital and weaker sensitivity to demand deposits.

The reverse causality may also be true, however: Lax lending standards may have contributed to the expansion of securitized credit. Mian and Sufi (2008) explore possible reasons for the recent increase in subprime mortgages. They show that neither the prospect of higher income for subprime borrowers in early 2000, nor the increased expectation of future growth in house prices can explain the rise in the supply of credit. The authors argue that the increase in the number of subprime loans is the result of a greater willingness among lenders to originate such loans. The study is inconclusive about the exact reason for the increased supply of credit, however, which may be better risk diversification, implicit government guarantees, or the lack of screening incentives. Similarly, McCoy, Pavlov, and Wachter (2009) posit that inflated fees at every stage of the securitization process have increased the competition for lending products. To acquire a larger market share, originators decreased their lending standards and extended mortgages to risky borrowers. Measuring lending standards by loan-denial rates and loan-to-income ratios, Dell'Ariccia, Igan, and Laeven (2008) find that the decrease in lending standards has led to an increase in the demand for, and supply of, subprime loans. In addition, the decrease in lending standards is more pronounced in regions where lenders securitized large portions of the originated loans.

Shin (2009) argues that the lack of screening incentives that is presumed to have led to low lending

¹⁵ FICO (Fair Isaac Corporation) scores measure the probability of a negative credit event in a 2-year period. More information can be found at <<http://www.myfico.com>>.

standards may not be the only reason for the growth of securitization. The supply of credit depends on balance-sheet attributes such as equity, leverage, and the funding source. Financial intermediaries must be funded either by equity or by borrowing from creditors outside the banking system. Securitization facilitates credit supply by attracting new creditors such as pension funds, mutual funds, and foreign investors. According to Shin's model, after the banks exhaust the pool of less-risky borrowers, intermediaries seek more-risky borrowers in order to invest the available funds from the new creditors. Thus, the increased supply of credit to more-risky borrowers results more from the availability of funds than from lax lending standards.

The importance of screening incentives is further highlighted by Rajan, Seru, and Vig (2008), who claim that the originators' lack of incentives to collect information about borrowers led to estimates of default probabilities that were biased downwards. In particular, originators of loans acquire two types of information: verifiable (loan-to-value ratios and FICO scores) and unverifiable (soft) information, which is not easily documented (e.g., possible termination of the borrower's job or expenses that are not included in the current credit report). As the distance between the borrower and the investor increases, originators do not have the incentive to collect soft information, which, since it is not verifiable, cannot be reflected in the price of the loans. Models using data from a low-securitization regime will systematically under-predict default probabilities in a high-securitization regime, when soft information is more important. Better statistical techniques may not reduce model risk, because the growth of securitization has changed incentives to determine the riskiness of loans. This suggests that regulators, credit-rating agencies, and investors may face challenges when they rely solely on historical data to estimate the riskiness of assets. One solution is for regulators to take into account the drop in originators' incentives and to mandate the collection of all the necessary information, regardless of the securitization regime.

A host of recent papers therefore suggest that securitization has weakened the incentives of originators to screen, resulting in a large increase in poor-quality securitized loans over the 2000–07 period. Alternatively, the growth in credit supply facilitated by securitization has forced an expansion of the pool of borrowers to include those who are more risky (Shin 2009).

Transparency and standardization

One way to reduce the problem of asymmetric information in securitization markets is greater transparency, which helps originators and arrangers to exercise due diligence and, consequently, to limit various types of risk, such as the risk of allowing bad loans to enter the asset pool.¹⁶ Yet, greater transparency may also reveal the investment strategies of loan originators, thereby affecting their willingness to buy and sell certain assets.

Securitization has weakened the incentives of originators to screen, resulting in a large increase in poor-quality loans over the 2000–07 period.

The proposals for regulatory reform require issuers of asset-backed securities to disclose more information, as well as to provide more standardized formats for reporting. For example, issuers will have to report the underlying structure of the securitization vehicle and will supply information about the transactions, the composition of the asset pools, and their outstanding balances. In addition, originators would have to disclose the structure of their compensation and their level of risk retention, as well as that of brokers and sponsors. To further improve investment decision making in securitization markets, there should be better standardization that will guarantee uniform rules for the various procedures.

Security design

The level of credit support provided to the senior tranches of asset-backed securities is determined by the subordination structure, whereby the first losses are covered by the equity tranche holders. In theory, the use of subordination as an internal source of credit enhancement signals the willingness of the issuer to weather significant credit risk. Low subordination implies that the share of the equity tranche in the deal is small, and may expose investors in the senior tranche to losses. Thus, if the subordination level is too low (the equity tranche is small relative to the senior tranche), originators and arrangers, as holders of the equity tranche, may not have enough incentive to screen borrowers and exert due diligence, and may

¹⁶ See Fender and Mitchell (2009a) for details on policy initiatives other than transparency and standardization. Some of these initiatives are discussed below.

find it more profitable to take large risky positions because the senior tranche investors will bear the greater share of potential losses. If the subordination level is too high (the equity tranche is large and covers potential losses), then originators and asset managers who hold the equity tranche may have strong incentives to screen and monitor. But, owing to the risky profile of the securitization deal, the investors in the equity tranche may not be able to cover the potential losses. Provided that the assets are diversified, with a low correlation of default, subordination offers a shield against losses on the pool of underlying assets and creates incentives for screening and due diligence.

Moral hazard

Shareholders employ managers to handle the day-to-day operations of the firm, yet conflicts of interest can arise between them because managers may not always act in the best interests of shareholders. For example, managers may have an incentive to herd (mimic the investment decisions of other managers) by ignoring private information (Rajan 2005). Herding can lead to suboptimal risk taking by not creating new value-enhancing projects and exposing the firm to the risk of using a single technology, rather than diversifying. Managers may also entrench themselves within the company by making manager-specific investments, such as taking projects whose completion depends on their specific skills, making it costly for shareholders to replace them (Shleifer and Vishny 1989). Entrenchment is also associated with suboptimal outcomes, since the firm relies on managers who invest only in projects that coincide with their own expertise, thereby increasing the firm's risk exposure.

Within financial markets, a moral hazard problem arises when the originator of a loan has no incentive to monitor the borrower's actions—again, because the originator will not retain the loan on its balance sheet and thus will not bear the costs of bankruptcy. Purchasing credit protection, such as credit default swaps, may also weaken originators' incentives to monitor borrowers (Kiff, Michaud, and Mitchell 2003). A consequence of this moral hazard problem is that borrowers may take risky actions that reduce the probability of loan repayment. Recent evidence suggests that the 3-year risk-adjusted underperformance of loans with an active secondary market is partially due to the lack of monitoring, which has allowed excessive risk taking by borrowers (Berndt and Gupta 2008).

Yet, the problems may be amplified throughout the securitization process. Excessive risk taking by bank managers, the main originators of securitized loans, is considered one of the major factors contributing to the credit crisis (Trichet 2008). Originators not only failed to monitor the actions of borrowers, they also appear to have taken risky actions that were not in the best interests of the ultimate holders of the loan (Mishkin 2008). Managers took risky positions mainly because their compensation did not reflect the level of risk of the investments. They had stronger incentives to take tail risks (those that generate a small probability of severe adverse consequences, but offer generous compensation the rest of the time) because their compensation was more sensitive to upside than to downside returns (Rajan 2005). Their compensation was also linked to short-term returns, assuming that negative outcomes would occur only in the distant future. These risks translated into positive returns most of the time, and only rarely into negative returns, until 2007. Because compensation was linked to instant profits without recognizing the source of the risk, banks had incentives to build their balance sheets by investing in securitized products.¹⁷

The policy debate on executive remuneration recognizes that compensation has to be adjusted for different risks.

The policy debate on executive remuneration recognizes that compensation has to be adjusted for different risks by ensuring that it is both symmetric and time consistent with those risks (Bordeleau and Engert 2009; U.S. Treasury 2009; Acharya, Carpenter, and Gabaix 2009). Edmans et al. (2009) propose a new scheme that would allow the firm to escrow compensation until retirement. To maintain sufficient equity in the firm, even if its stock falls, the authors suggest a rebalancing mechanism that maintains a constant ratio between cash and stock. Another way to avoid excessive risk taking in highly leveraged institutions is to decrease the sensitivity of compen-

¹⁷ Highly rated securities, regarded as less risky, required low capital reserves; as well, the originating banks did not account for the assets' level of liquidity risk. Clementi, Cooley, and Richardson (2009) note banks' practice of holding collateralized debt obligations (CDOs) rated Triple-A that they themselves had originated. CDOs are debt securities backed by a pool of heterogeneous debt instruments such as bonds and loans. See Gorton (2008) for a description of the design and issuance trends for CDOs in the 2000s.

sation to return as the value of debt increases (John, Mehran, and Qian 2007). This compensation structure would ensure that managers do not engage in behaviour that incurs higher risks for debt holders. Stated differently, the study implies that compensation in financial institutions has to be designed to encourage managers to serve not only the interests of shareholders, but those of debt holders as well.

Another factor related to securitization that exacerbated risk taking is that the fees paid to various parties were all transaction based—they were realized when the transaction was recorded. Brokers and traders were paid when the contract was signed; the mortgage lender earned a fee when the mortgage was sold; and the issuer was paid an issuance fee. Thus, no party was found to have any stake in the long-run performance of the underlying loan. To rectify this, regulators have moved to link the compensation for brokers, originators, sponsors, and underwriters to the long-term performance of the securitized assets. An important change will be the accounting recognition of income over time instead of the current practice of immediate recognition (U.S. Treasury 2009).

“Holding the equity tranche”

It is assumed that if originators hold the equity (junior) tranche, they will absorb the first losses and will bear most of the risk of default. Because they are in a position to know more about the quality of the loans they have securitized, requiring them to hold a portion of the equity tranche would give them a stronger incentive to screen and monitor borrowers. In the early days of securitization, originators usually kept the equity tranche; however, at some point during the 2005–07 period, these tranches began to be sold to investors such as pension funds, or hedged through credit derivatives.¹⁸ Banks undertook regulatory arbitrage by keeping the Triple-A tranches of securitized products, which allowed them to avoid capital charges. Under these conditions, the equity tranche did not play an incentive role, since they held the senior tranches instead of the equity tranche that could potentially curb risk taking (Clementi, Cooley, and Richardson 2009).

Even if it is held by the originators, the equity tranche may not be the most effective device for aligning incentives under all circumstances, since a systematic factor (an event beyond the control of the originators) might affect the performance of all of the tranches. In a theoretical model, Fender and Mitchell (2009b) argue that if the probability of an unfavourable systematic outcome is high, the equity tranche will absorb losses regardless of the efforts by originators, and thus may actually provide less incentive for originators holding those tranches to screen borrowers. In these circumstances, it is optimal to hold equal slices of both the mezzanine and equity tranches, or a slice of each tranche of the portfolio (a vertical slice). If the probability of a favourable outcome is high, however, then it is better to hold the equity tranche than the mezzanine or the vertical slice. Finally, the authors note that the equity tranche will not play an incentive role if it is hedged with credit derivatives or if the portfolio consists of loans with highly correlated default probabilities. In response, recent regulatory proposals prohibit any direct or indirect hedging of risks related to the equity tranche, which is meant to ensure the material interest of the originators and sponsors of the deal (U.S. Treasury 2009).

Requiring originators to hold a portion of the equity tranche would give them a stronger incentive to screen and monitor borrowers.

Credit rating (Stage 4)

At Stage 4 (Figure 1), arrangers contact credit-rating agencies to obtain a rating on each tranche. By assessing the creditworthiness of a corporation or security, credit-rating agencies act as “gatekeepers” that reduce the probability of asymmetric information about the default and recovery risk of securities and firms. As users of credit ratings, investors are interested in accurate ratings, while issuers, who are paying for the ratings, are interested in favourable ratings. Thus, there is a conflict of interest among issuers, rating agencies, and investors, for which rating agencies have been criticized.¹⁹ A frequently cited cause of the financial crisis is that credit-rating

¹⁸ Some of the U.S. pension funds that held CDO tranches in the pre-crisis period were Calpers (California Public Employees’ Retirement system), the General Retirement System of the City of Detroit, the Teacher Retirement System of Texas, and the Missouri State Employees’ Retirement System.

¹⁹ Of course, this agency problem is modified somewhat by reputational concerns: Issuers are interested in favourable ratings from reputable rating agencies that provide accurate ratings.

agencies may have delivered inaccurate ratings of structured products because the models and the underlying assumptions did not fully reflect the complexity and risk of these securities (Coval, Jurek, and Stafford 2009; Richardson and White 2009).²⁰ Rating original asset-backed securities depends on the default correlation among the underlying assets, while rating CDO tranches depends on the default probabilities of asset-backed securities. In other words, the ratings depend on the default probability of a product that itself depends on default probabilities. Coval, Jurek, and Stafford (2009) note that small errors in estimating the likelihood of default may not be enough to change the rating of structured products securitized once, but they may be crucial for the rating of products like CDOs that are securitized two or more times.

Another factor that might have exacerbated the agency problem between issuers and investors is “rating shopping,” which allows issuers to choose only the most favourable rating received from all of the credit-rating agencies. Agencies may have encouraged rating shopping by selling consulting, or advisory, services to attract issuers. The complexity of structured products may also increase the disparity in ratings across agencies, as argued by Skreta and Veldkamp (2009), which may be another reason for rating shopping. Regulators agree that the practice should be banned. Assuming that advisory services promote rating shopping, the European Union regulator has stipulated that “agencies may not provide advisory services” (European Commission 2008). A similar, though less-restrictive, proposal by the Securities Exchange Commission is to separate the roles of a rater and an adviser for the design of tranches in securitized products.

Theory suggests that reputational concerns may act as a disciplinary device among rating agencies. Klein and Leffler (1981) suggest that the agencies’ reputational concerns may maintain quality standards in markets where problems with asymmetric information preclude it. A recent theoretical study by Bolton, Freixas, and Shapiro (2009) shows that the issuance of inflated ratings is higher in situations where the costs of maintaining the agency’s reputation are low.

Since creating and maintaining a reputation is linked with competition, the market structure of the credit-rating agencies is expected to affect the quality of the service. Becker and Milbourn (2008) reason that competition reduces producer profits, which may result in weakened reputational concerns and, hence, ratings of a lower quality. On the other hand, competition among agencies may strengthen their reputational concerns because issuers can choose among many agencies. An empirical study by Becker and Milbourn (2008) on the effect of competition on ratings finds that the increase in the market share of Fitch in corporate bond rating since the mid-1990s has resulted in less-accurate corporate ratings. A potential policy implication is that weaker competition may strengthen reputational concerns and thus the quality of the ratings; however, careful examination of both the costs and the benefits of competition in the rating industry is needed.

Various regulatory proposals have been formulated to address conflicts of interest among credit-rating agencies. One of the methods used most frequently to realign incentives is the pay structure. Regulators are debating whether the fees collected by credit-rating agencies should be paid by investors rather than issuers (SEC 2009). If investors pay, however, they may not be willing to share rating assessments, which would reduce disclosure and increase the asymmetrical-information problem, likely to the detriment of smaller investors.²¹ Another proposal requires issuers to pay up front, which may introduce a new moral hazard problem: Rating agencies may not have the incentive to deliver high-quality service. An alternative mechanism for mitigating agency problems is strong oversight. The European Union regulator suggests that agencies appoint at least two directors on their boards whose salary does not depend on the performance of the rating agency (European Commission 2008).

Another proposal would require rating agencies to improve the disclosure of the models, methodologies, and assumptions on which the ratings are based (U.S. Treasury 2009). Too high a level of disclosure may deter innovation and reduce the diversity of models, thus increasing systemic risk, while too low a level hurts the interests of investors. A larger set of risk

²⁰ Although not necessarily proving the inaccuracy of the ratings of structured products, Fitch Ratings (2007) reports that 70 per cent of their structured products are rated Triple-A. Using a Standard & Poor’s database of 3,912 tranches of CLOs (securities backed by a pool of corporate loans), Benmelech and Dlugosz (2009) discover that 70.7 per cent of all tranches receive the highest grade.

²¹ See Zelmer (2007) for more details on this topic.

metrics can potentially inform investors of the multi-dimensional aspects of the risks they are taking.²²

Insurance (Stage 5)

Issuers and arrangers may choose to buy credit default swaps (CDSs) to insure against the possibility of default on the pool of underlying assets. In general, a CDS introduces counterparty risk—the risk that the insurer will fail to fulfill its obligation to pay the buyer of the swap (arrangers) if the borrower defaults (the pool of underlying assets). In the recent crisis, the counterparty risk in the CDS market turned into systemic risk because the standard bilateral arrangement of this contract did not take into account the exposure to other buyers of swaps. One way to mitigate this risk is to impose collateral and margin requirements. However, the lack of transparency in this market masked the exposure to expected credit defaults of counterparties, which may have made swap buyers reluctant to demand large margins and collateral.

The lack of transparency in the CDS market masked the exposure to expected credit defaults of counterparties.

In the wake of the market turmoil, it became apparent that high-rated swap sellers such as AIG had not posted sufficient collateral for their swap contracts. The swap counterparties were relying on AIG's own ratings to hedge counterparty risk.²³ However, this created a moral hazard problem because the expansion of insurers' balance sheets as a result of collateral avoidance allowed them to sell even more swaps. The question arises: Would the issuers have bought CDS contracts had they known, for example, that AIG had \$400 billion worth of exposure to credit defaults?

²² For example, the Dominion Bond Rating Service (DBRS) has introduced new reporting requirements for conduits of Canadian bank-sponsored asset-backed commercial paper. In particular, they are required to include details of the underlying structure of each conduit, the type of the transaction, and the composition of the asset pool. In addition, to increase the transparency of the rating process, DBRS releases surveillance reports on commercial mortgage-backed securities (CMBS) (DBRS 2009).

²³ AIG counterparties did not require collateral because of the insurer's Triple-A credit rating. Yet, they required collateral once the company was downgraded in September 2008 (Acharya, Brenner, and Engle 2009; McCoy, Pavlov, and Wachter 2009).

Since they are subject only to anti-fraud and anti-manipulation prohibitions, CDSs have been very lightly regulated (McCoy, Pavlov, and Wachter 2009). Regulatory proposals will require that if CDS markets continue to increase in size, they should trade through centralized clearinghouses or exchanges that play the role of counterparties (U.S. Treasury 2009; Acharya, Brenner, and Engle 2009).²⁴ An expected benefit from trading through these institutions is that the collateral and margin requirements will not be set bilaterally, ignoring the counterparty risk for each trade. In addition, exchanges guarantee that whenever the margin requirements are low, the trading positions will be liquidated immediately, unless the margins are restored. Thus, the collateral and margin arrangements would correspond to the credit and market risks, resulting in better aligned incentives for insurers.²⁵

Asset management (Stage 6)

At Stage 6, investors employ an asset manager to formulate a strategy and manage the pool of assets. Yet moral hazard arises because of investors' and managers' differing incentives. While the investors' objective is to achieve an optimal risk-return trade-off, the goal of asset managers is to maximize their fees, which may lead them to engage in various adverse strategies in regards to portfolio design and trading decisions. They may, for example, build high-risk undiversified portfolios that do not maximize risk-adjusted returns for investors; if they hold a portion of the equity tranche, they may purchase (sell) loans below (above) par value and distribute the gains to holders of the equity tranche. They may also buy low-rated assets to earn higher yields at the cost of increased credit risk or may not expend the effort to acquire private information about the loans, instead mimicking the investment decisions of other managers by "buying the market," thus ensuring that they will not underperform their peers (Rajan 2005). These

²⁴ If trading is organized through a clearinghouse, each trade is initially set bilaterally. The clearinghouse then steps in as a counterparty, thus permitting the netting of identical offsetting contracts. If the trading is organized in a formal exchange, licensed market-makers are counterparties that meet collateral and margin requirements. Exposure netting under both arrangements reduces counterparty risk. Duffie and Zhu (2009) examine whether the establishment of clearinghouses reduces counterparty exposure and collateral demand, arguing that this is efficient only if "the opportunity to get multilateral netting in that asset class dominates the resulting loss in bilateral netting opportunities across other asset classes" (p. 2).

²⁵ The regulatory proposals for over-the-counter (OTC) markets also include standardization of the CDS contracts; a centralized registry if the contracts are not large enough; (delayed) disclosure of the net positions of market participants; and transparency of information for regulators. See Acharya, Brenner, and Engle (2009) and U.S. Treasury (2009) for more details on these proposals.

risks can be alleviated by imposing constraints on managers' decisions and on the composition and risk profile of the portfolio (Keller 2008).

Servicing (Stage 7)

Once the loan is transferred to a trust and securitized, the master servicer is responsible for the allocation and distribution of the loan proceeds and losses to the tranche holders. The special servicer manages the work-out plan for delinquent loans. The presence of servicers alleviates potential coordination problems among heterogeneous classes of investors with different risk-return profiles. Ashcraft and Schuermann (2008) refer to Moody's estimates that the loss can vary within a 10 per cent range, depending on a servicer's quality.

Senior- and equity-class investors may have conflicting interests regarding the choice of extending the loan or foreclosing and selling the property. Loan extension may not be preferred by the senior-class investors, since the collateral may continue to deteriorate, thereby decreasing the proceeds. If interest rates are falling, however, senior tranche holders may be better off with an extension. The equity tranche holder may prefer an extension to prolong the period of fee proceeds if the value of the collateral is less than the loan balance.

Once they are handling the loan, special servicers may prefer to extend a loan work-out to obtain higher fees rather than assuming the cost of monitoring and creating the work-out. Gan and Mayer (2006) show that if a special servicer holds the equity tranche, the probability of transferring loans into special servicing is lower. Once the loan is transferred into special servicing, the size of the loss in the deal affects the liquidation period; i.e., loans with small losses are associated with faster liquidation than are loans with larger losses. Overall, holding a stake in the deal appears to be an important device to realign incentives between servicers and investors.

Conclusion

The rapid growth of securitization has modified the way credit markets function. Although securitization has many potential benefits, the agency problems inherent in the various stages of the process have made it difficult for investors to evaluate the underlying risks.

Thus, the main question is how to restore healthy and sustainable securitization markets by overcoming these agency problems. The regulatory proposals target reforms in several areas: improved transparency and disclosure, better use of credit ratings, effective alignment of incentives between originators and arrangers, and increased standardization. It is also debated that the regulators need to consider not only the separate effect of each policy, but their interactive impact as well.

The main question is how to restore healthy and sustainable securitization markets by overcoming these agency problems.

To ensure the availability and quality of information for the participants in the securitization deal, the proposals recommend better and timely disclosure of practices by originators, asset managers, and underwriters. For instance, regional industry bodies have prepared recommendations for disclosure at the pre-issuance stage of information on the cash flow of pools of assets (sensitivity to prepayments, default, and recovery scenarios, and a summary of loan characteristics), expected credit ratings, and a description of the hedging arrangements for the cash flow. At the post-issuance stage, investors will receive regular reports for the underlying structure of each deal, the nature of the transactions involving (asset-backed) securities, and the composition of the asset pool at the time of reporting. The regulators should ensure, however, that the information that is released has material content and does not burden investors and securitizers with irrelevant details. To further improve transparency and reduce valuation difficulties, the policy initiatives preview a reduction in the complexity of securitized products by imposing standardization.

To guarantee better use of credit ratings, the proposals require the disclosure of conflicts of interest among the participants, as well as more detailed information on the methods used to calculate the ratings. Credit-rating agencies should also release reports on, for example, specially serviced loans and collateral changes from previous reporting periods. It is also suggested that structured and unstructured products should be identified. To alleviate the conflicts

of interest, the practice of simultaneously obtaining a rating and advice on the deal structure will be banned.

Requiring issuers and/or originators to retain some exposure to the securitized asset is viewed as one means of achieving an alignment of their incentives with those of investors. While it is agreed that originators should maintain a material economic

interest in the deal by holding a portion of the loans they originate, the type and size of the tranche to be retained are still under debate. Retaining the equity tranche per se may not provide strong incentives to screen and monitor borrowers if it is too small to cover losses in a downturn.

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Appendix

Table A1: Summary of Regulatory Proposals Related to Securitization

Proposal	Purpose	Potential drawbacks
<p><i>Skin in the game</i></p> <ul style="list-style-type: none"> • Originators of securitized loans and sponsors have to hold 5 per cent of the credit risk of securitized exposures. 	<ul style="list-style-type: none"> • To ensure that participants have incentives to conduct due diligence regarding the performance of underlying assets 	<ul style="list-style-type: none"> • It remains unclear how regulators have defined the size of the material interest. Some consider that 5 per cent is not enough. The optimal size of the retention tranche is expected to depend on deal-specific characteristics and economic conditions.
<p><i>Focus on the long-term performance of loans</i></p> <ul style="list-style-type: none"> • Compensation of brokers, originators, sponsors, underwriters, and other participants should be linked to long-term performance of loans rather than being transaction based. • Eliminate the gain-on-sale accounting treatment 	<ul style="list-style-type: none"> • To redirect the focus from short-term fee-based performance onto long-term performance of assets corresponding more closely to their maturity. Ensure time consistency between incentives to monitor the actual maturity of the asset. • Eliminate the upfront profitability of securitization and thus induce better risk assessment 	<ul style="list-style-type: none"> • It may be difficult to measure long-term profit; need for design and implementation of new accounting rules • One-size-fits-all solutions. There may be other ways of linking pay to long term-performance: vesting periods, clawbacks, and target levels for incentives.
<p><i>Regulation of over-the-counter markets</i></p> <ul style="list-style-type: none"> • Clearing of all standardized OTC derivatives • Impose margin requirements and risk controls • Prudential supervision (capital requirements, reporting requirements, and rules for business conduct) 	<ul style="list-style-type: none"> • Prevent activities that increase systemic risk • Promote efficiency (through better price discovery) and transparency • Prevent manipulation, fraud, and other abuses. 	<ul style="list-style-type: none"> • Complexity in transforming the OTC market into exchanges. It may not occur immediately. • Clearing houses will clear only standardized trades. A large segment of the CDS market is not standardized • Need to coordinate oversight agencies
<p><i>Transparency and standardization</i></p> <ul style="list-style-type: none"> • Disclosure of practices by originators, asset managers, and underwriters • Disclosure of pay structure • Standardization of structured products 	<ul style="list-style-type: none"> • To reduce asymmetric information among the parties involved in the transaction 	<ul style="list-style-type: none"> • Standardization may impair innovation of structured products.
<p><i>Regulation of credit-rating agencies</i></p> <ul style="list-style-type: none"> • Disclosure of conflicts of interest; consistent policies for disclosure • Differentiate ratings of structured and unstructured products • More disclosure of methods for rating and of the risks involved 	<ul style="list-style-type: none"> • The pricing of structured products depends crucially on credit ratings. The rating agencies are considered to have provided too-optimistic assessments of credit risk. The ultimate purpose is to prevent such behaviour in the future. Less reliance on credit ratings in regulations 	<ul style="list-style-type: none"> • Optimal level of disclosure that is not accounted for in the current proposal. Too much disclosure may deter innovation in models that evaluate creditworthiness.