

Tymoigne, Eric

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## Securitization, Deregulation, Economic Stability, and Financial Crisis. Part I: The evolution of securitization

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## **Working Paper No. 573.1**

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# **Securitization, Deregulation, Economic Stability, and Financial Crisis, Part I**

## **The Evolution of Securitization**

by

**Éric Tymoigne**

The Levy Economics Institute of Bard College  
California State University, Fresno

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The Levy Economics Institute  
P.O. Box 5000  
Annandale-on-Hudson, NY 12504-5000  
<http://www.levy.org>

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## **ABSTRACT**

This study analyzes the trends in the financial sector over the past 30 years, and argues that unsupervised financial innovations and lenient government regulation are at the root of the current financial crisis and recession. Combined with a long period of economic expansion during which default rates were stable and low, deregulation and unsupervised financial innovations generated incentives to make risky financial decisions. Those decisions were taken because it was the only way for financial institutions to maintain market share and profitability. Thus, rather than putting the blame on individuals, this paper places it on an economic setup that requires the growing use of Ponzi processes during enduring economic expansion, and on a regulatory system that is unwilling to recognize (on the contrary, it contributes to) the intrinsic instability of market mechanisms. Subprime lending, greed, and speculation are merely aspects of the larger mechanisms at work.

It is argued that we need to change the way we approach the regulation of financial institutions and look at what has been done in other sectors of the economy, where regulation and supervision are proactive and carefully implemented in order to guarantee the safety of society. The criterion for regulation and supervision should be neither Wall Street's nor Main Street's interests but rather the interests of the socioeconomic system. The latter requires financial stability if it's to raise, durably, the standard of living of both Wall Street and Main Street. Systemic stability, not profits or homeownership, should be the paramount criterion for financial regulation, since systemic stability is required to maintain the profitability—and ultimately, the existence—of any capitalist economic entity. The role of the government is to continually counter the Ponzi tendencies of market mechanisms, even if they are (temporarily) improving standards of living, and to encourage economic agents to develop safe and reliable financial practices.

See also, Working Paper No. 573.2, "Securitization, Deregulation, Economic Stability, and Financial Crisis, Part II: Deregulation, the Financial Crisis, and Policy Implications."

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**JEL Classifications:** E6, E42, E44, G01, G18, G28, G38

## I. INTRODUCTION

The history of U.S. financial regulation and supervision has been one in which only catastrophes have resulted in meaningful improvements in the management of the financial system. Not only have there always been powerful socioeconomic interests and values to let economic agents do as they wish until the money machine breaks, but also the same forces have sometimes prevented the needed changes to be oriented toward better regulation and supervision. The early 1980s is a classic example of such a move, when Reagan's "the government is the problem" was the slogan of the day, and better government regulation and supervision meant less government regulation and supervision. As a result, tremendous internal pressures were put on field examiners to be lenient, the term "reregulator" took a pejorative connotation, and people like Edwin Gray became the subject of hatred, threats, and public mockery (Black 2005; Gray in Nash 1987).

These reactive and reluctant regulatory actions have been highly ineffective at promoting a safe and reliable financial environment for economic activity, and the recent "Minsky moment"<sup>1</sup> is the last addition to a long list of increasingly strong financial disruptions starting in the 1950s (Sinai 1976; Minsky 1986, Mishkin 1991; Wolfson 1994; Papadimitriou and Wray 2008). Each time, the government provided an ex post validation of financial innovations by modifying its regulatory framework to account for institutional changes and by providing emergency lending (backed by those innovations), but the new framework was made rapidly irrelevant. In addition, financial institutions have become so big and intertwined, and financial innovations have become so complex, that it has become extremely difficult to regulate and supervise them properly, which has led to an increase in systemic risk.

The first part of this study analyzes the evolution of securitization over the past thirty years and shows how it contributed to the emergence of a Ponzi process in the mortgage industry and other sectors of the economy. Over the years, securitization has progressively involved more and more complex financial instruments and its purpose has changed. All this has led to an increasing reliance on asset liquidation and refinancing as a source of funds to meet cash commitments in the securitization process.

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<sup>1</sup> Even though the following should illustrate Minsky's theory pretty well, those unfamiliar with his approach may want to check Tymoigne (2010) to see how the current crisis is a textbook example of Minsky's theory.

## II. SECURITIZATION AND THE PONZI PROCESS OF THE 2000s

### A. A Quick Primer on Securitization

The financial system has changed tremendously over the past 30 years, and it is difficult to understand the current financial crisis without having a good understanding of how the current financial system works. This quick primer should provide the reader with the basic principles necessary to understand the rest of the paper; readers already familiar with securitization can directly go the subsection titled “Consequences of Securitization: Potential Benefits and Risks.”

#### 1. *Basic Principles of Securitization*

Since the early 1970s, the pace of securitization has grown exponentially and has been extended to a wider and wider range of activities. Taken in a broad sense, the concept of securitization is not new; for example, the issuance of shares is a form of securitization (of capital equipments). Similarly, when someone exchanges her promissory note for a demand deposit she is securitizing her promissory note. However, since 1970 securitization is understood as a form of off-balance-sheet operation to transfer financial risks (credit risk and liquidity risk notably) embedded into the illiquid financial claims held by financial institutions. Even though the only direct implication of securitization is to transfer financial risks, this may create a new funding for banks. However, as shown later, securitization may occur without any transfer of funds to originators or anybody else, and, recently, it mostly concerns financial claims in secondary markets rather than primary markets.

If funding indirectly occurs, securitization is a form of to-the-asset funding operations. This means that the funds obtained are allocated to specific activities (the assets acquired with illiquid financial claims) and the parties that provided the funding to banks have an economic interest that is limited strictly to the illiquid financial claims involved in the transaction (i.e., their compensations are derived exclusively from the revenues generated by the funded economic activity and they have no way to claim compensations by other means in case of default). This is different from to-the-person (or to-the-entity) funding where the external funds can be used for a wide variety of activities and fund providers (bond holders, shareholders, etc.) are compensated on the basis of the revenues obtained from the overall business activity. Securitization is also different from secured lending because in the latter case the lender may ask the borrower for

additional compensations in case of a deficit between the value of the collateral at liquidation and the outstanding principal owed; in its pure form, securitization is a form of nonrecourse funding operation.<sup>2</sup>

A simplified example presents the original intent of securitization; it involves four parties: obligor/investor, originators/transferor/servicer, special-purpose entity (SPE)/transferee/trustee, and security buyers/savers/beneficiaries. Say that Joe the plumber wants to invest in a new car for his company. Unfortunately, he does not have any money, so he goes to his local Bank of American (BoA). After a review of Joe's finances, BoA agrees to provide funds to Joe in exchange for his promissory note that takes the form of an auto loan on BoA's balance sheet. All this allows Joe to buy a car from his local car dealer (who happens to have his account at BoA):

| Joe (Obligor/Investor) |                | BoA (Originator/Transferor/Servicer) |                        |
|------------------------|----------------|--------------------------------------|------------------------|
| Assets                 | Liabilities    | Assets                               | Liabilities            |
| Car +\$X               | Auto loan +\$X | Auto loan +\$X                       | Car dealer's acc. +\$X |

Joe's promissory note exposes BoA to several risks and costs. First, the promissory note contains a high credit risk and so has a 100% weight attached to it when calculating the required capital. Second, the promissory note is illiquid, which limits the flexibility of BoA in case it needs cash fast and may lead to costly refinancing methods. In order to restore the original liquidity of its balance sheet and to decrease capital requirements, BoA decides to try to sell Joe's promissory note. Unfortunately, nobody else is willing to acquire it (otherwise Joe would not have needed to go to BoA). In order to solve this problem, BoA creates an SPE—also called special purpose vehicle (SPV) or special purpose company (SPC)—and sells Joe's promissory note to the SPE.

In order to purchase the auto loan, the SPE borrows funds by issuing its own promissory note for cash to individuals willing to acquire them (so called "savers").<sup>3</sup> Unlike Joe's loan, the

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<sup>2</sup> In the real world, limited recourse is available through credit enhancements provided by the originator, like cash advance to the SPE.

<sup>3</sup> In most of the literature, the savers are called the "investors." Remember that in economics, investment only refers to the purchase of real resources to maintain or increase production capacities (physical accumulation); Joe is the investor in our example. The counterpart of investment is saving (financial accumulation). Savers (the "financial investors") *place* their money in securities. In addition, security buyers may not have any savings, but rather may buy securities by using leverage (either through [*ex nihilo*] bank advances or through unfunded positions).

SPE promissory note is supposed to be tradable, it is a security; this auto-loan-backed security is called a certificate for automobile receivables (CAR). The proceeds of the issuance are passed to BoA in exchange for the auto loan. After all the interbank clearing is done, we have (assuming that none of the security buyers have an account at BoA):<sup>4</sup>

| <u>BoA (Originator/Transferor/Servicer)</u> |             | <u>SPE (Trustee/Transferee/Security Issuer)</u> |             |
|---|-------------|---|-------------|
| Assets                                      | Liabilities | Assets  | Liabilities |
| Auto loan -\$X                              |             | Auto loan +\$X                                  | CARs +\$X   |
| Reserve +\$X                                |             |   |             |

| <u>Security Buyers (Savers/Beneficiaries)</u> |             |
|---|-------------|
| Assets  | Liabilities |
| CARs +\$X                                     |             |
| Bank acc. -\$X                                |             |

The auto loan (Joe's promissory note) has been securitized into several CARs, and has been transferred to the SPE who holds it in trust for the sole benefit of CAR holders. BoA will act as a servicer for a fee<sup>5</sup> by collecting the monthly debt services from Joe and transferring them to the SPE manager who will use the proceeds to service the CARs. This very simple example shows the basic tenets of securitization. In the real world, there are many different versions of this principle that take more or less complex forms.

First, the servicer, the transferor, and the originator can be different entities, and this is also true for the SPE and the trust,<sup>6</sup> as well as security buyers and savers (e.g., pensions funds buying on the behalf of retirees, financial institutions buying for their own account, etc.). In addition, there may be different types of servicers operating at different levels of the securitization process (primary servicer vs. master servicer) and under different circumstances (specialized servicers who work out loans in case of defaults and back-up servicers who replace a servicer who cannot make payments to the SPE). Furthermore, credit-rating agencies are an

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<sup>4</sup> If all of them have their account at BoA, bank accounts at BoA decline by -\$X. This lowers the required reserves for BoA (removal of auto loans lowers capital requirements).

<sup>5</sup> The payment of the fee depends on how subordinated the claim of the servicer is. BoA may take a fee upfront, the fee payment may depend on the existence of an excess spread, or a combination of both fee payment procedures may be used (Kothari 2006: 725).

<sup>6</sup> In which case the SPE takes the form of a corporation, LLC, or other organizational forms (Kothari 2006: 634). Depending on the passivity of their structures, some SPEs may choose not to have any balance sheet (Kothari 2006: 86, 823).

important element of securitization because they provide security buyers with a clue about the credit quality of the securities issued by the SPE. Finally, within a single securitization procedure, there may be several SPEs involved at different levels of securitization.

Second, asset-backed securities (ABS), a general term for securities created through a securitization process,<sup>7</sup> are backed by a pool of relatively homogenous (in terms of loan-to-value, credit risk, servicing method, etc.) financial claims rather than just one loan; in fact, that is an essential reason why the SPE exists. Indeed, the latter allows many economic agents to participate in a pool of risky financial claims without having to break down the pool into individual portions. SPE security buyers are the collective owners of the pool of reference (in case of CARs, the pool contains many auto loans with relatively homogenous characteristics). The SPE is similar to a mutual fund, with the main difference being that rewards and risks are not proportional to the stake in the fund; indeed, as explained below, SPE securities have usually different classes of credit risk and maturity (Bond Market Association 2007: 711).

Third, instead of selling the securities to financial market participants, the SPE may just give its promissory notes (CARs) to BoA in exchange for the illiquid financial claims (auto loans), and BoA may decide to keep or to sell the CARs. However, even though the SPE creates tradable securities, not all securities are liquid and some of them may involve a buy-and-hold strategy from the part of the beneficiaries and the originator. In this case, the originator (and security buyers) may try to securitize the ABSs they hold (leading to resecuritization).

Fourth, there is usually a private or federal insurance mechanism that comes into the deal to enhance the creditworthiness of all, or some, of the securities issued by the SPE.

Fifth, securitization may proceed without the occurrence of a sale, even if financial claims do not currently exist; indeed, synthetic securitization involves no sale and securitization may concern future flows of income from currently nonexistent assets (Kothari 2006: 93–97, 764).

Sixth, a SPE can be used in several securitization procedures simultaneously. The master servicer, however, must make sure that each pool of assets is clearly assigned to a specific issuance of securities and, thus, a specific group of beneficiaries (Kothari 2006: 640–641).

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<sup>7</sup> The term asset-backed security is used more or less broadly. In the broadest sense, it means all securities issued by SPEs (from mortgage-backed securities to structured finance collateralized debt obligations). In the strictest sense, it means all first-level securitization SPE securities excluding mortgage-backed securities.



Seventh, the servicer usually pays the SPE in advance of the collection of debt services on the pool and then keeps the latter proceeds, which may lead to financial difficulties for the servicer if obligors (Joe) become delinquent and then default. The strength of this risk depends on the requirements of the deal in terms of advance payment by the servicer—mandatory advancing requires that the servicer continues to pay the SPE even if obligors default,<sup>8</sup> while optional advancing does not legally bind the servicer to continue to advance payments to the SPE (Fabozzi and Dunlevy 2002: 373–374).

Eighth, over time, the intent of securitization has changed and the main reason for securitizing is no longer removing newly originated illiquid financial claims from the balance sheet, but rather making portfolio arbitrages based on existing financial claims. More precisely, a collateral manager may be hired to buy existing financial claims in the secondary market (including the securities of other SPEs) and to create a SPE. This SPE will be able to enter into complex management strategies involving buying and reselling financial claims to maximize return on equity. Thus, the initiative for the securitization process, and so the creation of the SPE, may come from the savers' side (asset managers) rather than from the investors' side (loan originators) (Kothari 2006: 423ff). In this case, there is no originator, but rather a “sponsor” of a SPE, and the cash flow generated by the use of the underlying assets may be of no concern because payments to the holders of SPE securities may be based on capital gains obtained through active asset management (Boutlwood and Meissner 2008). The rise of synthetic deals has been extremely beneficial for setting up arbitrage securitization (Kothari 2006: 538).

## 2. *The SPE: A Central Device for Securitization*<sup>9</sup>

The SPE has different names, like “special investment vehicle” or “conduit,” depending on the structure of its balance sheet and the intent of its creation (International Monetary Fund 2008: 71; Polizu 2007). Sometimes, it takes the name of the securities it issues (CDO-issuing SPEs are called “CDOs”), and it seems that synthetic SPEs are all called “CDOs,” even though no security named CDO (collateralized debt obligation) is issued. The operational aspects of SPE vary, but at least in their original intent, one essential characteristic of all SPEs is that the management of

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<sup>8</sup> Unless the servicer can prove that repossession and liquidation of the underlying collateral (Joe's car) will not allow the servicer to recover the amount of advance payments he is about to make.

<sup>9</sup> This section relies heavily on Kothari (2006).

assets and liabilities entails absolutely no discretion, i.e., it involves preprogrammed actions that involve no choice and that provide a unique way to behave (i.e., preprogrammed rules cannot include two alternatives if something happens). This implies that specific triggers are set to define what should happen if, for example, cumulative losses increase above  $x\%$ , if the value of the pool declines by  $x\%$ , or if the originator defaults. In the first case, some SPE securities may not receive any servicing at all, or the method of reimbursement of liabilities may change (e.g., proportional to sequential repayment); in the second case, the SPE is allowed to sell some assets in a preprogrammed fashion. In addition, in the original intent of securitization, the asset selection for the SPE is made by the originator (rather than the SPE manager) and assets are purely passive. The perfect example of a passive asset is a saving deposit, for which interest is accumulated automatically from the initial amount deposited. Swaps are other passive assets. Nonpassive financial assets are shares (involve voting right) and options (involve a decision to exercise the option or not).

With innovations in the securitization process (generic to synthetic) and change in purpose of securitization (balance sheet to arbitrage), the SPE progressively went from a role “limited to the collections of principal and interest on passive assets and distribution of the cash flows to the beneficial interest holders in the entity based on a predefined formula” (Counterparty Risk Management Policy Group III 2008: 45), i.e., a “brain-dead” entity, a pure conduit, to a more active role where assets and liabilities were managed more or less fully to obtain the highest return possible on equity.<sup>10</sup> In response to those changes, for consolidation purposes, a difference has been made between qualifying SPEs (QSPE) (which stick to the original intent of a SPE and are consolidated by nobody) and other SPEs (which are consolidated according to the variable-interest-entity approach).<sup>11</sup> Most SPEs set for arbitrage purposes are not QSPEs, for example, CDO SPEs are not QSPEs (Kothari 2006: 787). SPEs that hold credit

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<sup>10</sup> For example, in 2000, none of the European synthetic CDOs were managed, but this changed rapidly from 2001 and in 2003, 22% were managed (Moore 2004: 16).

<sup>11</sup> Following the Enron scandal (Enron hid some of financial problems by creating many SPEs), the concept of variable interest entity (VIE) was introduced in 2003 to determine who the real beneficiaries of the SPE are and how to consolidate a SPE. All SPEs (except QSPEs) are VIEs, that is, they cannot be consolidated with another entity on the basis of the share of capital held by this entity because equity holders (if any) are not the real beneficiaries (Kothari 2006: 825–827). Even if there is some equity, equity holders have no significant voting right and no discretion in the management of the SPE; the expected losses are absorbed mostly by beneficiaries holding subordinated debts or by insurance mechanisms, and equity holders may not be entitled to any residual return. The consolidation is determined by who holds the majority of risks and rewards rather than on voting rights (Counterparty Risk Management Policy Group III 2008: 43–45).

card receivables, auto loans, and mortgages are usually set as QSPEs (Counterparty Risk Management Policy Group III 2008: 45). The U.S. GAAP has recently considered eliminating the distinction.

The SPE is an essential device in the securitization process because it allows the isolation process necessary in the transfer of risks off of the balance sheet of the originator. Security buyers can only look at the assets bought, not the overall financial health of the originator, and, in case of bankruptcy of the originator, the security buyers' claim is limited strictly (at least in theory) to the securitized assets (Joe's auto loan) without any additional recourse on the originator.

In order to achieve isolation, the capacity to prove that the sale of illiquid claims is true is key in the generic securitization process. Indeed, it aims at showing that the originator and the SPE are completely independent, legally and financially, even though the latter was created by the former (Kothari 2006: 531–532). If the SPE was not independent from the originator, there would be a threat that the SPE could be involved in a bankruptcy involving the originator, and that other creditors besides SPE security holders could have a claim on the securitized assets. In addition, a sale is essential for securitization, otherwise the transaction is just a collateralized loan between the originator (BoA) and the security buyers, in which case BoA could not legally remove Joe's promissory note from its balance sheet (Kothari 2006: 576ff).

The SPE has several characteristics that aim at isolating it legally and financially from the originator. Firstly, as the name states, it was created for a special purpose rather than for a general purpose (like typical companies), i.e., it cannot be involved in any other activities than those related to the acquired financial claims. Secondly, a SPE is a bankruptcy remote entity, i.e., it has an extremely low probability of being involved in insolvency procedures. This is so for several reasons (Kothari 2006: 630–632, 636ff). First, given that its activity must be restricted to the securitization process, the SPE has no other creditors than those involved in the process (security holders, trustees, servicers, managers, auditors, and others). Second, the SPE has no employees and subcontracts all administrative tasks, and these creditors must sign a nonpetition agreement promising not to file (directly or indirectly) the SPE into bankruptcy (Kothari 2006: 70–71). Third, the SPE has no or very minimum net wealth (created through overcollateralization or other means described below) and all the economic interest in the assets held is transferred to the security holders (i.e., the SPE makes no profit that could grow its net

wealth), so security holders have nothing to gain from liquidating the SPE.<sup>12</sup> Fourth, the sale procedure is an essential way to protect the SPE from bankruptcy procedures that could emerge on the originator side because the asset is no longer owned by the originator (Kothari 2006: 76). Thirdly, because the originator is usually the servicer (instead of having the SPE directly collecting debt services from borrowers), the SPE is still indirectly financially dependent on the originator, which may create problems if the latter becomes insolvent. Thus, a back-up servicer may be established in the deal, or, if possible, the servicing function may be transferred to someone else, which is more or less difficult to do depending on the type of financial claim in the pool of reference (Kothari 2006: 725). As discussed below, additional protection can be established via credit and liquidity enhancements.

When creating a SPE, the central aim of the originator is to make sure that as many of the SPE securities are sold to financial-market participants rather than stay on the originator's book (who is the buyer of last resort) because this is how the embedded risks are transferred. In order to achieve this aim, the SPE must accommodate as closely as possible the preferences of security buyers in terms of credit risk, maturity, and other factors. In order to deal with these issues, the SPE first establishes a specific organizational structure and then issues several classes of securities, which is where structured finance plays a crucial role.

Leaving aside the benefits of structured finance and assuming that all SPE securities are the same, a SPE can accommodate the preferences of some security buyers through its balance-sheet structure. The latter determines how SPE securities are amortized relative to the financial claims on the asset side (Kothari 2006: 79ff). The first and simplest structure is a pass-through structure, where the maturity of assets and liabilities of the SPE are matched. As a consequence, payments collected from assets (minus fees to pay for overall management) are directly passed to security holders without any alteration, which leads to erratic principal payments because of usual prepayments or delinquencies (i.e., late payments) by borrowers. Most security buyers do not like that and prefer a standard type of security that has a fixed maturity date at which all the principal is paid at once. In order to smooth principal payments to security holders, the SPE can

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<sup>12</sup> Given that a SPE cannot have any net wealth, it must acquire assets that have a face value that declines as its liabilities go down with repayment. This implies that a SPE usually cannot hold durable physical assets because otherwise net wealth would be created as the liabilities of the SPE are repaid. If the SPE ever acquires physical assets (e.g., because of repossession), there are mechanisms that prevent the accumulation of wealth by the SPE (Kothari 2006: 639, 786). In addition, only QSPE can hold (temporarily) nonfinancial assets.

be structured in a second way: a pay-through structure. The latter creates a mismatch between the maturity of assets and liabilities by reinvesting any excess principal collected on the pool of reference relative to the principal to be paid to security buyers given the amortization speed of SPE securities. Thus, a pay-through structure, at least in its pure form, will not pass the excess principal, but instead will place it until its liabilities mature. Stated another way, assuming that no principal payment is due on SPE liabilities, the assets and liabilities of a SPE stay constant, but the pool of reference declines and is progressively replaced by reinvestment assets. One of the main disadvantages of the pay-through structure is that reinvestment options are limited to very safe passive securities, which leads to a lower reinvestment return than the interest rate on SPE securities, and, thus, creates a negative carry (Kothari 2006: 87). This negative carry intensifies as the pool of reference is amortized and the asset side of the balance sheet is progressively transformed into safe assets. A third SPE structure is the revolving structure (used for credit card receivables, consumer finance, home-equity lines of credit, and CDOs). This structure funds short-term financial claims with long-term securities, which allows security buyers to be involved in short-term financial deals for the long term. Contrary to a pay through structure, the SPE uses the principal payment collected to buy the same financial claims (short-term receivables) until its SPE securities need to be repaid (Kothari 2006: 79ff, 388). A fourth structure, the direct opposite of the revolving structure, is the asset-backed commercial paper conduit (ABCP) that buys long-term financial claims and issues commercial papers (Kothari 2006: 461).

Structured finance aims at correcting some of the flaws of each SPE structure, as well as further accommodating the preferences of security buyers. It does so by creating different classes of securities with specific credit rating, maturity, sources of coupon payment (stripping of payments collected to create interest-only [IO] and principal-only [PO] bonds), types of coupon payment (variable or fixed), and protection against risk of unscheduled amortization (prepayment<sup>13</sup> and/or delinquency) (Kothari 2006: 344–345). Thus, within a pay-through structure some unscheduled principal payment may be passed to some SPE securities, and within a pass-through structure some specific classes of assets may have a highly protected amortization

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<sup>13</sup> Remember that for fixed-income securities, the reinvestment rate is crucial to determine the total return. Prepayment risk is a form of reinvestment risk because a lower interest rate leads to more prepayment (e.g., lower interest rates lead to higher mortgage refinancing), and so generates a need for ABS buyers to reinvest their money more quickly than anticipated and at a lower rate (Adelson 2006).

schedule that fully smoothes amortization (Kothari 2006: 82ff). Structured finance blurs the differences between SPE structures.

The process of carving the initial outstanding principal of the pool of reference to create SPE securities with different amortization procedures is called (time) “tranching.” The SPE creates securities with a different maturity than the maturity of underlying pool by allocating more of the principal payment collected to some securities. The SPE may choose to have a sequential amortization, which means that all classes of securities receive some interest payment, but some securities do not receive any of the principal service collected until other securities have been completely repaid. The SPE may also choose to have a proportional amortization scheme (where each bond class is repaid in proportion to its outstanding amount) or it may choose to mix both repayment methods. In addition, the SPE can create special classes that either take none of the unscheduled repayment risk (planned amortization class [PAC] within a class of bonds), all of the risk (support bond class or companion bond class), or some of the risk (targeted amortization class [TAC] covers for prepayment risk, but not delinquency risk) (Adelson 2006; Kothari 2006).

SPE structure and tranching deal with maturity issues; however, not only do potential buyers have different placement horizons, but they also have a different credit-risk tolerance. Some of them, like pension funds, may have bylaws or federal regulations that prevent them from buying securities below a certain credit rating. In order to deal with this issue, the SPE can create a capital structure with securities that have a credit rating unrelated to the credit rating of the underlying pool of reference, as shown in figure 1. The process is called “subordination” (it is credit tranching rather than time tranching) and is implemented by creating classes of security with different degrees of seniority.<sup>14</sup> Some classes are subordinated to more senior classes in the sense that they are wiped out first (and so security buyers lose the amount of cash they initially provided to the SPE) if default occurs on the underlying financial claims.

A common capital structure is the six-pack structure with sequential amortization. It contains six classes of SPE securities; each class has a specific credit risk and is repaid in a sequence determined by its seniority. The class A, called “senior tranche,” contains the SPE

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<sup>14</sup> The seniority of a security determines how quickly it will be affected by losses on the underlying pool. This is different from the amortization mechanism (sequential vs. proportional) and SPE securities with the same seniority may have different amortization procedures, with some repaid fully before others start to be reimbursed.

securities with the lowest credit risk of all classes (AAA rating) because all other classes (called subordinated tranches) have to be wiped out in order of their seniority before the A-class securities have their principal affected.<sup>15</sup> While all classes received a portion of the interest payment collected, the entire principal collected on the pool of reference is used first to amortize A-class bonds until all of them are repaid, after which all the principal collected is used to amortize B-class bonds, and so on. The first-loss notes are usually not rated—they are the last ones to be repaid and they are the first to take a hit in case of default if there is no equity—therefore, they have a higher coupon rate.<sup>16</sup>

Because of the credit support (i.e., number of subordinated classes) it requires, the A-class is always the overwhelming class of the SPE structure and the pure equity is extremely limited and created by overcollateralization, initial cash retention, and/or temporary accumulation of excess spreads (which ultimately are paid to the originator or whoever is the equity holder in the SPE). There may be no equity, but the first-loss note is considered equity for regulatory purposes because, even though it is a SPE security that the creator of the SPE would like to sell, the latter is forced to keep it on his balance sheet given that there is only a limited or no demand for it.

The credit support for the A-class can be combined with sequential repayment (creating bonds with different maturity within the A-class) and planned amortization to create one of the safest securities, AAA-PO-short-term PAC note, which has a low credit risk, no unscheduled repayment risk, and a relatively low market risk (because of a low duration due to the short maturity). However, the yield on this type of securities must be very low, which makes it unattractive. One of the riskiest securities would be the unrated-IO-long-term support bond, which would have a very high yield, but would be probably unattractive because of the very high credit risk, unscheduled repayment risk, and market risk.

The SPE uses several credit enhancement techniques in order to protect some security holders against defaults in the pool of reference. The enhancements are provided by the originator (or the sponsor), third parties, and the SPE capital structure (Kothari 2006: 210ff). First, credit enhancement can be provided by the SPE capital structure itself through

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<sup>15</sup> The A-class may be divided into subclasses like senior-A class and junior-A class.

<sup>16</sup> A higher coupon rate does not mean that most of the interest payment collected on the reference pool is allocated to the bonds in the first-loss tranche. Indeed, first-loss notes usually represent a very small proportion of the total amount of notes in the capital structure; most of the interest payment collected goes to A-class notes.

subordination. The amount of credit support to provide to a class depends on the credit rating that the SPE wants to achieve for a certain class of securities.<sup>17</sup> Say that to get a AAA rating, a class of bonds must have an 8% credit support, i.e., credit losses have to generate an 8% deduction in the outstanding principal of the reference pool before the principal of AAA notes is affected. In this case, 92% of the capital structure will be composed of senior securities (AAA), while the rest will be composed of mezzanine tranches (AA to BBB) and junior tranches (BB to unrated). Second, the originator provides credit enhancement through excess spread/profit,<sup>18</sup> overcollateralization (the SPE buys the pool at a discount, which creates some equity in the liability structure of the SPE that acts as a buffer in case of liquidation),<sup>19</sup> cash infusion and retention (either the originator provides a loan to the SPE or allows the SPE to hoard some of the initial cash proceeds and/or some of the excess spread), and the holding of the unrated SPE securities. As illustrated in figure 23, overall originator's enhancement is lower than the 8% capital requirement of banks imposed by Basel I (Kothari 2006: 422). Finally, a third party (private company or government) can also provide credit protection in the form of a derivative contract or a traditional insurance contract, which protects some securities (it is common that a AAA rating can only be obtained on the condition of the existence of an insurance mechanism).

As shown in figure 2, monoline insurers (i.e., insurers that specialize in protecting against default on securities, especially municipal bonds) and credit derivative product companies (CPDC) (that sell credit protection through credit default swaps) take position mostly on the super-senior credit exposure, while hedge funds take position mostly on junior exposures. Banks hold mostly senior tranches (about 60% of their holdings), while mutual funds, pension funds, and life insurance companies hold mostly junior bonds and mezzanine bonds. Even though hedge

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<sup>17</sup> The proportion of credit support to provide in order to obtain a specific rating is determined by credit-rating agencies as a function of a multiple of the expected loss of capital on the pool, expressed as a proportion of the par value of the pool. The expected loss (commonly calculated by the "value-at-risk" method) depends on the default probability ( $p$ ), the recovery rate ( $R$ ) (i.e., the capacity to recover the outstanding principal through the liquidation of the collateral), and the exposure ( $E$ ) (i.e., the amount advanced): the *average* expected loss equals  $p(1 - R)E$  (Kothari 2006: 221ff; International Monetary Fund 2008: 63ff; Tavakoli 2001: 132).

<sup>18</sup> Note that the originator is making money from securitization through the servicing fees and interest income from excess spread (the difference between the interest income collected on the reference pool and the sum of servicing fees, management expenses, and interest payments to SPE securities).

<sup>19</sup> This form of credit enhancement is not specific to securitization, even though it usually takes the form of cash collateralization in traditional lending contracts rather than discounted acquisition (i.e., pay \$80 for what is worth \$100); for example, car dealers and mortgage originators usually require that the buyer provides a down payment. In case of repossession and liquidation, the lender has a greater chance to recover the funds he advanced because the value of the collateral can go down for awhile before fewer funds than the amount advanced can be recovered through liquidation.



funds are the most involved in junior tranches, the previous asset managers are not far behind (International Monetary Fund 2008: 80).

## **B. Consequences of Securitization: Potential Benefits and Risks**

Let us look at some of the consequences of the securitization process for the parties involved and for the whole economy. For BoA, the process has allowed to find an alternative funding source that involves selling assets rather than pledging them. Not only may this alternative be less costly,<sup>20</sup> but also securitization has allowed to remove from the balance sheet the credit risk and the liquidity risk induced by Joe's promissory note, which allows BoA to reduce its required amount of capital. For security buyers, there is now a more diversified set of economic activities (auto loans) in which they can take positions. As shown later, the types of activity affected by securitization have grown tremendously and they have been progressively delinked from economic activities. Security buyers also have been able to access securities with similar credit rating as corporate bonds, but that provide a higher return:

Many fixed-income investors have strict rating constraints for their investments while also facing yield targets. The tightness of spreads prevailing over the last few years has made it hard for these investors to achieve their return targets while maintaining the risk of their portfolios within their risk limits. In order to achieve it, many have turned to CDOs that are typically higher yielding than cash assets. For example, in December 2005, AAA corporate bonds were trading at a spread of 5 basis points over Libor, whereas CDOs with comparable maturities were offering spreads between 25 basis points (AAA CLOs—Collateral Loan Obligations) and 50 basis points (AAA synthetic investment-grade CDOs). (Renault 2007: 376–377)

As shown in figure 3, the difference is quite significant.

For borrowers like Joe, the main benefit is an increase in the availability of funding for the activities that are securitized. Indeed, now that loan originators can transfer risks, they may be willing to grant more auto loans to a wider range of borrowers because they will not have to carry the risks embedded in borrowers' promissory notes. Depending on the cost of transferring risks, this may or may not result in lower interest rates for borrowers.

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<sup>20</sup> The lower cost of securitization is not a sure thing; several studies argue that securitization is costly to originators and so did not help to bring down interest rates on bank advances (Kothari 2006: 29, 327).

For the financial sector (BoA and others), securitization has created a new source of revenues that has been highly profitable. As shown in figure 4, there has been an unprecedented redistribution of profitability away from Main Street and toward Wall Street since the mid 1980s when securitization really started to boom.

The main potential social benefit is to increase the willingness of banks to finance and to fund economic activities that raise standards of living. Securitization is also potentially good for financial stability because it simplifies the job of security buyers in terms of determining the cash inflows and/or cash outflows that can be expected. Rather than examining a whole range of activities, like in the to-the-person financing, security buyers only need to focus on the economic activity related to the asset (Minsky 1986).

All those potential individual, sectorial, and social benefits have to be compared to the potential costs and risks, most of which have become reality during the 2000s boom. At the origination level, several potential related problems that may emerge; first, to the decline in the quality of loans, both in terms of the creditworthiness of borrowers and the terms of loans; second, to the actual transfer of financial risks and the creation of new risks; and third, to the dangerous gambling that securitization may generate.

The first problem is that given that originators will sell the promissory notes they obtained from granting advances of funds, they may not have the incentive to check carefully (or at all) the creditworthiness of borrowers; this all the more so that their market gets saturated (i.e., it becomes harder to find potential borrowers without loosening the criteria of selection). This threat materialized recently in the mortgage industry (and has existed for years in the credit card business). From 2001 to 2003, there was a large refinancing process going on in the prime business, but, as the market dried up, mortgage originators turned to nonprime borrowers, as shown in figures 5 and 6. As shown in figure 7, this was accompanied by the proliferation of mortgages with low or no documentation (to verify borrower's income, assets, etc.) in the nonprime *and* prime sectors.<sup>21</sup> In fact, the growth of low-doc/no-doc mortgage practices was much higher in the prime-mortgage business from 2001 to 2006, while this was already a well-established practice in the nonprime business from 2001 (especially for alt-A mortgages).

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<sup>21</sup> "Stated income programs were initially reserved for high net worth individuals, who were self-employed and did not want to disclose all their business dealings but had assets that supported the income stated and strong credit profiles and credit scores. As the mortgage industry grew, originators expanded their programs to include salaried borrowers, and then on to the subprime sector" (Pendley, Costello, and Kelsh 2007: 6).

According to Zelman (2007), in 2005 and 2006 at least 50% of all mortgages backing new private-label mortgage-backed securities (PL MBS) had low documentation; this proportion climbed to 77% in 2006 for PL MBSs backed by alt-A mortgages. Among the PL MBSs issued in 2006, 5.8% of the jumbo mortgages backing them did not have any documentation, 3.3% for alt-A mortgages, and 0.2% for subprime mortgages.

As shown in figure 8, the boost provided to mortgage lending by extending it nonprime borrowers and by loosening underwriting requirements was reinforced further by a large increase in frauds. Figure 9 shows that frauds were concentrated in states where, as shown later, a Ponzi process was present.

The lenders compounded those problems by not verifying the information provided by borrowers, even though it was very easy to do so:

Almost all mortgage applicants had to sign a document allowing lenders to verify their incomes with the Internal Revenue Service. At least 90% of borrowers had to sign, seal, and deliver this form, known as a 4506T, industry experts say. This includes the so-called stated income mortgages, affectionately known as “liar loans.” So while borrowers may have misrepresented their incomes, either on their own or at the urging of their mortgage brokers, lenders had the tools to identify these fibs before making the loans. All they had to do was ask the IRS. The fact that in most cases they apparently didn’t do puts the lie to the idea that cagey borrowers duped unsuspecting lenders [...] “My estimate was between 3 and 5% of all the loans that were funded in 2006 were executed with a 4506,” Mr. Summers said. “They just turned a blind eye, saying, ‘Everything is going to be fine.’” (Morgenson 2008)

In fact, the Financial Crimes Enforcement Network finds that mortgage brokers, appraisers, and borrowers were all central part of the fraudulent schemes that consisted mainly in misrepresentation of income/assets/debts and forged/fraudulent documents (over 70% of all frauds in the mortgage industry) (Financial Crimes Enforcement Network 2008).<sup>22</sup> Fraud became

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<sup>22</sup> Frauds recorded by the Network are mostly for prime and alt-A mortgages because “it is important to realize that the [SARs] are typically only filed by federally chartered or federally insured institutions. Since the majority of the subprime mortgage loans are originated by entities that are not federally chartered or insured, the number of potential fraud instances could easily be multiplied two to three times” (Pendley, Costello, and Kelsh 2007: 10). In addition, looking at a sample of 45 subprime mortgages, Pendley, Costello, and Kelsh (2007: 4) state: “The result of the analysis was disconcerting at best, as there was the appearance of fraud or misrepresentation in almost every file. [...] In addition, [...] the files indicated that fraud was not only present, but, in most cases, could have been identified with adequate underwriting, quality control and fraud prevention tools prior to the loan funding.”

a quasi-institutionalized way of operating for all eyes to see, with websites advertizing software that allow to print fake pay stubs and fraudulent methods to raise credit scores (Creswell 2007).

The second problem is that given that the originator's profitability depends on fees induced by securitizing and servicing loans (rather than on the interest payments paid by borrowers), the originator has an incentive to provide as many loans as possible in order to increase securitization activities. As a consequence, the originator may aim at attracting as many new borrowers as possible and at pushing as many existing borrowers as possible to refinance.<sup>23</sup> The main way to do that is to lower the cost of mortgages by advertizing "low-cost" loans that seem attractive at first, but may be highly toxic for borrowers. As a consequence, the chance of default increases for any level of creditworthiness. The rise of nontraditional mortgages has taken several forms and was helped greatly by the rise of automated underwriting programs that judge "creditworthiness" in minutes (40% of subprime mortgages were judged through automatic underwriting in 2007 [Browing 2007]). One form, shown in figure 10 and figure 11, has been an increase in interest-only mortgages (IOs) and payment-option mortgages. Another form, shown in figure 12 and figure 13, has been an increase in the proportion of adjustable rate mortgages (ARM); this is because of their lower monthly cost relative to fixed-rate mortgages—higher maturity and lower interest rate—at least until the end of 2006. All this was combined with teaser interest rates.

Since 2001, the origination of ARM IOs has grown tremendously and, in 2004, became the largest collateral in MBSs backed by prime and Alt-A mortgages (47% of all prime mortgages purchased were ARM IOs, 44% for Alt-A mortgages). Since 2003, the proportion of ARM IOs has been growing faster for subprime mortgages (Lui 2005). The low-cost effect (either through teaser rates, IOs, pay-option mortgages, ARMs, or a combination of them) and low-doc effect were reinforced by higher loan-to-value ratio, piggyback lending, and short-term interest reset in order to create a large increase in origination volume:

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<sup>23</sup> Refinancing implies repaying a loan and creating a new loan with different (or similar if the loan is maturing) terms. It is different from a renegotiation that simply changes the terms of existing loans.

The combined loan-to-value on Alt-A purchase originations was 88% in 2006, with 55% of homebuyers taking out simultaneous seconds (piggybacks) at the time of purchase. Low/no documentation loans (stated income loans) represented a staggering 81% of total Alt-A purchase originations in 2006, up significantly from 64% just two years earlier (not likely a phenomena just out of convenience). Interest-only and option ARM loans represented approximately 62% of Alt-A purchase originations in 2006. Adding to the risk is the fact that 1-year hybrid ARM represented approximately 28% of Alt-A purchase originations in 2006, setting the stage for considerable reset risk. Investors and second home buyers represented 22% of Alt-A purchase originations last year, which is the largest non-owner occupied share among the various segments of the mortgage market. (Zelman 2007: 4)

The same kind of state of affairs was observed on the subprime mortgage market. All this was compounded by the willingness of households (which was initiated and nurtured by the aggressive marketing strategies of lenders) to go for those “low-cost” mortgages, even though rates on traditional mortgages were already at historical low in 2003. A mortgage lender noted: “you have the people wanted to do a fixed rate at 4 7/8 or so 45 days ago and are now looking at 6 and saying, ‘what are my options?’” (Aiken in Bayot 2003). As Bayot notes candidly about IOs:

Leaving the principal balance on a mortgage untouched, however, carries risks. [...] This is not to worry as long as home prices are appreciating [...] and owners can simply sell for more than they paid. (Bayot 2003)

By 2003, the Ponzi process was working full speed in the mortgage industry and the same was going on in corporate-leveraged buyouts that went on at a frenetic rate with extremely high (and rising) leverage (Mah-Hui Lim 2008).

Leverage was needed to boost returns over the last few years, owing to a lack of distressed debt. This led to 7 times (and sometimes as much as 10 times) leverage on U.S. leveraged buyouts. In Europe, debt multiples also were stretched, with leverage of 5.5 times in 2007, versus 4.7 times in 1998. (International Monetary Fund 2008: 10, n. 21.)

Like in the mortgage industry, a long period of low default rates created a need to increase leverage in order to boost returns and gave confidence that leverage could be used safely to do so. A 2006 newspaper article by Duhigg clearly shows the mood of the moment:

With Wall Street caught up in a wave of acquisitions, normally cautious bond investors are living like Las Vegas high rollers [...]. And for some companies, the more they borrow, the safer they are deemed. [...] The wave of recent purchases by private equity groups has pushed issuance of high-risk debt to record levels. [...] But instead of worrying that defaults will increase, debt prices are signaling that bondholders believe that companies will have few problems paying off new loans. [...] For many acquirers, debt has never been easier to get. Global issuance of risky high-yield, or junk, bonds has reached record levels. [...] Many of those issuances offer surprisingly low yields, suggesting that despite the glut of new debt, demand is still outpacing supply and [financial] investors are betting companies won't default on their new, risky loans. A further sign that borrowers, rather than [financial] investors, are calling the shots is the growth of pay-in-kind notes, which allow a company to pay a bond's interest with more debt rather than with cash. (Duhigg 2006)

This is a textbook example of the boom period analyzed by Minsky.

Thus, securitization may generate higher financial fragility from the originator side by lowering the quality of underwriting standards and the quality of consumer protection (both in the financing and refinancing process) so as to increase the flow of lending activities as much as possible to earn fees from securitization. In fact, both sources of risk were combined when originators used introductory interest and amortization rates to determine if someone qualified for a mortgage:

According to our contacts, homebuyers were primarily qualified at the introductory teaser rate rather than the fully amortizing rate, which for many buyers was the main reason they were even qualified in the first place. We believe that much of the subprime surge and easing of lending standards came in the aftermath of the refinancing boom from 2001–2003. Mortgage lenders had staffed up in order to handle the flood of refinance business and then were suddenly hit with a drop in business. In order to maintain production volume, originators began chasing the purchase market by easing underwriting standards and taking share from the GSEs. (Zelman 2007: 24)

Because of weaknesses on the originator's side, the gains on the real side have been short lived, as illustrated later. The broader access to homeownership and consumer lending has been associated with financial weakening and securitization can be used to explain the worsening of the financial position of households (Tymoigne 2007; Brown 2007).

In addition to problems related to credit quality, securitization transforms risks for the originator rather than transfers them (Das 2006):

These legal structures have transformed credit risk into counterparty and funding risk. For example, some of the risk that is transferred out of the banking system to hedge funds could return to the system as prime broker counterparty risks. Similarly, risks transferred to [SPEs] are returning to the banking system via funding support facilities. (International Monetary Fund 2007: 19)

Moreover, there may be only a limited transfer of the initial credit risk because equity exposure and super-senior exposure are especially difficult to transfer. As shown later, originators have tried to deal with the problem by resecuritizing, but this comes at the cost of a very high leverage and so increased financial fragility. They have also tried to deal with this problem by buying credit default swaps, but this creates a counterparty risk that materialized in full-blown fashion during the crisis, as explained later. Besides the transfer of credit risk, liquidity risk may be hard to transfer because many SPE securities are illiquid. Finally, in addition to transforming and compounding risks for the originator, securitization increases systemic risk by increasing the interdependence of cash flows. Indeed, the ABS holders depend on the SPE for the servicing of the coupon, but the SPE depends on BoA, and BoA's capacity to service depends on Joe's capacity to service. If Joe, or anybody else in the chain of relation defaults, there are now far more economic entities involved in the problem, which tremendously increases the potential systemic risk and macroeconomic consequences. This is all the more the case, as shown later, that with recent innovations the opacity of transactions has increased so much that nobody knows who the actual counterparties are and what their financial strength may be, making it very difficult to know what the overall effect of a default by one or several counterparties will be.

Finally, if the purpose of securitization is arbitrage, this can rapidly lead to very large risk taking and limitless gambling, where securitization and resecuritization are the name of the game, the credit quality of the underlying assets is of limited concern, and the hope is to make money on a bonanza. Market-value CDOs and collateralized fund obligations (CFO) (backed by hedge funds securities) are a typical example of this type of tendencies. They can be issued by pension funds and other institutional investors that are supposed to place their money in reliable safe assets (Kothari 2006: 446ff).

The second main potential drawback of securitization is found at the level of the SPE in terms of the balance-sheet risks and of the quality of the securities issued by the SPE. First, securitization only moves credit risk and liquidity risk, it does not eliminate them; the SPE is

now the one that has to deal with those problems. The potentially destabilizing impact of those risks has been analyzed in detail by Minsky in the context of the partnership banking model (Wray and Tymoigne 2008; Tymoigne 2009). Second, through subordination, SPEs are able to issue securities with a AAA credit rating, even though the backing assets may be junk financial claims. This may lead to a false sense of safety and may further enhance the willingness to take risks. It has been argued that security buyers, as “rational” agents (i.e., people involved in cold-blooded fundamental analysis), would be able to clearly understand the risks involved so the latter would be transferred to the entities the most able and willing to bear them. However, as it turned out, this is not the case because risk measurement does not result from an independent, individual, rational decision process *à la homoeconomicus*, but rather from a social rationality. In addition, strong economic competition and social interaction push financial institutions to follow short-term strategies by taking as reference what the majority thinks (either go with or against the majority), independent of the actual relevance of what the majority thinks (Tymoigne 2009).

Credit-rating agencies, who are now supposed to be judging credit risk, are not immune from these tendencies and have been notably unable to anticipate economic problems before they were clearly present, even though a rating is supposed to provide a long-term view of the solvency of the issuer. In addition, not all credit-rating agencies require the same level of subordination to grant AAA rating (Tavakoli 2005), which, combined with competition between rating agencies and commissions paid by security issuers, creates a potential risk of conflict of interests, as well as sloppy or rushed rating procedures. In fact, the methodology and data that credit-rating agencies used to determine the rating of SPE securities did turn out to be quite inappropriate. Indeed, given the lack of data on SPE securities, credit-rating agencies used as proxy the data on default rate, recovery rate, and default correlation for corporate bonds to determine the appropriate credit support to provide to a structured note. For example, the observed cumulative default rate over five years on AAA corporate bonds is 0.03%; this was used as reference (and adjusted upward) by credit-rating agencies to compute the expected losses on the asset pools of SPEs, but unfortunately the 5-year cumulative losses on AAA SPE securities turned out to be much higher than expected. Similarly, the probability of single and multiple downgrades on AAA corporate bonds is much lower than on AAA SPE securities (International Monetary Fund 2008: 61). In addition, the use of the value-at-risk methodology to determine expected losses has been criticized for understating potential losses and for reinforcing



procyclical views of potential risks in the financial industry (International Monetary Fund 2007; Tymoigne 2009).

Even though to-the-asset funding facilitates the job of judging the creditworthiness of borrowers, credit agencies are not interested in that. First, the pool of reference blends together many promissory notes issued by borrowers who do not have the same creditworthiness if judged carefully. What the credit-rating agencies judge is the “creditworthiness” of the securities issued by the SPE given the credit enhancement provided by the latter. Thus, rather than carefully analyzing the creditworthiness of the underlying borrowers and deriving the appropriate rating, the whole rating process is turned upside down with the SPE targeting a specific rating and structuring securities in order to obtain the desired rating from credit-rating agencies. Second, credit rating, rather than measuring the capacity to pay from income generated by core business operations, provides a measure of risk of losses for the security buyers in case of default. This was supposed to provide a good alternative to the loan officer’s careful judgment of the solvency of borrowers. As explained later, credit rating and creditworthiness are two different concepts that do not serve the same purpose and should not be confused.

The third and final potential problem is at the level of SPE security holders. Indeed, most of the securities issued by SPEs are complex and do not have a well-organized market on which they can be traded (agency MBSs are a notable exception). For example, market participants have noted that CDOs are mostly illiquid instruments (Kothari 2006: 434).<sup>24</sup> In this context, it is difficult to determine the market value of SPE securities and their lack of liquidity can lead to problems. There are three levels of fair valuation for securities recognized by generally accepted accounting principals in the United States (U.S. GAAP). Level I uses the observed market price, level II uses the price of similar transactions as proxy, and level III allows to use a homemade model to estimate the value of a security; this type of estimation grew fast in 2007 (International Monetary Fund 2008: 66, 83), as shown in figure 14.

Of course, level III can lead to large abuses and sometimes financial firms have used different pricing models to value financial assets for their customers and internally (Counterparty

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<sup>24</sup> “Liquid securities include senior tranches of automobile ABS, CF CBOs/CLOs, CMBS, cards, consumer loan ABS, HEL ABS, RMBS, Italian government ABS, student loan ABS, all tranches of static CDO, wrapped tranches depend on underlying” (Flanagan, Asato, and Reardon 2005: 14). “Newer transaction types, such as securitizations of mutual fund fees, structured settlements, future flows, etc. also lack liquidity, even at the senior-tranche level” (Gluck and Remeza 2000: 2).

Risk Management Policy Group III 2008: 88). With level III, the assessment of solvency and liquidity by a regulator and private companies becomes extremely difficult, and the recent financial crisis and Troubled Asset Relief Program have shown how difficult it is to find a way to value those securities. Some of them are now trading at a deep discount, or not trading at all, as shown in figure 40. In addition, the credit quality of those securities may be very deceptive and pension funds and others that are supposed to limit their placements to safe securities actually have large positions in very risky securities. As shown in figure 17, CDO-squared have a AAA tranche, even though the latter was obtained by restructuring noninvestment grade securities (themselves potentially backed by subprime mortgages). Asset managers surely had the incentive not to look too carefully into those details as long as credit-rating agencies gave their blessing, because these securities provided a much higher yield than traditional investment-grade securities and so were a convenient way to meet the targeted returns demanded by stakeholders. As Galbraith (1961: xxi) noted, “[a]bove all, it is evident that the capacity of the financial community for ignoring evidence of accumulating trouble, even of wishing devoutly that it might go unmentioned, is as great as ever.”

Overall, securitization may encourage banks to increase their financing and funding of economic activity, while also increasing potential systemic risk and misinformation about the quality of the funding process, and encouraging lenders and borrowers to increase the external funding of economic activity. If securitization ought to be socially beneficial rather than only enriching Wall Street, one must therefore make sure that the potential risks do not outweigh potential benefits. Unfortunately, the recent financial crisis shows that this has not been considered relevant by regulators who, following the deregulation fad, have assumed that financial firms were “sophisticated” agents who need to be left alone so as not to threaten their competitiveness. In addition, financial innovations have progressively removed connections to the financing and funding of welfare-improving assets and have transformed the whole process into pure financial gambling. As predicted, rather than orienting securitization toward fulfilling social needs, Wall Street firms used securitization and the confidence placed in them to meet their own interests; the last housing boom is a perfect example of that.

### **III. THE ROAD TO PONZI LAND: UNSUPERVISED INNOVATIONS**

The road to the housing boom and current financial crisis can be clearly seen in the evolution of the financial system over the past 30 years. As securitization became more common and as yield spreads became thinner (because of low default rates, high confidence, and/or rising central bank rate), financial institutions had to innovate to maintain their profit margins by creating instruments that involved a higher use of leverage, as well as by widening their banking activities to riskier enterprises:

In recent years, asset spread compression has had important consequences for the CDO marketplace. Spread compression reduced the available arbitrage to the investment banks and also reduced the size of the credit risk premium payable to investors for the purchase of CDO tranches. In response to spread compression, investment banks took a variety of steps, including: (1) the creation of CDO squared structures; (2) longer dated transactions; (3) constant maturity swaps; and (4) the inclusion of alternative, higher yielding assets in CDO structures. These innovations were taken to restore spread availability. (Adams, JHooty and Wong 2005: 1)

Combined with a long period of stability and low defaults, financial-market participants viewed the required rising leverage to meet targeted returns as a convenient and normal way to do business. All this was encouraged further by lenient government regulation and by the popular view that “the market” can best regulate itself and that “sophisticated” financial institutions know best how to manage financial risks. The socioeconomic tendencies and state of mind that Galbraith described in his *Great Crash* were back and working in a full-blown fashion.

#### **A. A Wave of Innovations in the Securitization Process**

Since the 1970s, there have been a number of innovations on two sides of the balance sheet of SPEs in terms of the way of funding deals (funded vs. unfunded), motive for setting them up (balance sheet vs. arbitrage), management style (unmanaged vs. managed), source of profitability (cash flow vs. market value), and method of transferring financial risks (generic vs. synthetic). For example, early CDO SPEs were fully (cash) funded, i.e., they issued enough securities to be able to buy a pool of illiquid financial claims (hence the term “cash CDO” [Boultwoud and Meissner 2008]), they involved the transfer of ownership of the illiquid financial claims through

sale (“generic CDO” [Kothari 2006]), the CDOs were serviced from collecting debt services on the pool of claims (“cash-flow CDO”), they were created to remove illiquid claims from the balance sheet of the originator (“balance-sheet CDO”), and were pass-through structures (“unmanaged CDO”). Today, CDO SPVs are only partially funded (or unfunded), credit risk is transferred without transferring the illiquid financial claims embedding the risk (synthetic CDO), many CDOs make money from actively trading their assets (managed CDO) and making capital gains (market-value CDO), and they were created to allow SPV equity holders to make money on the difference between cash inflows from income and liquidation of financial assets and cash outflows from payments to the creditors of the SPE (arbitrage CDO). The asset and liability management frequently described for banks from the 1950s to the 1980s has been frenetic for SPEs since the end of the 1980s. The main motives for these innovations have been to avoid the high weight set by Basel I on loan products and to increase return on equity by leveraging asset positions (Moore 2004), as well as to counter limits to market growth. As shown below, financial innovations have created more and more complex financial instruments relying on higher and higher leverage and backed by more and more artificial assets. Everything started in the mortgage sector, but other classes of financial claims were progressively included. Given that, in principle, asset-backed securities (ABS) can be created from almost any stream of cash flows, the Securities Industry and Financial Markets Association (SIFMA) concludes on its websites that “issuers and investment banks will continue to search for—and find—new types of assets to securitize to meet the growing [financial] investor demand for ABS.”<sup>25</sup>

### 1. *Innovations in the Mortgage Market: From PC to CMO*<sup>26</sup>

Homeownership has been one of the major American dreams and so a central political agenda. Following the Great Depression, government agencies were created to stimulate mortgage lending. The Federal Housing Administration (FHA) and the Department of Veteran Affairs (VA, or Veteran Administration) started to insure and to guarantee payments on mortgages conforming to requirements they set and FNMA (Federal National Mortgage Association) was created to improve the liquidity of mortgages by acting as dealer of FHA/VA-insured

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<sup>25</sup> <http://www.investinginbonds.com/learnmore.asp?catid=11&subcatid=57&id=12>

<sup>26</sup> Adelson (2006: 27–28) provides a timeline for the history of MBSs. Information about FNMA, GNMA, and FHLMC comes from their respective website.

mortgages.<sup>27</sup> Until the 1966 credit crunch, FNMA remained a minor player in the secondary market for mortgages because it exclusively dealt in conforming mortgages. The crunch led FNMA to enlarge its dealership to conventional mortgages<sup>28</sup> and it became the largest player in the secondary mortgage market. In order to cope with this new state of affairs,<sup>29</sup> FNMA was split in 1968 into the Government National Mortgage Association (GNMA) (government agency focusing on maintaining a secondary market by providing guarantee on MBSs backed by FHA/VA-insured mortgages)<sup>30</sup> and FNMA (a private corporation focusing on maintaining a secondary market by acting as a dealer of conventional mortgages meeting FNMA criteria). Federal Home Loan Mortgage Corporation (FHLMC) was created by act of Congress in 1970 to compete with FNMA in the conventional mortgage market.<sup>31</sup>

Securitization in the U.S. mortgage industry has existed in a scattered form since the end of the 19<sup>th</sup> century (Kothari 2006: 323ff), but the 1970s marked the emergence of financial innovations that would change the financial sector profoundly. In 1970, GNMA sponsored the issuance of a new type of bond by private financial companies: mortgage-backed securities (MBS). FHLMC started to issue MBSs in 1971 and FNMA did the same from 1983. Private-label MBSs (i.e., those backed by nonconforming mortgages) were first issued in 1977 by Bank of America in collaboration with Salomon Brothers (Kothari 2006: 330; BusinessWeek 2004). PL MBSs include prime mortgages that are nonconforming, either because they are jumbo mortgages (i.e., their outstanding amount is too high to meet the conforming loan limit) or because they do not comply with other criteria set by GNMA and GSEs (e.g., mortgagor is a resident alien).

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<sup>27</sup> “Under Sam Husbands, who presided over the association from 1938 to 1948, Fannie Mae bought 66,947 FHA-insured mortgages and sold 49,048. [...] In 1949, Fannie Mae expanded its activities to include buying and selling loans guaranteed by the Veterans Administration (VA).” (FNMA website)

<sup>28</sup> Conventional mortgages are those not insured by FHA or guaranteed by VA. Conforming mortgages are those meeting the criteria of GNMA, FNMA, or FHLMC.

<sup>29</sup> Everything could have continued under FNMA, but government involvement in private affairs (here conventional mortgages) is never seen with a good eye and this involvement required a larger funding capacity that the government was probably unwilling to provide.

<sup>30</sup> “GNMA MBS” is a misnomer because GNMA does not issue (nor buys) any MBSs. GNMA just guarantees payments on MBSs backed exclusively by FHA/VA-insured mortgages. Thus, the federal government and GSEs provide a double insurance: one for banks against defaults on conforming mortgages and one for buyers of MBSs against the default of issuers of MBSs backed by conforming mortgages.

<sup>31</sup> Given that FNMA and FHLMC were created by act of Congress, they are government-sponsored enterprises (GSEs) and the MBSs they issued are included with GNMA-insured MBSs. The sum of GSE MBSs and GNMA-insured MBSs is called “agency MBS,” even though FNMA and FHLMC are not government agencies.

The first, and still most common, MBS is the participation certificate (PC) most commonly known as “pass-through.”<sup>32</sup> PCs are SPE securities that are fully amortized instead of having the whole principal paid at maturity, which makes them similar to a callable bond.<sup>33</sup> Given the risk involved in pass-through structures, PCs can only accommodate the preferences of some security buyers. To widen the demand for their securities, SPEs progressively moved toward a pay-through structure and began to issue bonds with different maturity. FHLMC issued the first collateralized mortgage obligation (CMO) in 1983<sup>34</sup> and stripped mortgage-backed securities (SMBS) were created in 1986 by FNMA (Obay 2000; Mohebbi, Li, and White 2005). CMOs can have as many as 50 different classes of bonds (arranged by maturity and seniority), while extreme income stripping allows security issuers to fully accommodate the preference of financial market participants who do not have the same views about the future direction of interest rates (and so prepayment risk) (Adelson 2006).

Given the explicit or implicit government insurance, agency MBSs are free of credit risk, so they do not need to have any additional credit enhancement (Adelson 2006: 16).<sup>35</sup> On the contrary, most PL MBSs<sup>36</sup> do not have a government guarantee and have to deal with nonconforming mortgages that are riskier. As a consequence, PL MBSs cannot reach a AAA rating without providing some credit enhancement in the forms presented previously (Kothari 2006: 329; Adelson 2006). As shown in figure 15, the outstanding volume of agency PCs far outweighs any other.

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<sup>32</sup> Given that PCs are the most common MBSs, the term MBS is used usually to refer to them, even though strictly speaking the term MBS refers to both PCs and CMOs.

<sup>33</sup> PCs existed before mortgage securitization (Kothari 2006: 76ff). PCs are treated as equity for tax purposes, making them similar to mutual fund shares (Kothari 2006: 80ff).

<sup>34</sup> The issuance of CMOs was facilitated by the creation of a new SPE: the Real Estate Investment Conduit (REMIC), that is the equivalent to REIT in the SPE world. REMICs have a pay-through structure and were allowed by the Tax Reform Act of 1986. They facilitate the issuance of CMOs by loosening restrictions on the traditional pay-through structure in terms of reinvestment options, equity requirements, and others.

<sup>35</sup> FNMA MBSs are not rated: “The rating agencies have not rated any of the mortgage-backed securities issued by Fannie Mae, but securities issued by others and collateralized by Fannie Mae MBS are rated consistently as ‘Triple-A’ quality.” (<http://www.fanniemae.com/mbs/mbsbasics/market/quality.jhtml?p=Mortgage-Backed+Securities&s=Basics+of+Fannie+Mae+MBS&t=Basics+of+MBS+Market+%26+Pools&q=Credit+Quality>) The same applies to FHLMC MBSs ([http://www.freddiemac.com/mbs/html/cs\\_faq.html#6\\_6](http://www.freddiemac.com/mbs/html/cs_faq.html#6_6)). They are not rated for the same reason Treasury securities do not have a credit rating: they are free of credit risk (default probability on dollar-denominated debts is zero). For the GSEs, this is due to the implicit backing from the federal government.

<sup>36</sup> FNMA and FHLMC do hold some PL MBSs and guarantee payment on them, and they also hold IOs and payment-option mortgages, but their holding is limited. For example, IOs and payment-option represent 9% of FHNA’s holdings of conventional mortgages (FNMA 2008: 122).

From 2003 to 2007, PL MBSs have grown much faster than agency MBSs (CMOs and PCs) for reasons explained earlier and illustrated by the Zelman in the quote page 20.

## 2. *Extending Securitization to Other Classes of Assets and Securitizing Securities*

Once the securitization techniques for mortgages were fully understood, they were rapidly extended to all kinds of economic activities. It started with equipment leases in 1985 with computers (Kothari 2006: 402, 410), followed by auto loans (certificate for automobile receivables, CAR). Credit cards (certificates for amortizing revolving debts, CARD) were securitized in 1986 by Bank One with the help of Salomon Brothers (Obay 2000: 74ff; Kothari 2006); students loans, and home equity loans (HEL ABS) followed. “First-level” securitization now has been extended to intellectual property rights (royalties on music [Bowie Bonds], movies [Bond Bonds], perfumes [Calvin Klein Bonds], etc.), as well as future flows (i.e., securities backed by the expected cash inflows from assets not yet produced) and many others sources of cash flows (Kothari 2006: 65, 501ff; Hurst 2001). In 2007, the newest collateral in first-level securitization was in carbon emission allowances, infrastructure loans, nonperforming loans, and others (de Vries Robbé and Ali 2007).

As shown in figure 16, from 1995 to 2008, securitization has grown from about \$400 billion to about \$2.7 trillion. Car loans and credit card receivables were the dominant underlying assets at the beginning, but home equity loans now dominate and collateralized debt obligations, credit card receivables, and student loans are currently a sizeable portion of the securitization process.

However, it is likely that there is a finite amount of illiquid receivables that can be transformed into securities, simply because there are a limited number of economic activities (or their number grows too slowly to meet the demands of financial institutions in terms of market expansion). To counter this problem, “second-level” securitization (resecuritization), “third level” securitization (re-resecuritization), and “fourth-level” securitization (re-re-resecuritization) have been developed progressively on the basis of collateralized debt obligations (CDO); these various levels consist in securitizing securities.

The CMO was the first case of resecuritization when SPEs used a pool of MBSs as collateral (CMOs can also be directly backed by mortgages). The CDO is an extension of the CMO that was first apply to high-yield bonds (collateralized bond obligation [CBO]) by Drexel

Burnham Lambert in 1987,<sup>37</sup> followed in 1989 by high-yield corporate loans (collateralized loan obligations [CLO]), as well as distressed bonds (Lucas, Goodman, and Fabozzi 2006: 5; Goodman 2001: 141; Kothari 2006: 443).<sup>38</sup> CDOs backed by emerging market bonds (EMCDO) were created in 1994. From 1995, the pool of assets bought by CDO SPEs began to contain some asset-backed securities (starting with residential MBSs [Lucas, Goodman, and Fabozzi 2006: 5]) in addition to corporate loans and bonds. Today, CDOs are backed by all sorts of ABSs, derivatives,<sup>39</sup> and other financial claims. The frontier of second-level securitization is now in commodity options (commodity option obligation [COO]) (Jobst 2007; de Vries Robbé 2006).

The next step (third-level securitization) was to create CDOs backed by ABSs and other CDOs. Watterson (2005) states that CDO-squared have existed since at least 1998 and figure 19 shows that CDOs backed by high-grade SF CDOs existed in 1997.<sup>40</sup> The fourth level of securitization was reached with the issuance of CDOs partly backed by CDO-squared (CDO-cubed) (Boultwoud and Meissner 2008). Second- through fourth-level CDOs are called structured-finance CDOs (SFCDO) or asset-backed (security) CDOs (ABSCDO or ABCDO) and, after 2001, they have been mainly backed by residential and commercial MBSs:

Also, certain types of ABS present in SF CDOs from 1999 through 2001 disappeared from later vintages: manufactured housing loans, aircraft leases, franchise business loans, and 12b-1 mutual fund fees. All of these assets had horrible performance in older SF CDOs. In their place, SF CDOs have recently focused more on RMBS and CMBS. (Lucas, Goodman, and Fabozzi 2006: 7)

As shown in table 1, SFCDOs have been collateralized mainly by subprime mortgage products in recent years. Figure 17 shows that the securitization of CDO-squared is based on mezzanine CDOs.

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<sup>37</sup> Nelken (1999: 175) argues that Drexel first issued CBOs in 1980. Given that CMOs were created in 1983 and that mortgage securitization has been at the root of the current financial situation, one may doubt this date.

<sup>38</sup> CLOs should be classified as first-level securitization because loans are not securities. CLOs “were designed to purge the lender’s balance sheet of lower quality commercial loans, the recent bank-issued CLOs have been secured by higher credit quality, lower margin commercial and industrial loans” (Kalser and Puwalski 1998).

<sup>39</sup> Credit default swaps have been securitized into collateralized swap obligations, CSO (de Servigny and Jobst 2007: 455). Equity default swaps were first securitized by JP Morgan in 2003 into collateralized equity obligations, CEO (Jobst 2007: 479; Moore 2004: 23), also known as equity default obligations, EDO (de Vries Robbe 2006: 72; Logie and Castagnino 2006), or equity collateralized obligations (ECO). In 2004, Daiwa Securities SMBC “launched the first publicly rated arbitrage CDO 100% collateralised by EDS” (Moore 2004: 23).

<sup>40</sup> Sometimes, CDO-squared are said to represent resecuritization, but this fails to note that CBOs and CMOs are already securitizing securities.



As shown in figure 18, the CDO market experienced two booms (1996 and 2004), both driven by ideal arbitrage conditions (Kothari 2006: 417–418). Figures 19 and 20 show that in the United States the main underlying collateral of CDOs used to be high yield debts (bond and loans), but, since 2003, SFCDOs have been a major collateral (leading to CDO-squared). Investment-grade backing has been a very small and declining proportion of overall collateral because of its low profitability and it was almost nonexistent from 2003 to 2007:

Banks are motivated to securitize investment-grade commercial loans because by doing so they effectively subject themselves to the market's capital requirements for such loans instead of their regulator's. Tight competition has compressed the margin that banks earn on investment-grade loans to the point that more institutions are considering investment-grade lending to be an inefficient use of capital. (Kalser and Puwalski 1998)

Gone are the days when banks prided themselves on triple-A ratings and sometimes hinted at hidden balance-sheet reserves (often true) that conveyed an aura of invulnerability. Today, or at least prior to August 9, 2007, the assets and capital that define triple-A status, or seemed to, entailed too high a competitive cost. (Greenspan 2008)

CDO-squared have been very successful and have comprised up to 20% of the total CDO market in 2005 and 2006 (Boultwoud and Meissner 2008). As shown in figure 19, CDO-cubed (cash CDOs backed by CDO-squared) have existed since 1999, but only represented a small proportion of structured securities because of their very high complexity.

With the 2001 recession and accounting scandals, the CDO market experienced a setback from 2001 to 2003, but came back in force in 2004 (Moore 2004). In 2006, the outstanding amount of CDOs was about \$2 trillion, but since 2007 (Boultwoud and Meissner 2008) global issuance of CDOs progressively has declined and the outstanding volume of CDOs must have declined sharply.

### 3. *Synthetic Securitization*

The process of piling up levels of securitization has limits because modeling becomes extremely complex and data to evaluate the viability and credit quality of the products is very limited.<sup>41</sup> Thus, rather than piling up levels of securitization, the latter can also work by stretching a given level of securitization (intensive securitization rather than extensive securitization). Synthetic securitization achieved this goal by eliminating the need to transfer the ownership of a financial claim through sale. Further developments have limited the use of the SPVs to a small portion of the deal. All these innovations make it easier to create an SPV by eliminating the need to establish truth in sale (which can be quite challenging legally) and by eliminating the need to raise cash to fund the entire asset position (which can be costly and complex to set up) (Goodman 2001: 143).

In order for synthetic securitization to happen, innovations first had to appear in the derivative markets with the creation of credit default swaps (CDS) in 1993 by Bankers Trust (Nelken 1999),<sup>42</sup> which have allowed a boom in cash-flow synthetic CDOs. The creation of equity default swaps (EDS) in 2003 has allowed market-value synthetic CDOs to boom (Logie and Castagnino 2006). CDSs and EDSs are over-the-counter (OTC) insurance contracts that are triggered, respectively, by default on underlying financial claims and by a decline in the price of the share of a company by a given percentage. Focusing on CDSs, the CDS seller acts like an insurance company by providing protection in case a contingency occurs (default). If the bond issuer defaults, the buyer of the CDS receives the difference between the face value and the market value of the bond.<sup>43</sup> EDSs work in the same way, but reference shares rather than bonds and they were developed because:

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<sup>41</sup> Assumptions about default correlations among the financial claims in the reference pool can be set quite arbitrarily, can dramatically affect the expected loss on the pool, and can be quite unstable over time (it is well known that assets that have uncorrelated, or inversely correlated, returns in periods of tranquility usually end up having similar correlations in periods of crisis) (International Monetary Fund 2008). As Adelson (2005: 21) notes “we just don’t know about the correlation among the assets that go into real estate CDOs.”

<sup>42</sup> Polizu (2007: 660) states that CDSs were created in 1991.

<sup>43</sup> More precisely, the payment will equal  $(1 - R)E$ , with  $R$  the recovery rate and  $E$  the exposure.

By the end of 2003, it was becoming increasingly difficult in many countries to structure investment-grade credit portfolios that had significant returns, e.g. [...] the CJ50 Index, which tracks the spreads of the 50 most liquid five-year credit default swaps in Japan, fell from 80 basis points at the beginning of 2003 to only 30 basis points towards the end of 2003. In response to this, new derivatives whose value depends on both the credit quality and the equity value of the reference firm were developed. (Medova and Smith 2004: 2)

CDSs were created by investment banks to meet their own needs because the demand for credit-risk protection grew too fast to meet the latter with traditional means and investment banks had to take a large amount of credit risk on their balance sheet (Nelken 1999: 14–15). Like most derivatives, one of the main characteristics of CDSs (and EDSs) is that there is no need to be a bondholder (or shareholder) of a company to buy or to sell a swap protecting against the default (or decline in the price of the shares) of a company.<sup>44</sup> This has led progressively to a change in the purpose of issuance of CDSs:

Credit Default Swaps (CDS) were originally created in the mid 1990s as a means to transfer credit exposure for commercial loans and to free up regulatory capital in commercial banks. By entering into CDS, a commercial bank shifted the risk of default to a third-party and this shifted risk did not count against their regulatory capital requirements. In the late 1990s, CDS were starting to be sold for corporate bonds and municipal bonds. By 2000, the CDS market was approximately \$900 billion and was viewed as, and working in, a reliable manner, including, for example, CDS payments related to some of the Enron and Worldcom bonds. There were a limited number of parties to the early CDS transactions, so the parties were well-acquainted with each other and understood the terms of the CDS product. In most cases, the buyer of the protection also held the underlying credit asset (loan or bond). However, in the early 2000s, the CDS market changed in three substantive manners: Numerous new parties became involved in the CDS market through the development of a secondary market for both the sellers of protection and the buyers of protection. Therefore, it became difficult to determine the financial strength of the sellers of protection; CDS were starting to be issued for Structured Investment Vehicles, for example, ABS, MBS, CDO, and SIVs. These investments no longer had a known entity to follow to determine the strength of a particular loan or bond (as in the case of commercial loans, corporate bonds, or municipal bonds.); and

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<sup>44</sup> As if someone did not need to have a house to buy a fire insurance and could buy fire insurance on a stranger's home because she would bet that the house has a good chance of catching on fire. One may note the nasty incentive that may emerge from allowing "naked" position taking: the buyer of the fire insurance may try to burn the stranger's house (or may set up conditions that increase the chance that a fire will erupt) to receive the insurance payment (Hu 2008; Hu and Black 2008).

speculation became rampant in the market such that sellers and buyer of CDS were no longer owners of the underlying asset (bond or loan), but were just “betting” on the possibility of a credit event of a specific asset. (Zabel 2008: 548)

As shown later, the date of 2000 used by Zabel to note the change in purpose of issuance of CDSs is related to a change in their regulation, which has enhanced greatly the speculative use of CDSs. As consequence, as shown in figure 21, the CDS market has boomed tremendously since 2001.

From less than \$1 billion, the market reached \$62 trillion in 2007 before crashing rapidly in 2008. The British Bankers’ Association, while using a different measure, also finds an explosion in credit default swaps, from \$180 billion in 1996 to \$20 trillion in 2006 (Barrett and Ewan 2006). The first CDSs were corporate CDSs (i.e., they provided protection against default of a corporation [single-name CDS], or several corporations [multiple-name CDS], on its/their bonds). Following developments in the synthetic-CDO business, ABS CDSs (or ABCDSs) were developed in 2005 to provide protection against default on ABSs, especially those referencing mortgages and home equity loans (Clark 2007; Flanagan, Asato, and Reardon 2005).<sup>45</sup>

The first synthetic SPE was created in Europe by Swiss Bank in August 1997 (Goodman 2001: 145). It was a fully funded deal, which means that the SPV issued credit-linked notes (CLNs) for cash and sold some CDSs to the originator for the same amount as the notional value of CLNs. As shown in figure 22, the cash proceeds from the CLNs are used to buy very safe securities (treasuries, AAA corporate bonds, etc.); thus, the credit protection sold by the SPE is fully collateralized by very safe and very liquid securities, which provides a very strong protection for the originator (JP Morgan 2000: 73ff). Buyers of CLNs receive payments from the CDS spread and coupons on safe securities. The spread on CDSs (some basis points of the notional value insured), nicknamed “premium” (in reference to insurance contracts), is set to compensate for the (negative) difference between the return on securities and the weighted-average-coupon (WAC) of the different classes of CLNs (Kothari 2006: 528). If default occurs, the SPV will sell some of the safe assets, transfer the proceeds to the originator, and reduce CLNs accordingly in function of their subordination. The first-loss notes usually are held by the originator, which acts like a deductible (Adelson 2004).

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<sup>45</sup> It seems that ABCDS already have been used as collateral into CDOs (which allows the alphabet soup contest to continue with the new acronym ABCDS CDO which is a SFCDO) (Flanagan, Asato, and Reardon 2005).

In December 1997, JP Morgan launched the first partially funded synthetic CDO, called BISTRO (Broad Index Secured Trust Offering) (Goodman 2001: 149; Boultwoud and Meissner 2008; JP Morgan 2000: 74ff). In this case, the SPV only participates partially in the protection provided to the originator and the rest is left unfunded by the latter.

The credit risk of the portfolio of loans held by the sponsoring bank is tranching up. The riskiest tranche, which may comprise up to 2%–3% of the first losses in the portfolio, is usually retained for reasons including the facts that its high risk may make it difficult to sell, the bank may also believe that it is best able to judge the risk due to its close relationship with the borrower, and investors in other tranches may require the bank to hold the first loss for reasons of moral hazard. Under bank regulatory capital rules, the first-loss tranche is classified as equity and incurs a one-for-one capital charge. The second tranche assumes the credit risk of the portfolio usually starting after the first 2%–3% of losses with a maximum loss of about 10%. This risk is moved off the bank's balance sheet through the use of a portfolio default swap. The counterparty to this portfolio default swap is an SPV, which then transfers this risk into the capital markets by issuing notes to the face value of the portfolio default swap. These notes can be tranching into several levels, with, for example, a AAA-rated senior and two mezzanine level notes. The proceeds from selling these notes [are] used to borrow AAA-rated OECD government securities from a repo counterparty. Because of the high credit quality of this collateral and the fact that it is OECD government issued with a 0% BIS risk-weight, the counterparty risk in the portfolio default swap is negligible and, subject to the regulator's approval, may obtain a 0% risk-weighting. The remaining credit risk of the portfolio is hedged through the use of a second (senior) credit default swap with an OECD bank as the counterparty. This portion obtains a 20% risk-weighting. [...] [T]he total regulatory capital charge falls from 8% of the portfolio notional to 3.4%. (O'Kane 2001: 58–59)

Usually only 5% to 15% of the notional value of the reference portfolio is funded through the use of a SPE (Goodman 2001: 149). The unfunded part above the A-class CLNs is called the “super-senior tranche” because its seniority is above the former and the assets backing the CLNs are very secured, so the chance that the super-senior tranche will be affected by losses is considered to be extremely low. The difference of capital structure between the funded and partially funded deal is shown in figure 23.

Note that the credit support provided by AAA CLNs is very small in a partially funded deal, but it is still supposed to protect the super-senior exposure very well so that only “catastrophic risk” (Kothari 2006: 529–530) would affect the latter.

It is broadly accepted that the risk embedded in the super-senior tranche of a synthetic CLO referencing a pool of investment-grade assets is remote in the extreme. This is because even if a super-senior swap accounts for as much as 90% of a CDO's capital structure (which is not uncommon), more than 10% of the assets within the reference pool would have to default for losses to be sustained by the most senior tranche—an improbably high default rate for investment-grade bonds when the historical norm has been for a default rate of about 0.3%. Because the perceived risk associated with the super-senior swap is so low, the investor in this tranche is typically paid a premium that is no more than 8 basis points to 10bp of the CDO's notional size (Moore 2004: 14)

The super-senior exposure is not securitized, so it does not have an explicit rating (implicitly it is above AAA, sometimes noted AAAA or AAA+). The originator assumes the super-senior exposure and the first-loss exposure (by holding the first-loss CLNs). Most of the time, the originator seeks protection on the super-senior credit exposure by buying CDSs from a counterparty (usually a bank from an OECD country, which are considered financially strong).<sup>46</sup> Even though the super-senior exposure is now protected, it is still unfunded because the counterparty does not provide any advance of cash as collateral. Like in a traditional insurance contract, the insurance seller just promises to pay if a credit event happens, no fund is provided in advance of the occurrence of the event.<sup>47</sup> Very recently, the partial funding was reduced to its minimum with only the mezzanine CLNs issued to financial-market participants. In this case, the SPV is called single-tranche CDO (ST CDO), as shown in figure 24:

The unfunded structure (super-senior exposure and equity) leaves the originator with some credit risk, or with some counterparty risk if the originator buys CDSs. In 2004, the first synthetic ABS CDO was issued “with home equity loan and residential mortgage-backed securities markets as the underlying reference obligations” (Clark 2007: 32).

Since 2000, the rapid growth of the CDS market has been a main driver of the CDO market; especially in Europe where “in 2003, 92% of all European CDOs rated by Moody's were

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<sup>46</sup> Given that credit risk on the super-senior tranche is seen as extremely low, credit protection is sought by the originator only because it may be required to apply a weight of 20% rather than 100% on the super-senior exposure (Kothari 2006: 530; Adams, JHooty, and Wong 2005; O'Kane 2001: 59).

<sup>47</sup> The OECD bank who sold the CDSs may protect itself against its incapacity to pay by hedging its short position in CDS through the purchase of an equal amount of CDSs from another OECD bank. As shown later, this hedging process has led to a large increase in interdependencies among participants of the CDS market.

accounted for by synthetic structures, up from 88% in 2002” (Moore 2004: 7). Until 2001 most synthetic securitization was driven by balance-sheet motives (Goodman 2001: 152), but, as shown in figures 26 and 27, since 2001 worldwide issuance of synthetic arbitrage CDOs has become the main driver of the CDO market. Hybrid securitization (that mixes generic and synthetic aspects) has also developed tremendously. In an arbitrage synthetic deal, the SPV sells CDSs<sup>48</sup> and limits the funding of its position as much as possible to increase leverage. The SPV manager then buys CDSs (or EDSs if the arbitrage is done on shares) to hedge the SPV on the super-senior exposure, as shown in figure 25 (Kothari 2006: 546ff):

A key difference between Europe and the United States is the dominance of balance-sheet securitization in the former, while the latter emphasizes mostly arbitrage securitization (Kothari 2006: 419). In 2004, 93% of all global new CDOs were issued for arbitrage purposes (mostly because the United States dominates the CDO market) and the financial crisis only slightly altered the dominance of arbitrage CDOs that represented about 80% of all CDO issuance in 2008 (according to SIFMA).

The housing boom has led to a massive increase in arbitrage deals; balance-sheet deals also returned, but in a far more moderate way. With the crisis and the crash in the CDO market, arbitrage deals have declined tremendously.

In May 2005, with the downgrade of Ford and GM, market participants “realized” that single-tranche structures were not very safe. Indeed, some tranches recorded losses and declines in value much larger than what models predicted, which led to a reconsideration of the reliability of models to value CDO tranches. Consequently, there has been a reduction in CDO-squared issuance, and a willingness to develop securities that protect against mark-to-market volatility and to return toward more funded structures (Renault 2007: 391 ff; Jobst 2007: 536). Regarding the latter, SPE sponsors have wanted to fund the super-senior tranche by issuing super-senior securities. A complete funding of the super-senior tranche is impossible, however, because the return on the super-senior risk is extremely low (0.08% to 0.1%), so there is not much demand for this credit exposure. To boost the demand for super-senior tranches beyond monolines (Carter and Osako 2006: 3), the leveraged super-senior note (LSS) was introduced, which is a

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<sup>48</sup> Synthetic securitization also can be done by using a total rate of return (TROR) swap that protects against credit risk and market risk. The buyer of a TROR receives a fixed return, while the seller of a TROR receives coupons and capital gains/losses on underlying assets.

CLN with a seniority above the A-class CLN. The buyer of a LSS takes position on the entire super-senior exposure (and so receives an return based on the notional value of the super-senior exposure) while providing only a small amount of funds upfront, thus creating a leverage—typically 10 to 25 time the notional value insured (Boultwoud and Meissner 2008)—that boosts the return obtained by the LSS buyer:

For example, take a senior exposure covering the 10% to 100% portion of a portfolio with a notional equal to €100 million, and a swap that pays a premium of 5 bps per year. If the funded portion of the resultant €90 million exposure is €6 million, the tranche is thus 15 times leveraged, i.e., €90 million/€6 million. The 5 bps per year on the €90 million is thus the equivalent of 75 bps per year on the notional of the funded portion (5 bps\*15). (Chandler and Jobst 2005: 3)

This additional reward is justified by widening the scope of protection that a LSS provides to the issuer. Contrary to other CLNs, LLS holders must provide protections not only against credit risk, but also market risk. Developing reliable mark-to-market triggers in LSS notes is still in its infancy and is based on proxies given by the libor-spread (or losses) on corporate bonds. A specific widening of the spread would cause an unwinding of the contract (Chandler and Jobst 2005; Jobst 2007: 509).

Given the thin yield spreads prevailing in early 2005, to boost the return on super-senior exposure, managers of SPEs also have searched for higher yields by buying unrated claims and by buying notes from each other:

Some CDOs now purchase mezzanine or subordinate tranches of similar CDOs from other managers who have similar investment styles. This somewhat undermines diversification (amplifies correlation) while boosting leverage. Another possible area of concern is the going trend of including unrated assets in CDOs. (Adelson 2005: 6)

By 2005, it became clear to some members of the financial community that the preservation of a satisfactory level of profitability relied more and more on a Ponzi process, which was a concern among some members of the financial community. However, a “long” period of stable defaults and rising home prices, combined with the optimism of the day, pushed those worries aside and, as shown earlier, the mood was to increase debt in mortgage and leverage buyout deals.

Additional innovations in ABS markets and credit derivative markets came to sustain this mood



with credit-linked constant proportion portfolio insurance (CPPI)<sup>49</sup> (which have helped to increase the demand for rated first-loss notes by creating a principal-protected CLN [Renault 2007; Whetten 2005]) and constant proportion bond obligation (CPBO) (Boutlwood and Meissner 2008; Jobst 2007). The credit derivative market has also developed tremendously with index trading and tranching index trading for corporate CDS (CDX) and ABCDS (ABX) since 2003 and 2006, respectively, which has allowed the creation of standardized contracts (rather than OTC contracts) and so has increased the transparency and liquidity of CDSs and some ABSs (Bond Market Association 2007: 749; Fender and Scheicher 2008).

#### IV. CONCLUSION

The past 30 years were a classical example of the transition from hedge to Ponzi financing that Minsky analyzed in detail (Minsky 1986; Tymoigne 2009): from cash-flow cash CDO to market-value unfunded CDO; from MBS to CMO to CDO-cubed and LSS; from fixed-rate mortgages to adjustable-rate mortgages, interest-only mortgages and, finally, payment-options mortgages; from transaction-determined price to model-determined prices; from reliable credit rating to sloppy rating procedures; from credit protection to market-value protection. All these changes in financial products and structures represent a progressive shift away from an income-related activity with low/moderate leverage requiring little refinancing to a capital-related activity requiring large leveraging and constant refinancing at low interest rates.

Once established, the Ponzi process in the mortgage and the corporate leverage buyout businesses have required more and more daring (legal and illegal) financial practices, which ultimately have consisted in letting borrowers choose what income to state and how much debt to service, and letting financial companies use esoteric methods to price and to rate esoteric SPE securities:

The losses in the early 2000s didn't stop the market, it branched out in a myriad of directions. There was ABS CDOs, [...] CFOs, [...] ECOs, [...] and CCOs. I was waiting for the UFOs (Unspecified Fund Obligations). It would be tranching portfolio of unknown assets. It was designed as surprise for the [financial] investor. (Das 2006: 292)

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<sup>49</sup> CPPI were created in 1986, but were not applied to credit risk until 2003 by ABN AMRO. One has to wait until 2005 for credit-linked CPPI really to take off in the financial community (Whetten 2005: 4).

This Ponzi process was sustained by all sectors involved in the securitization process, bankers and appraisers (for the fee they earn: servicing fees, brokering fee, late fees from delinquency, and fees from foreclosing on a home with rising prices), homebuyers (for access to a home and speculation), and security holders (pension funds, hedge funds, etc. for capacity to earn large returns on “safe” securities); as a consequence there were strong sociopolitical pressures to let it go unchecked. This was compounded by strong economic pressures to meet profitability targets.

The current crisis has put a halt to the innovative frenzy, but surely more innovations are to come by widening the number of SPE products and by increasing the appeal for existing SPE securities in order to counter regulatory barriers and other limits to market growth. Das provides a nice insider view of the need for the financial sector to innovate constantly:

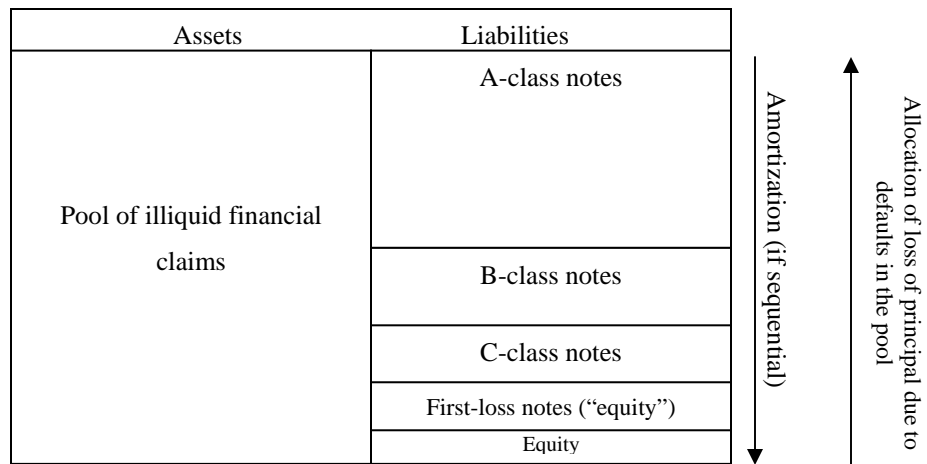
We need “innovation,” we were told. We created increasingly odd products. These obscure structures allowed us to earn higher margins than the cutthroat vanilla business. The structure business also provided flow for our trading desks. [...] New structures that clients actually wanted were not that easy to create. Even if somebody came up with something, everybody learned about it almost instantaneously. [...] Margins, even on structured products, plummeted quickly. (Das 2006: 41)

Basel II has changed the capital requirements on structured products and imposed very high weights (much higher than 100%) on structured securities with a credit rating below BBB- in order to provide an incentive to issue investment-grade securities (Renault 2007: 394ff).

However, we have seen that investment-grade deals are not interesting for financial institutions, and that mezzanine and rated junior structured products are an important source of profitability for SPE sponsors and for asset managers buying these notes.

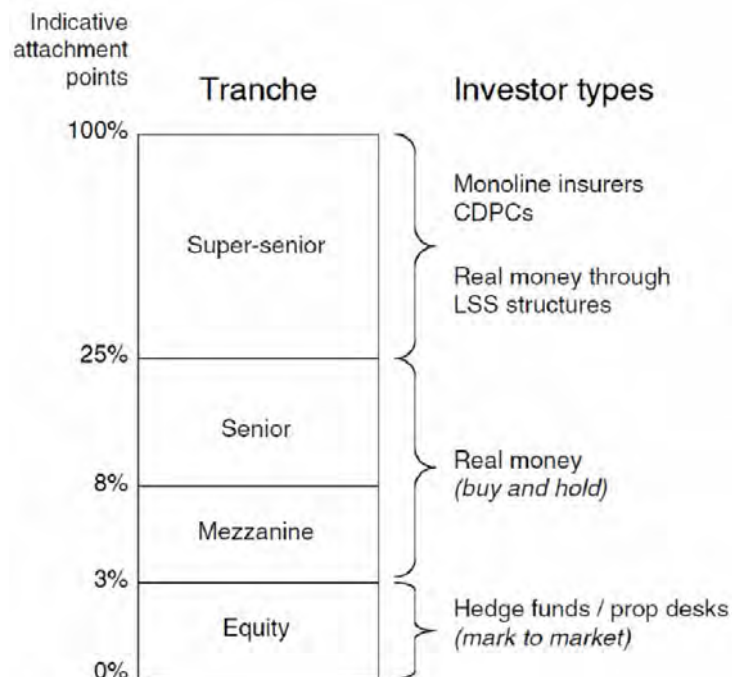
## FIGURES AND TABLES

**Figure 1. SPE Structure Set-up for Balance-sheet Purpose with Sequential Amortization**



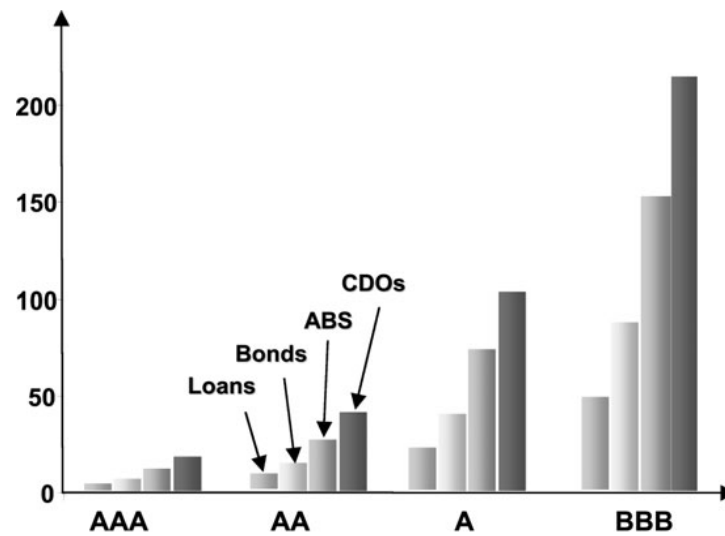
**Note:** Arbitrage SPEs have more or less liquid assets on the assets side and allocation of losses also depends on realized losses in the market value of assets.

**Figure 2. Security Buyers for Each Tranche Exposure**



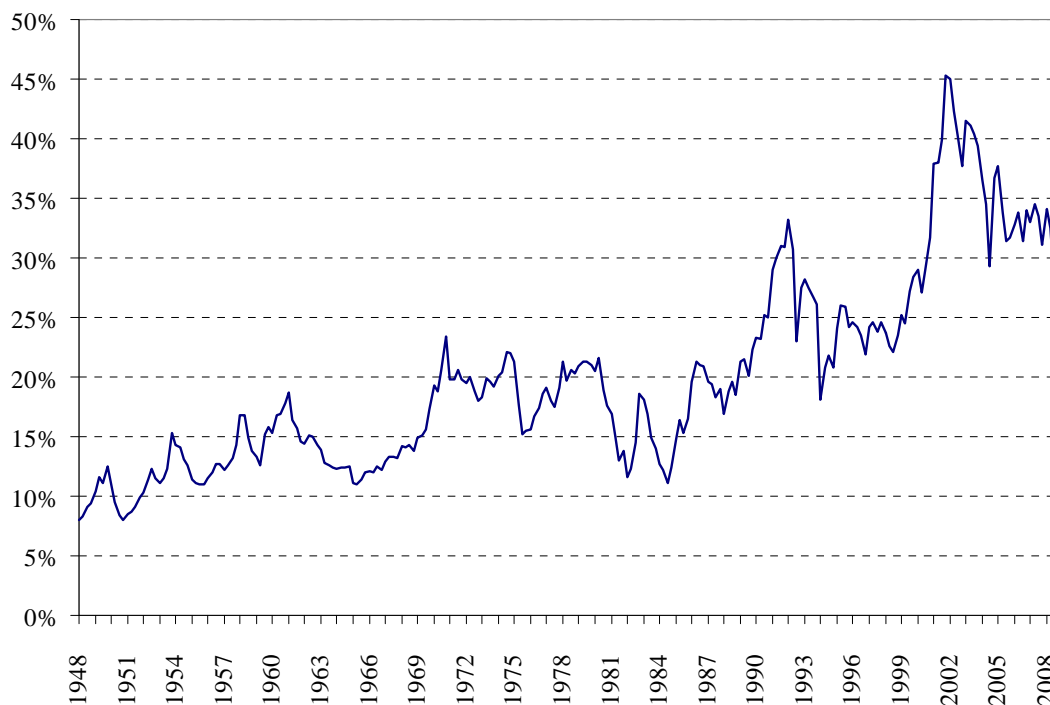
**Source:** Bond Market Association (2007: 768)

**Figure 3. Average LIBOR-Spread per Rating for Various Asset Classes**



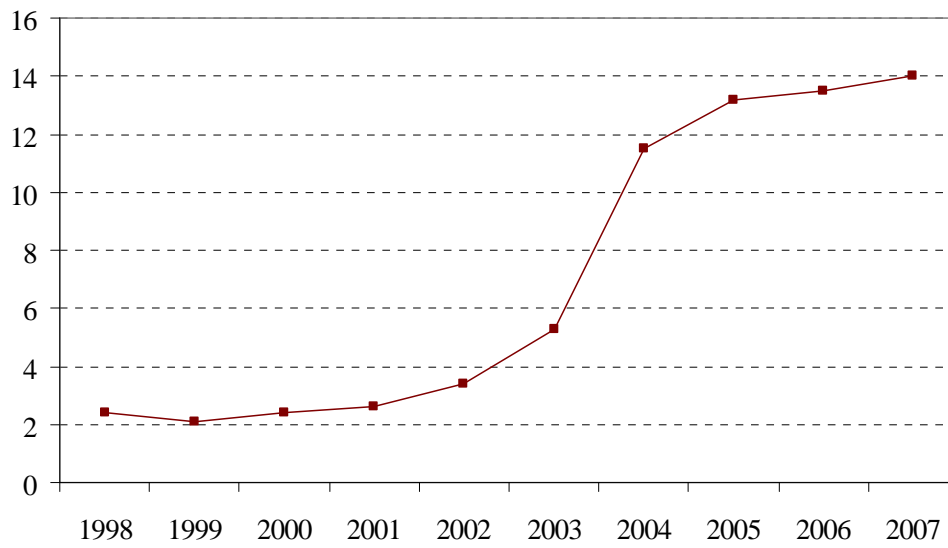
Source: Renault (2007)

**Figure 4. Proportion of Corporate Profit Received by the Financial Sector, Excluding Federal Reserve Banks**



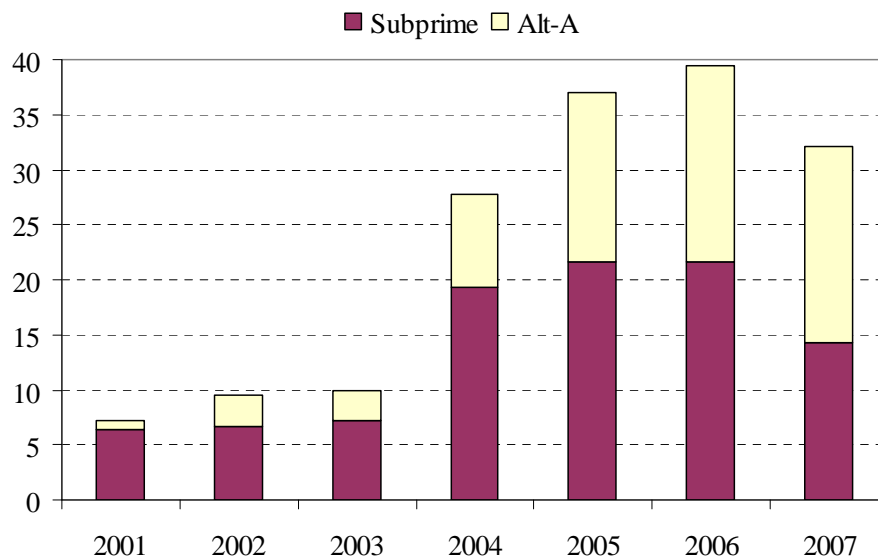
Source: BEA tables 6.16B, 6.16C, and 6.16D. Corporate profit with inventory valuation and net of capital consumption.

**Figure 5. Share of Subprime Mortgages in Outstanding Mortgages**



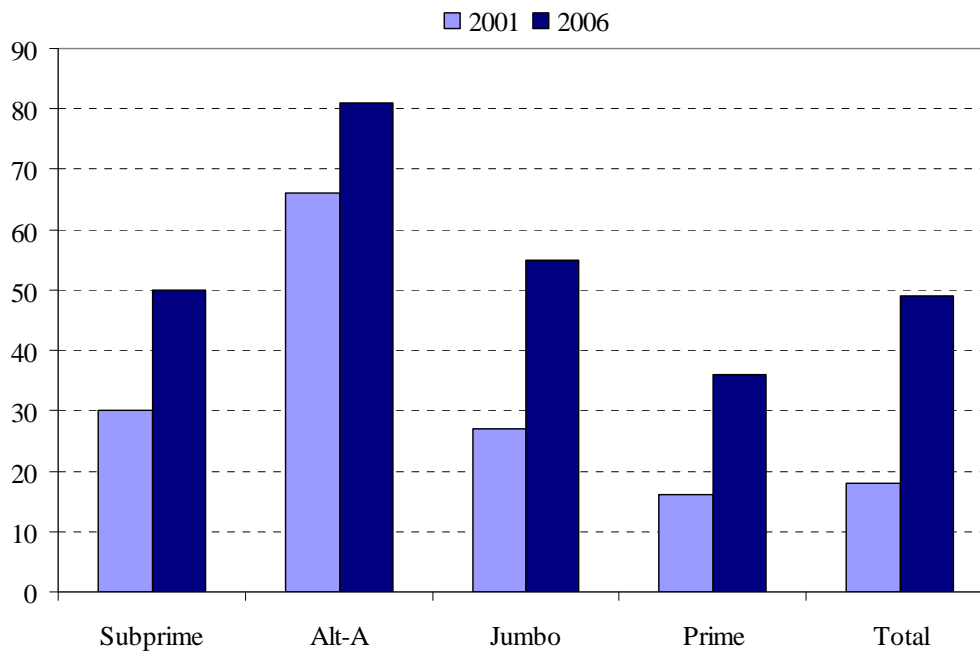
**Source:** Mortgage Bankers Association in Rosen (2007)

**Figure 6. Share of Nonprime Mortgages in Securitized Purchase Mortgage Originations**



**Sources:** Loan Performance and Credit Suisse in Rosen (2007)

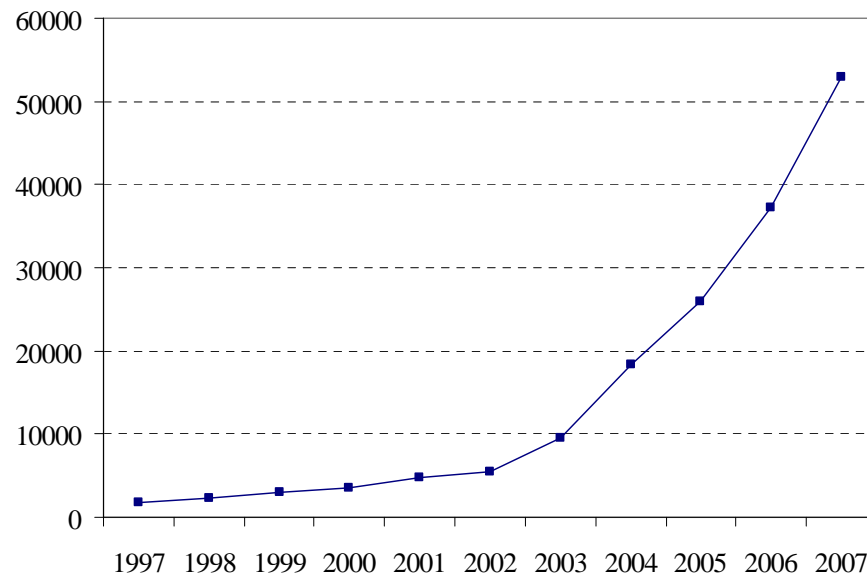
**Figure 7. Distribution of Low/No-Doc Share of Purchase Origination (Percent of Origination Dollars of Securitized Loans)**



**Sources:** Loan Performance in Zelman (2007)

**Note:** Prime mortgages have 0% of no-doc mortgages (Zelman 2007: 13)

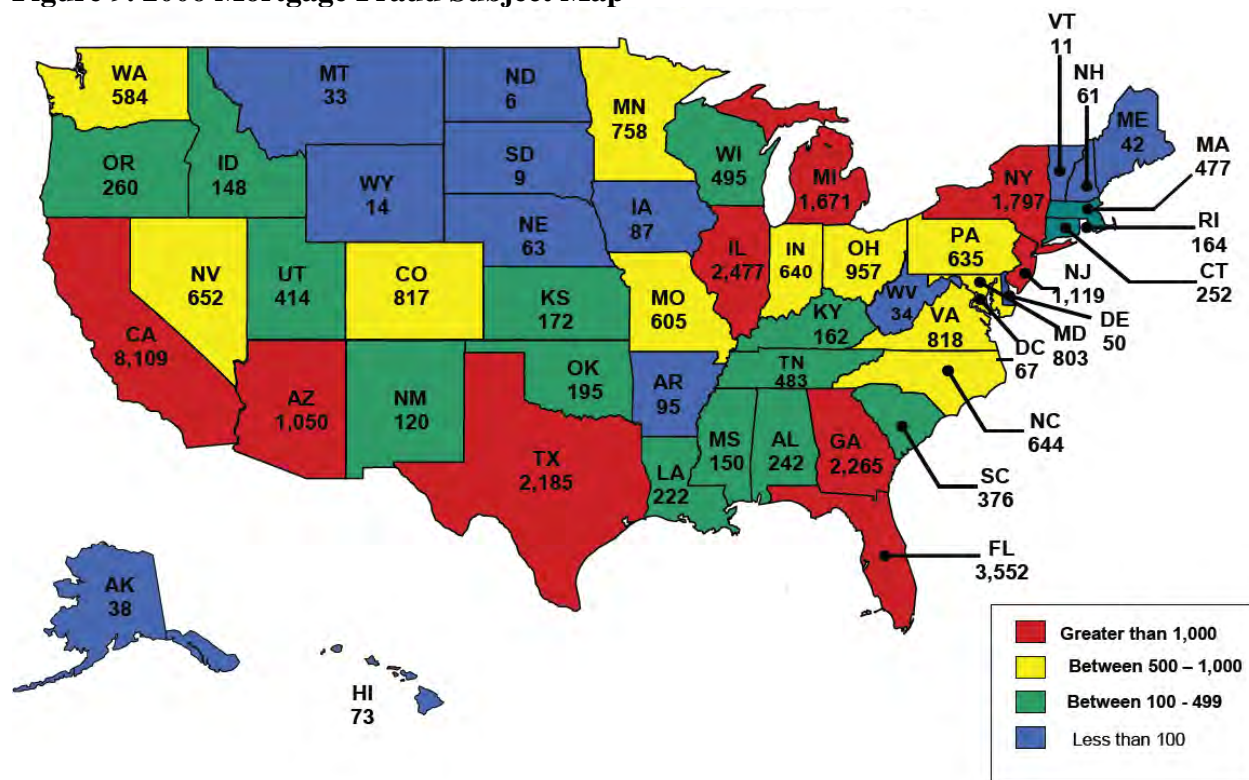
**Figure 8. Number of SARs Reporting Suspected Mortgage Loan Fraud**



**Source:** Financial Crimes Enforcement Network (2008)

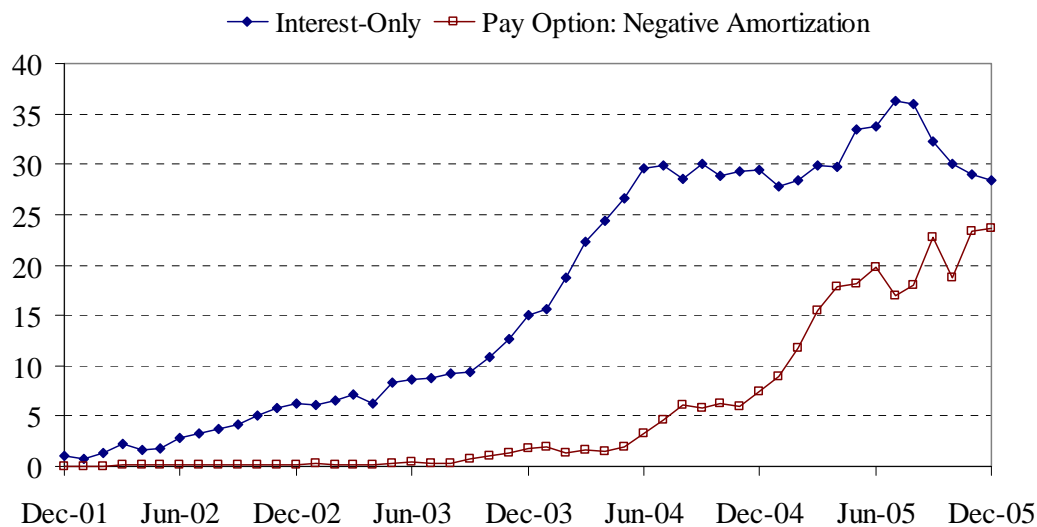
**Note:** SAR means suspicious activity report

**Figure 9. 2006 Mortgage Fraud Subject Map**



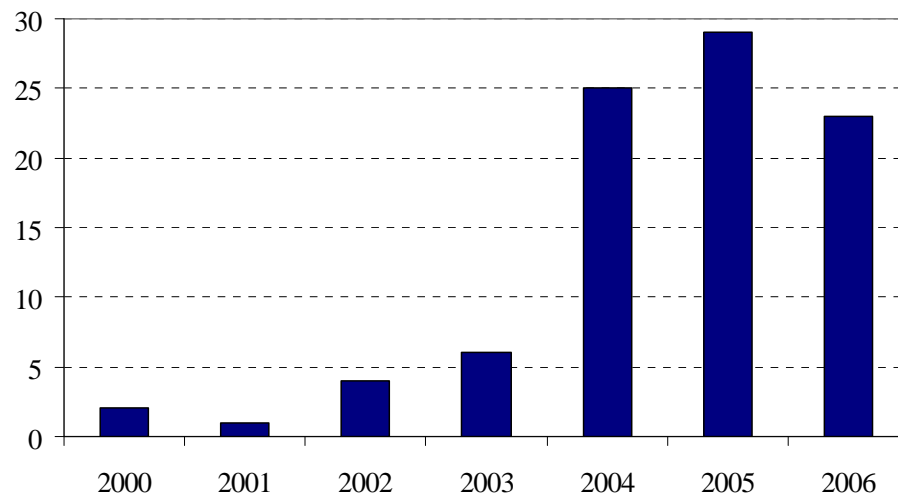
Source: Financial Crimes Enforcement Network (2008)

**Figure 10. Proportion of Newly Issued Nonprime Mortgages with Nontraditional Characteristics**



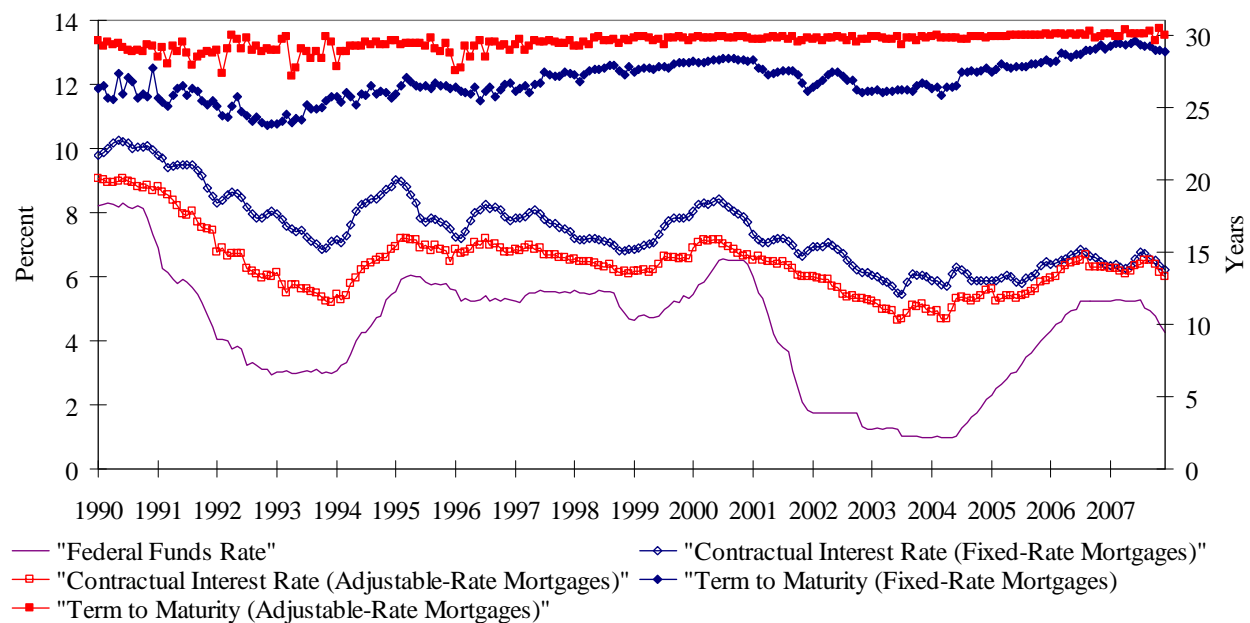
Source: FDIC Outlook, Summer 2006. Nonprime mortgages are alt-A and subprime mortgages.

**Figure 11. Share of Interest-Only and Payment-Option Mortgages as a Percent of All Mortgage Originations Purchased, 2000–2006**



**Source:** Loan Performance and Credit Suisse in Zelman (2007)

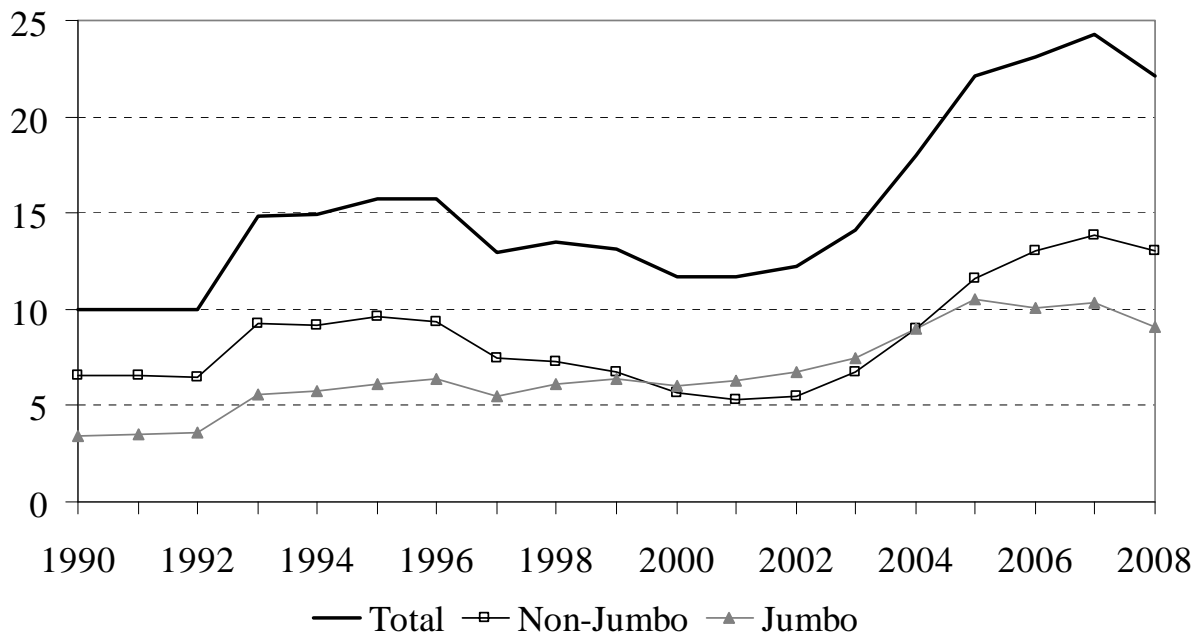
**Figure 12. Terms on Conventional Single-Family Mortgages, Monthly National Averages, All Homes**



**Sources:** Federal Housing Finance Board, Board of Governors of the Federal Reserve System

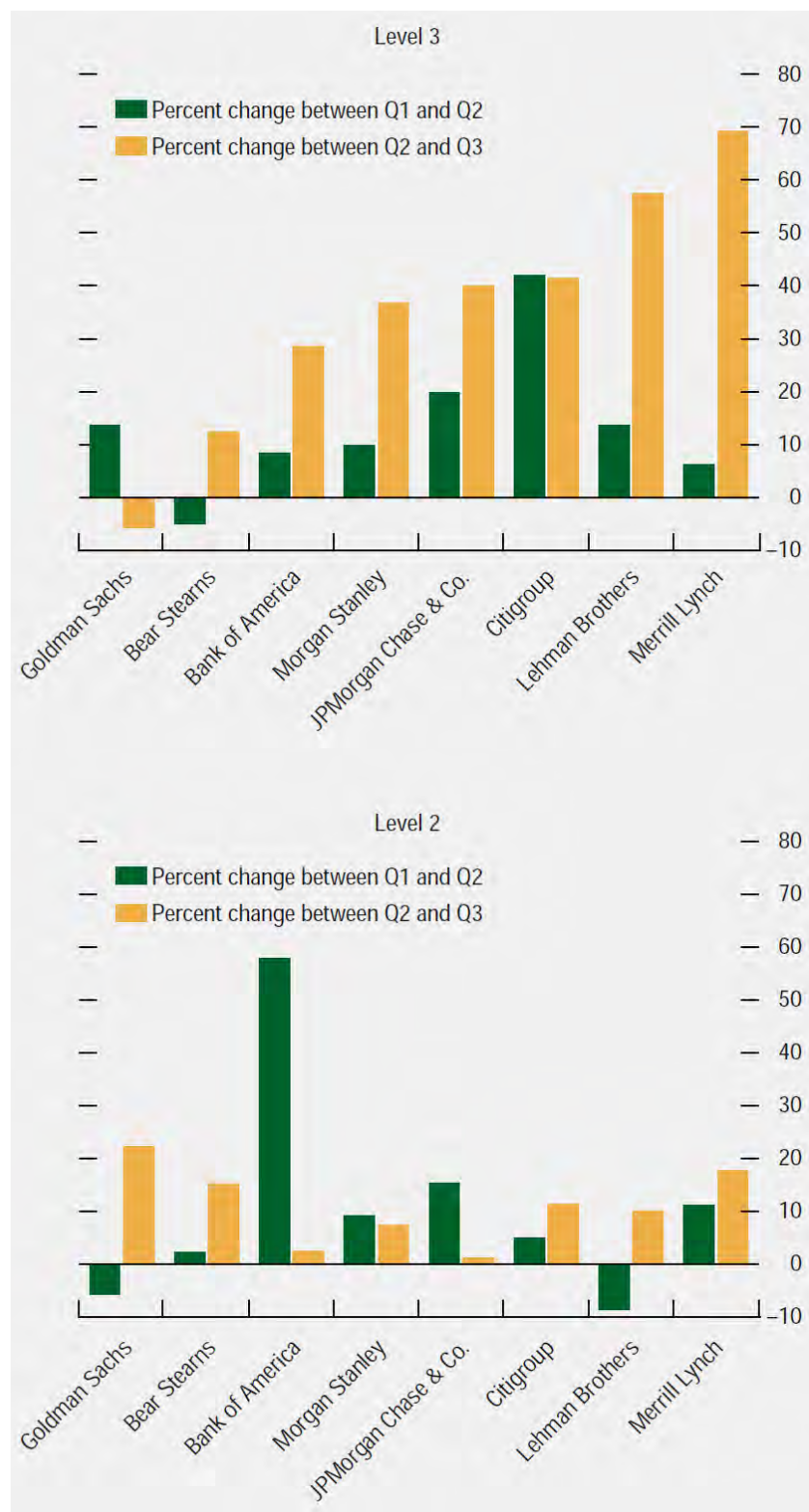


**Figure 13. Proportion of Conventional Single-Family Mortgages with Adjustable Rate**



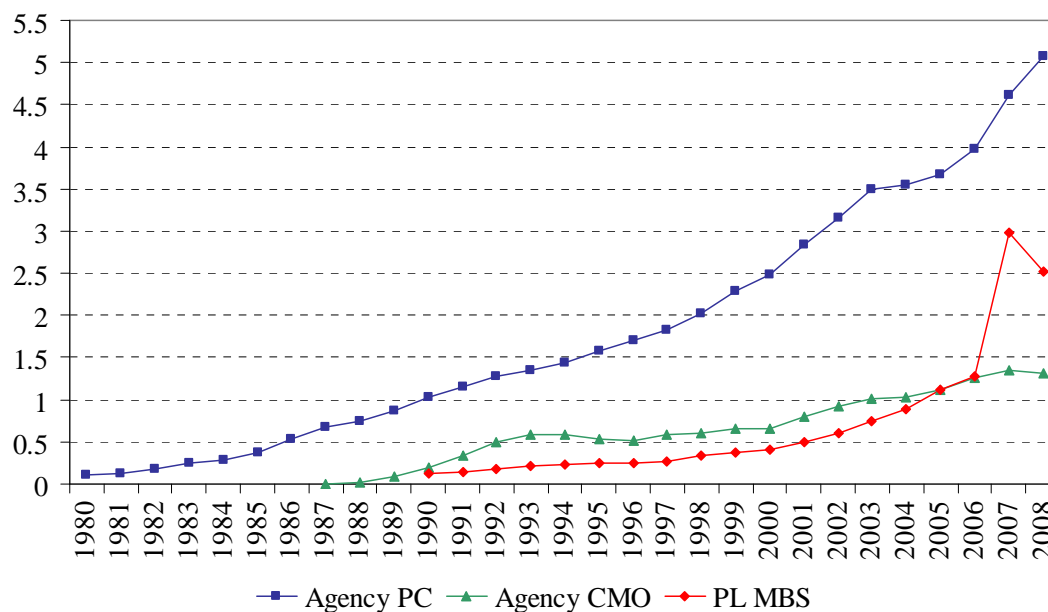
**Source:** OFHEO. Average of the first three quarters for 2008.

**Figure 14. Selected U.S.-based Financial Institutions: Change in Level 3 and 2 Assets (Percent Change, 2007:Q1–2007:Q3)**



**Source:** International Monetary Fund (2008: 66)

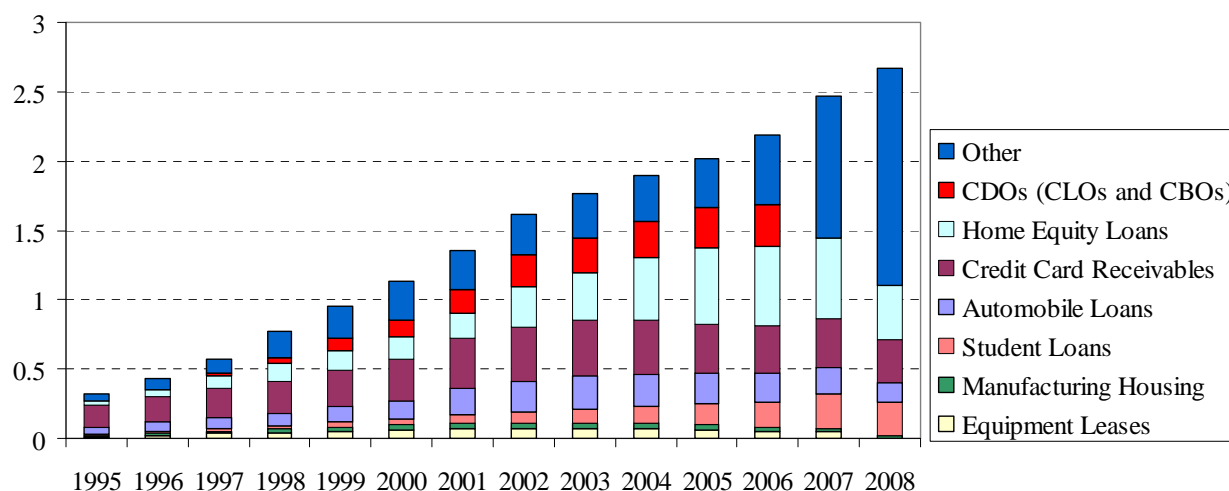
**Figure 15: Outstanding Volume of Mortgage-Related Securities at the End of the Year (Trillions of Dollars)**



**Sources:** BMA, SIFMA, GNMA, FNMA, FHLMC

**Note:** By convention, agency MBSs and CMOs include those issued by FNMA and FHLMC, even though they are private corporations.

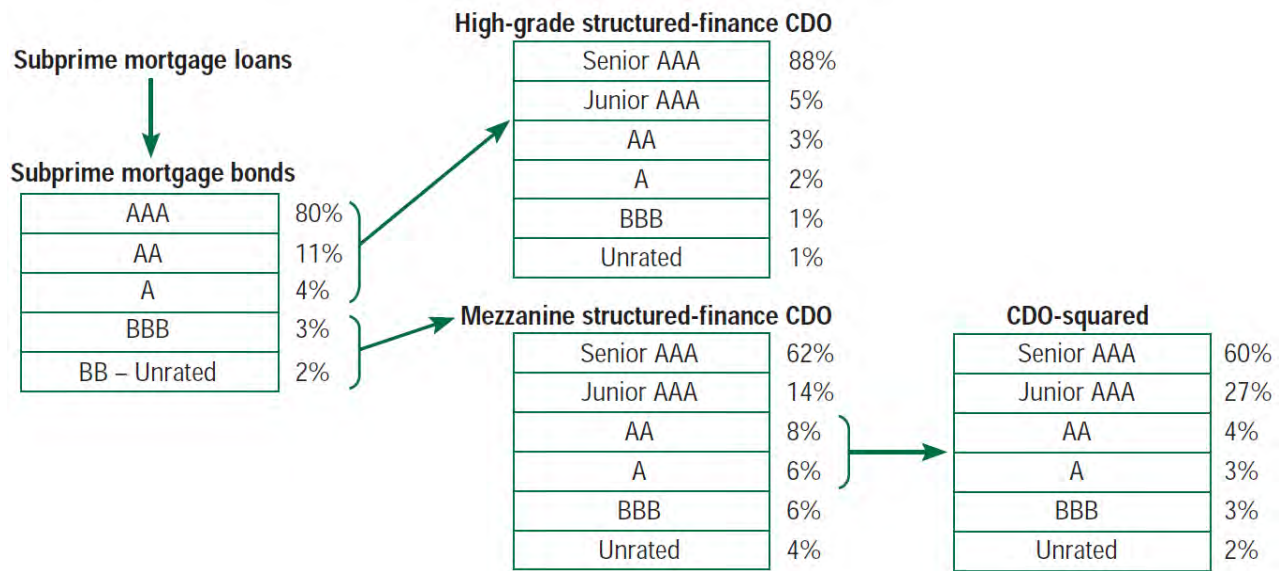
**Figure 16. Types of Financial Claims Backing Outstanding Asset-Backed Securities, Excluding Mortgage-Backed Securities (Trillions of Dollars)**



**Source:** SIFMA, Bond Market Association.

**Note:** From 2007, CDOs are included within “other” and the same applies to equipment leases from 2008. “Other” includes auto leases, small business loans, trade receivables, claims on intangibles, nonperforming loans, and other miscellaneous financial claims.

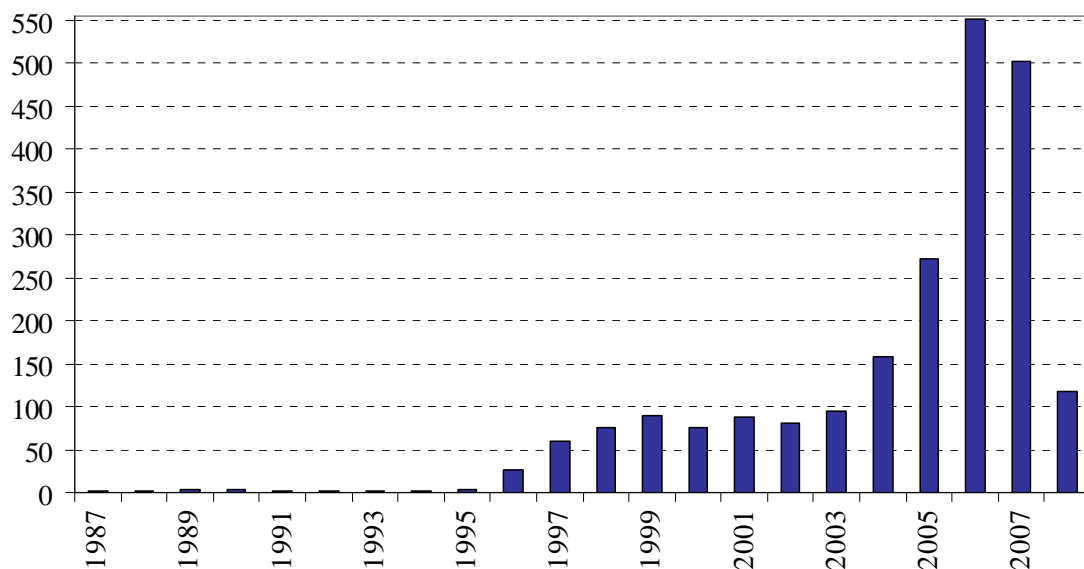
**Figure 17. CDO-squared in Subprime Mortgage**



**Source:** International Monetary Fund (2008)

**Note:** About 75% of subprime mortgages loans were used as collateral for subprime mortgage bonds (International Monetary Fund 2008).

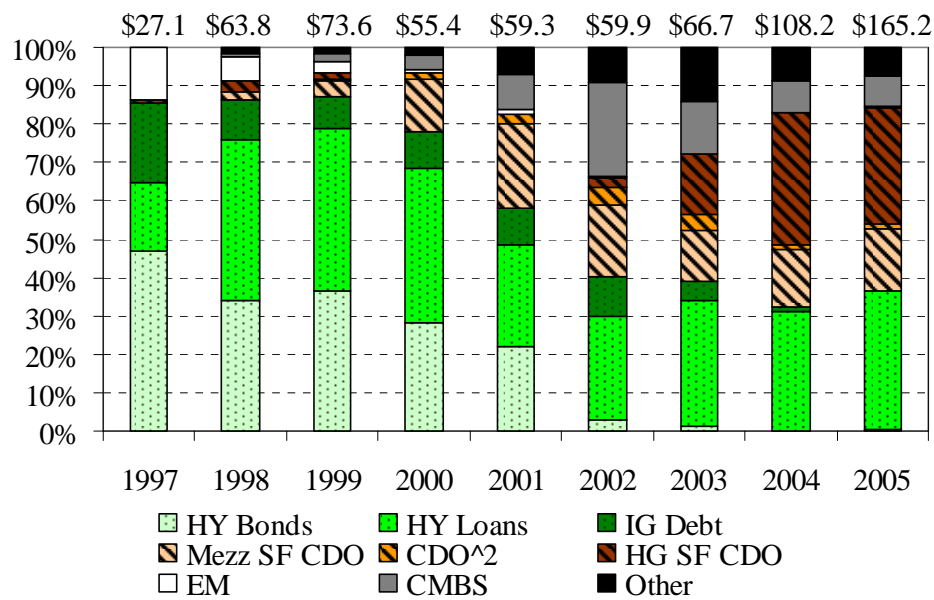
**Figure 18. Worldwide Issuance of Cash Funded CDOs (Billions of Dollars)**



**Sources:** Kothari (2006) (before 1996), FDIC *Outlook* Fall 2006 (1996-2003), SIFMA (2004-2007), abalert.com (2008)

**Note:** Data about CDOs (and other structured products) are hardly standardized. Data for unfunded synthetic CDOs is not available.

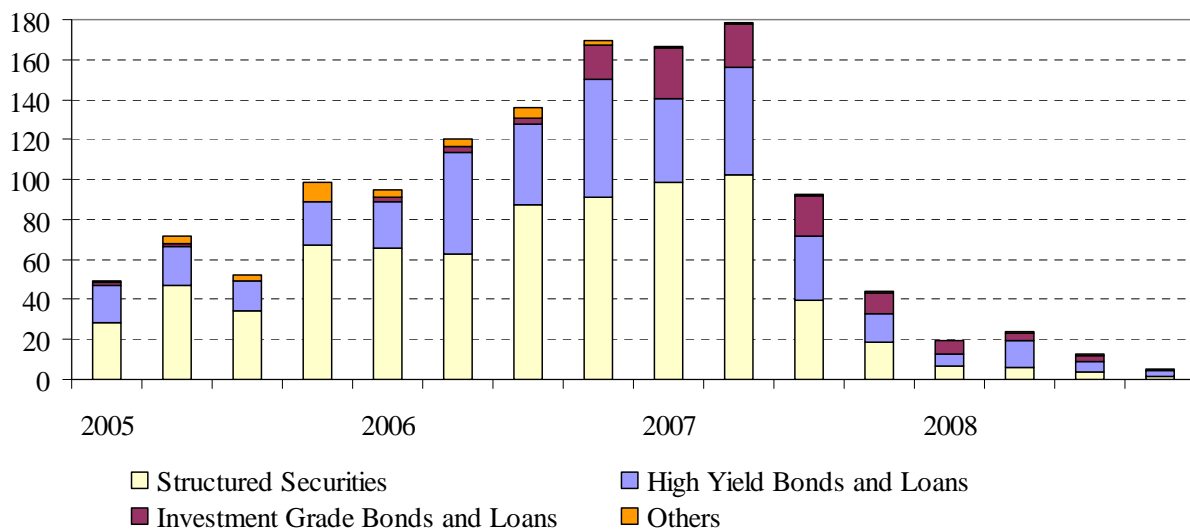
**Figure 19. Collateral of Newly Issued Cash CDOs in the United States, 1996–2005 (Billions of Dollars)**



**Source:** *FDIC Outlook*, Fall 2006.

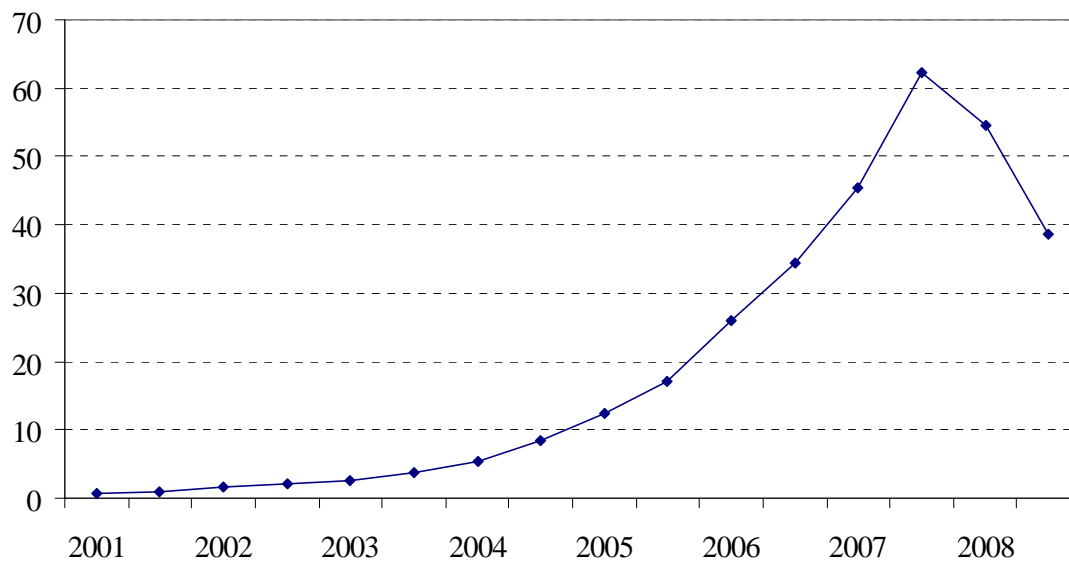
**Note:** HY = high yield, IG = investment grade, CDO<sup>2</sup> = CDO squared, HG SF = high grade structured finance, Mezz SF = mezzanine structured finance, CMBS = commercial mortgage-backed securities, EM = emerging markets.

**Figure 20. Global Issuance of CDO by Collateral (Billions of Dollars)**



**Source:** SIFMA

**Figure 21. Notional Amount of Credit Default Swaps (Trillions of Dollars)**

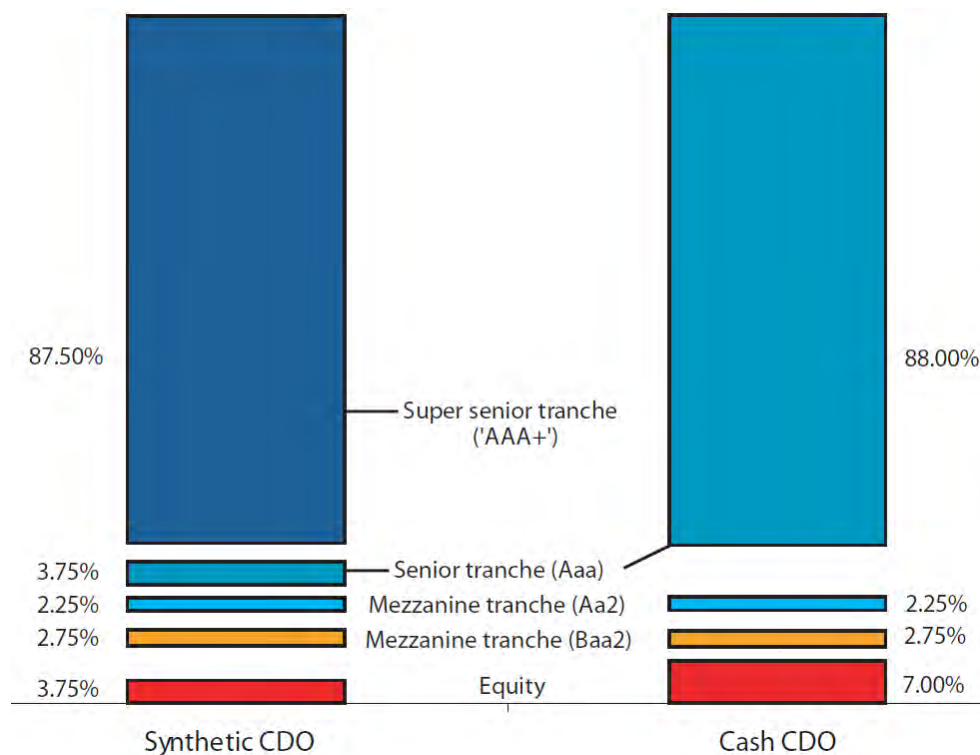


Source: ISDA

**Figure 22. SPE Structure in a Fully Funded (or “Unleveraged”) Synthetic Deal**

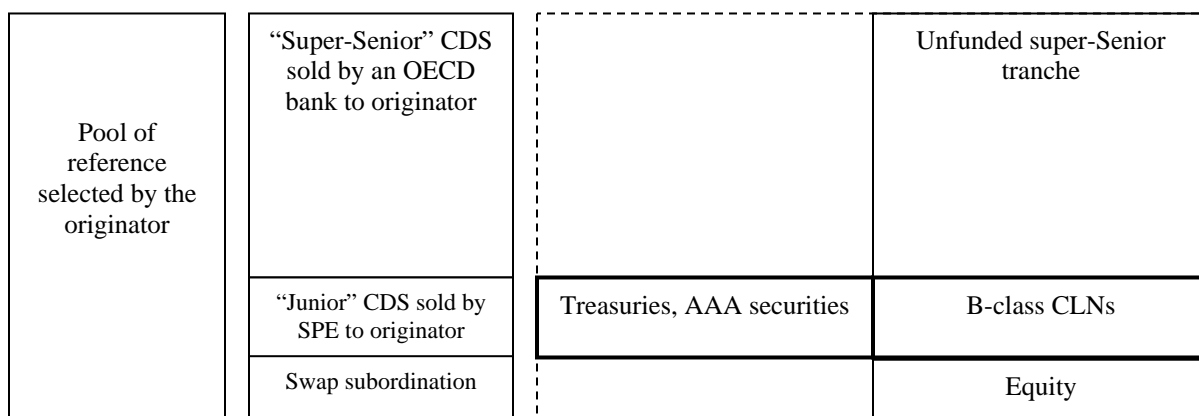
|                  | Assets                     | Liabilities               |
|------------------|----------------------------|---------------------------|
| CDSs sold by SPE | Treasuries, AAA securities | A-class CLNs              |
|                  |                            | B-class CLNs              |
|                  |                            | C-class CLNs              |
|                  |                            | First-loss CLNs or equity |

**Figure 23. Tranching of a Typical Synthetic CDO Deal**

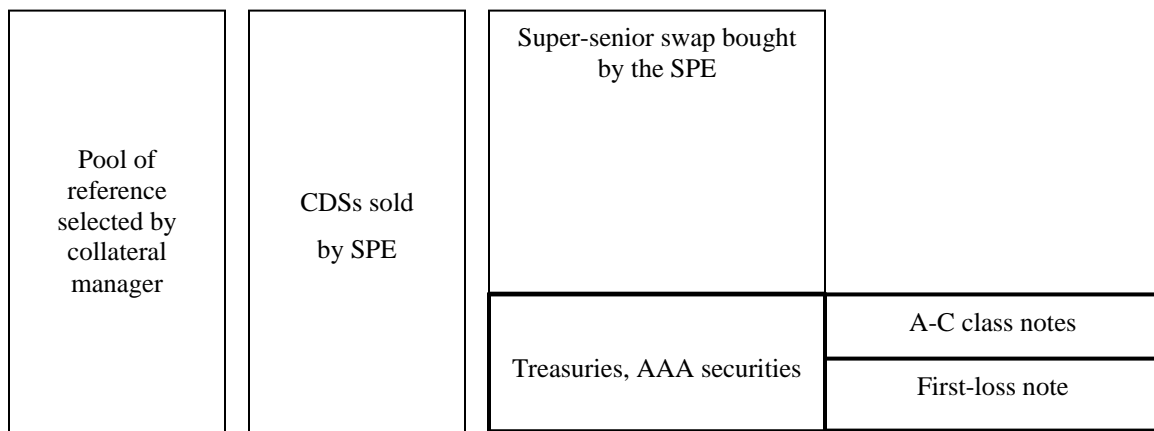


Source: Moore (2004)

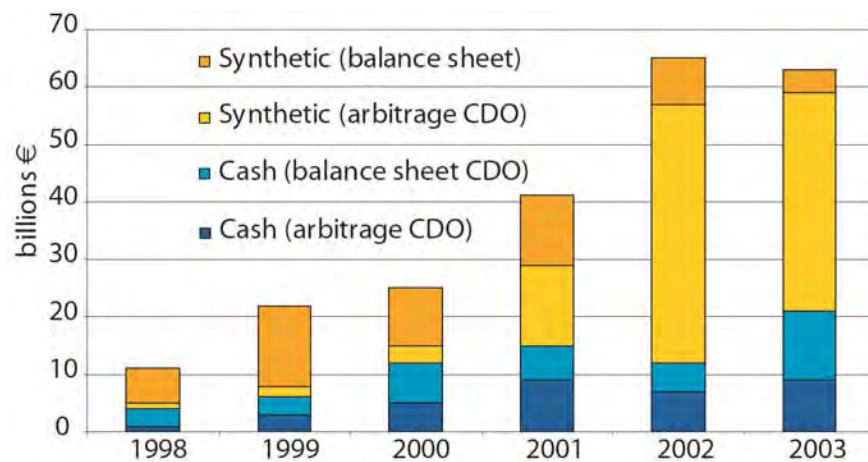
**Figure 24. SPE Structure (in bold) in Single Tranche CDO Synthetic Deal Established for Balance-sheet Purposes (based on Clark [2007], Goodman [2008])**



**Figure 25. SPE Structure (in bold) in Multi-tranche CDO Synthetic Deal (in bold)  
Established for Arbitrage Purposes (based on Renault [2007])**



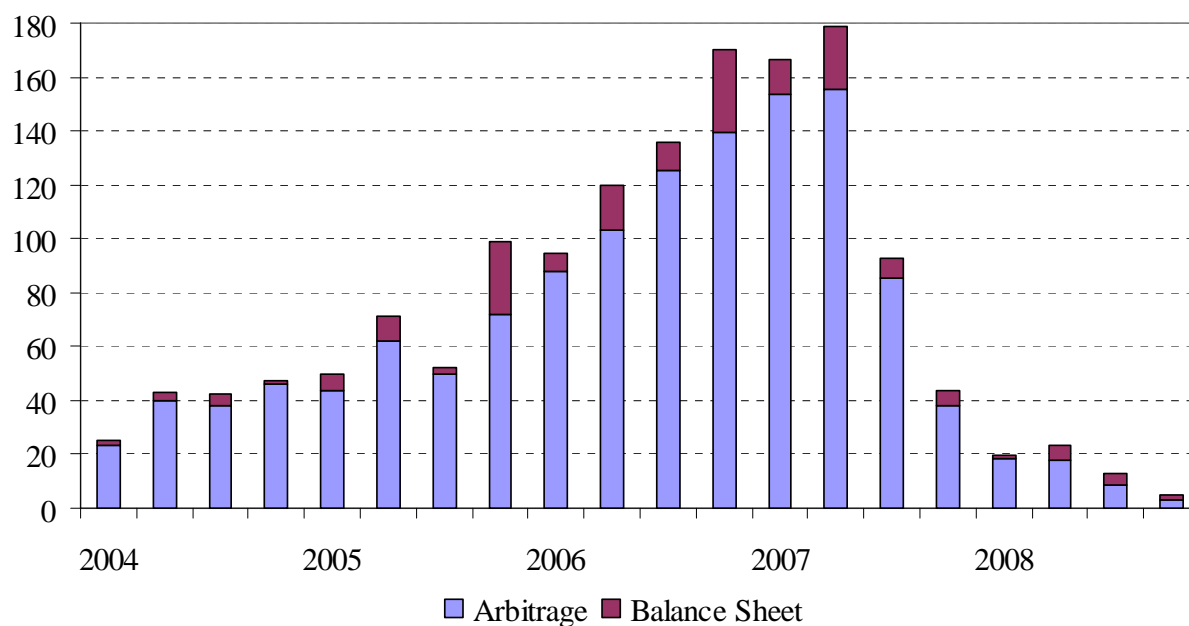
**Figure 26. Global Issuance of CDOs by Motives, 1998–2003**



Source: Lehman Brothers in Moore (2004)

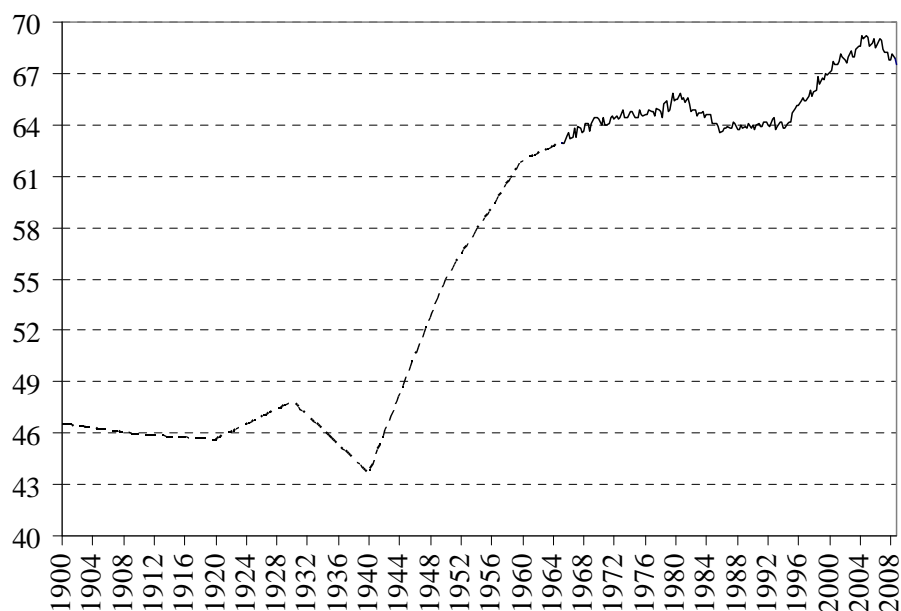


**Figure 27. Global Issuance of CDOs by Motives, 2004–2008 (Billions of Dollars)**



Source: SIFMA

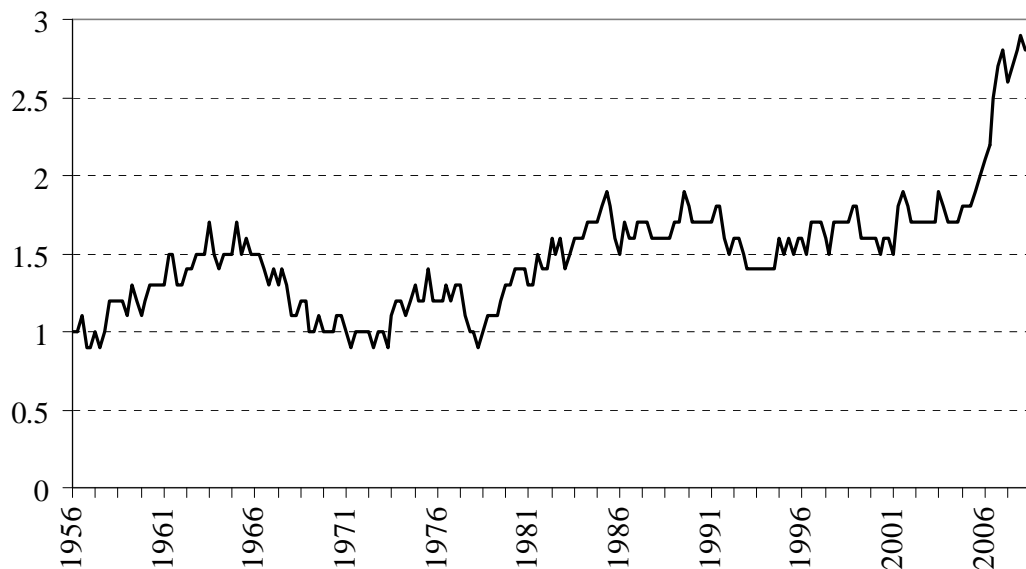
**Figure 28. Homeownership Rate, 1900–2008**



Source: Census Bureau.

**Note:** Decennial data from 1900 to 1960, quarterly data from 1965. Homeownership rate is computed by dividing the number of owner-occupied housing units by the number of occupied housing units or households. A housing unit is owner-occupied if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for.

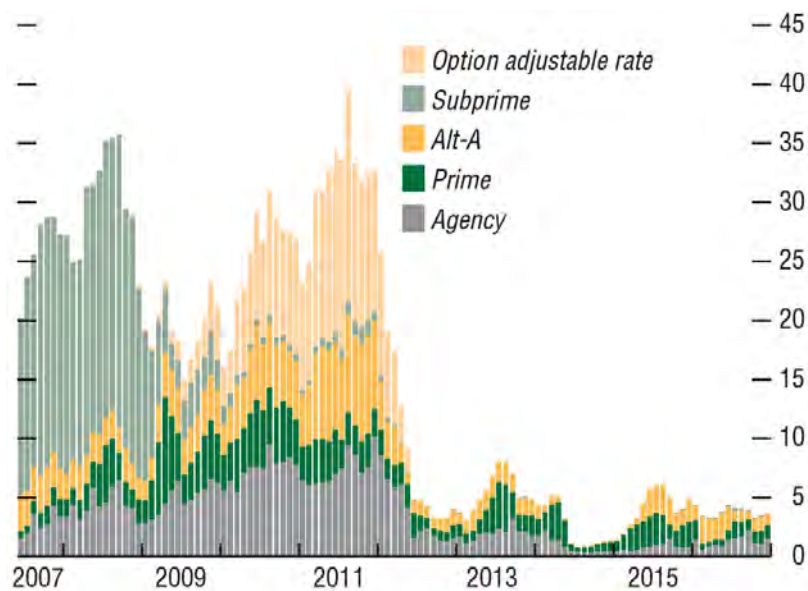
**Figure 29. Quarterly Homeowner Vacancy Rate, 1956–2008**



**Source:** Census Bureau

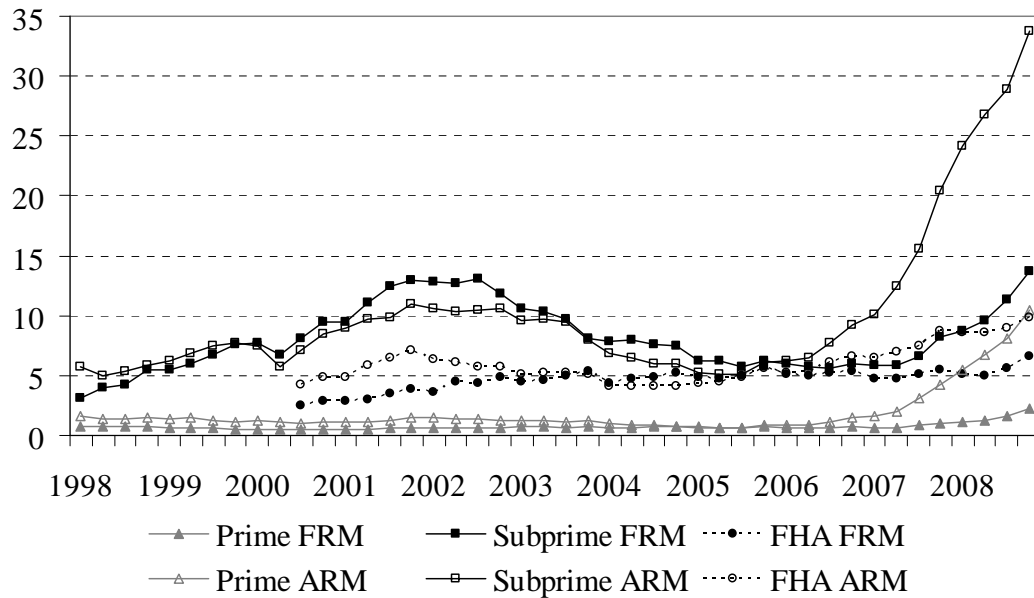
**Note:** The homeowner vacancy rate is the proportion of the homeowner inventory that is vacant for sale. It is computed by dividing the number of vacant units for sale only by the sum of the owner-occupied units and the number of vacant units that are for sale only.

**Figure 30. Monthly Mortgage Rate Reset**



**Source:** Credit Suisse in International Monetary Fund (2007: 8)

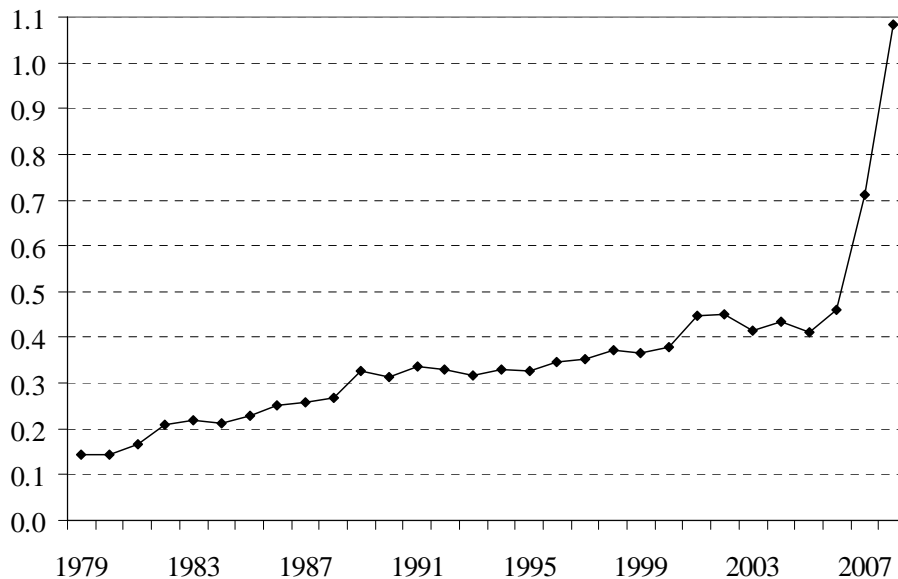
**Figure 31. Percentage of Single-Family Mortgages in Serious Delinquency**



**Source:** National Delinquency Survey (Mortgage Banker Association).

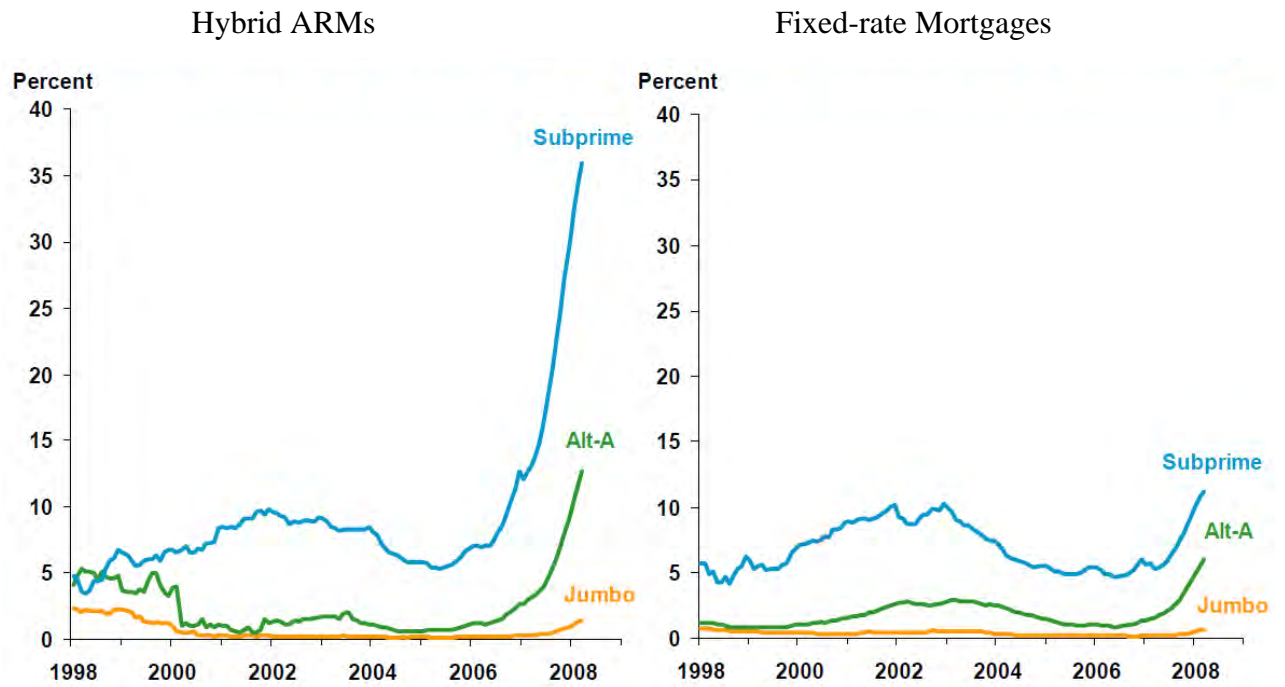
**Note:** Serious delinquency means that debt service payments are 90 days past due or in the process of foreclosure.

**Figure 32. Rate of Foreclosure Started, All Mortgages**



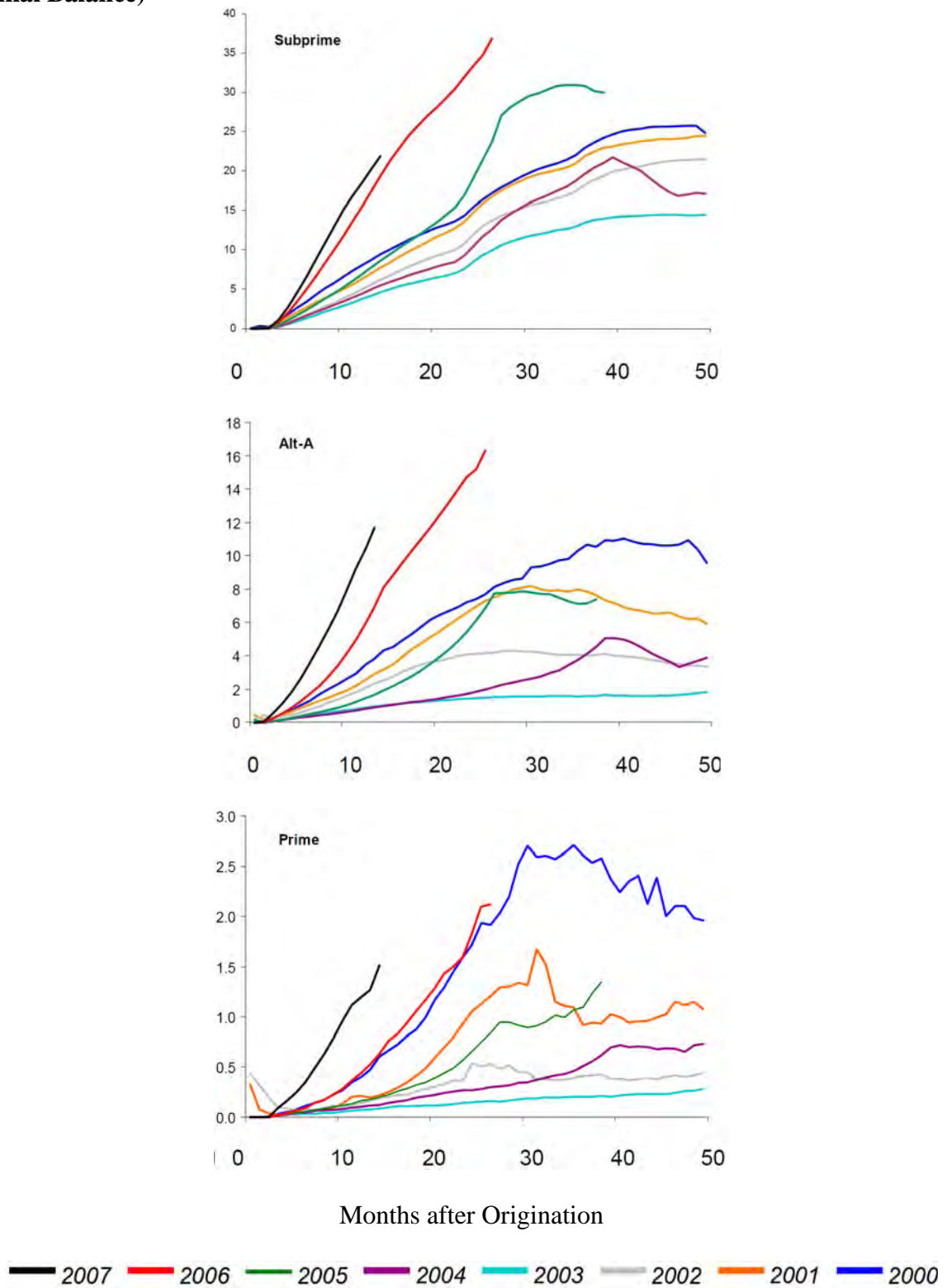
**Source:** MBA National Delinquency Survey. Rate of foreclosure started refers to the percentage of loans for which a foreclosure has been initiated during the quarter.

**Figure 33. Delinquency on Traditional and Toxic Mortgages**



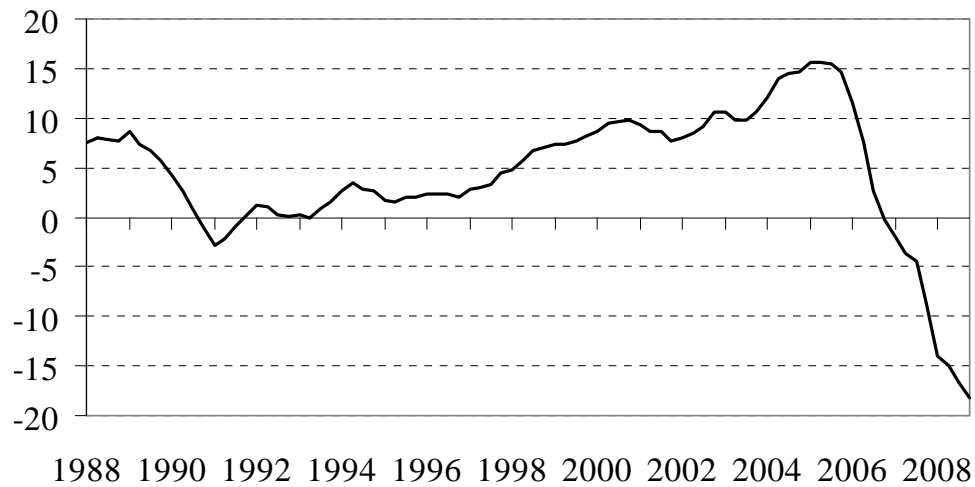
**Source:** Citigroup in FHLMC (2008)

**Figure 34. U.S. Mortgage Delinquencies by Vintage Year (60+ Day Delinquency, in Percent of Original Balance)**



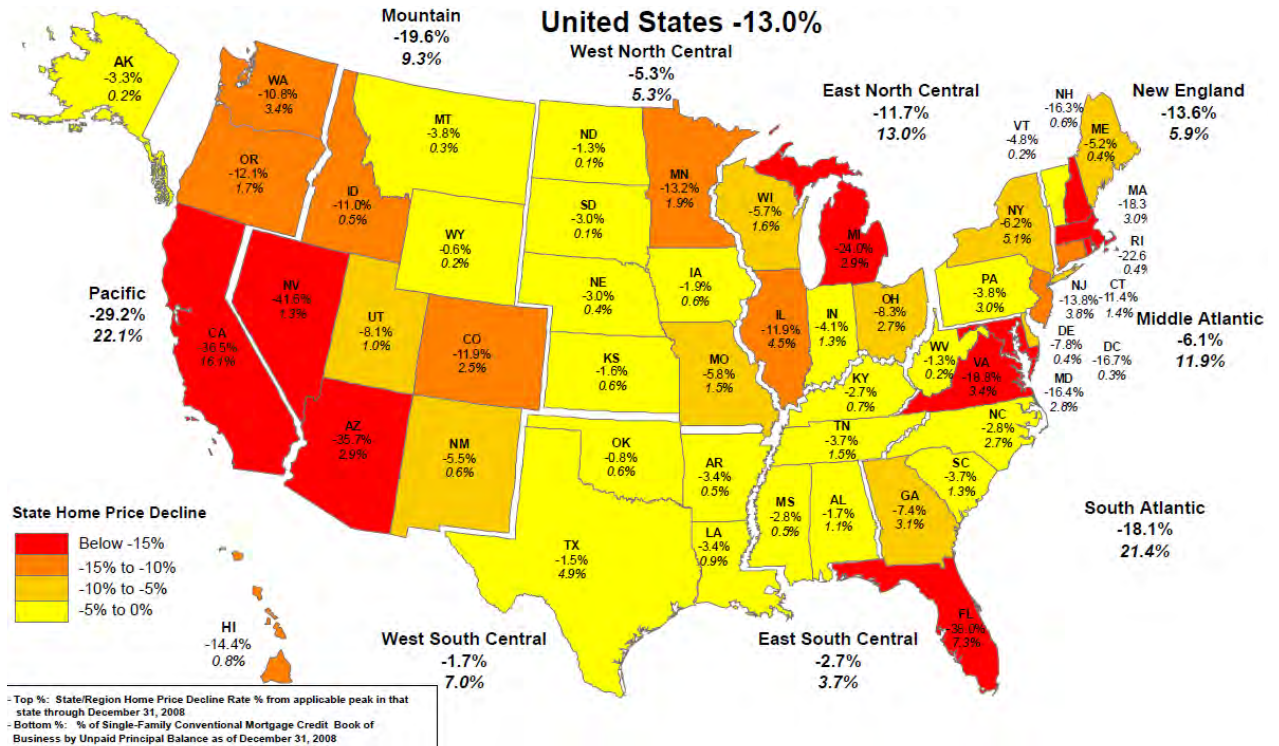
**Sources:** Merrill Lynch and LoanPerformance in International Monetary Fund (2008b: 6)

**Figure 35. Annual Growth Rate of U.S. Home Price Index (Case and Shiller Index)**



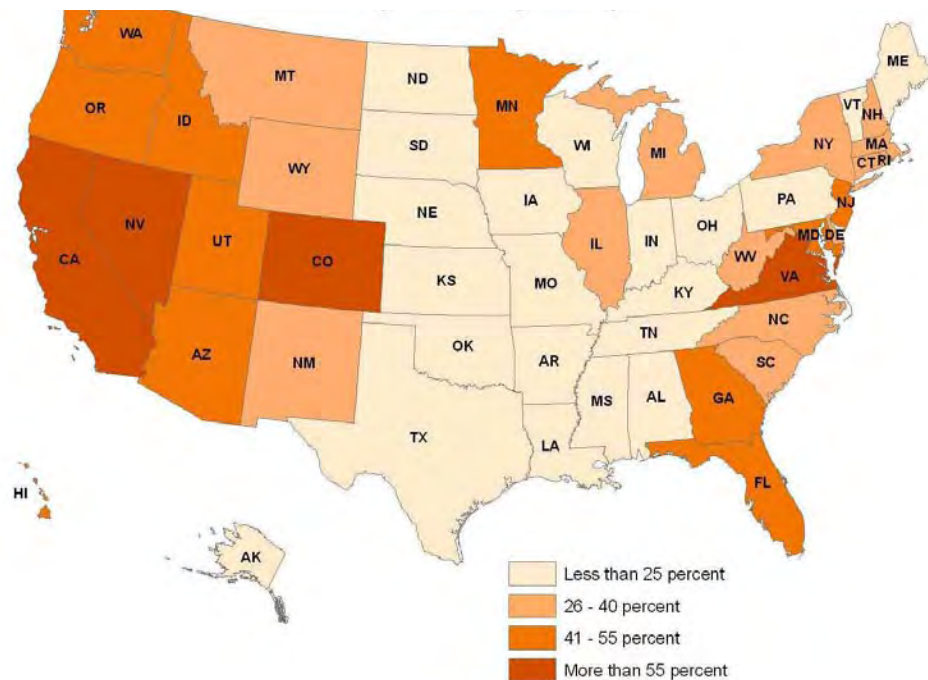
Source: Standard and Poor's

**Figure 35. Change in Home Price from Peak to 2008 Q4**



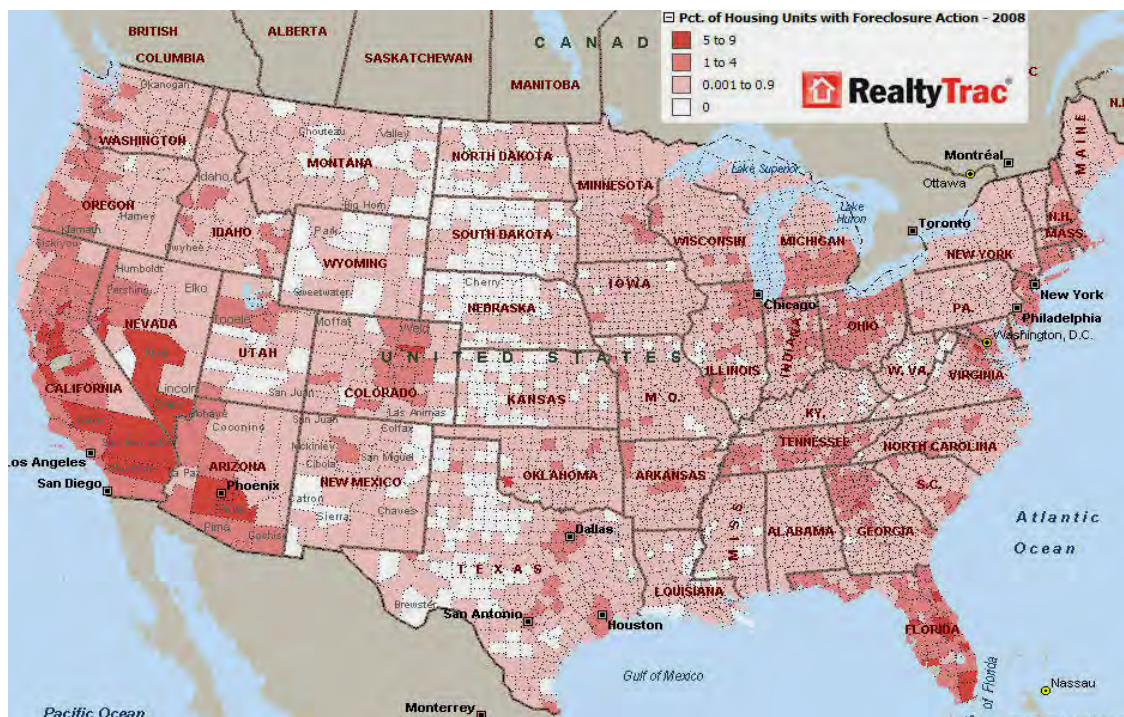


**Figure 37. Share of Nonprime Mortgage Origination that Are Interest-only or Have Payment Options (Fourth Quarter 2005)**



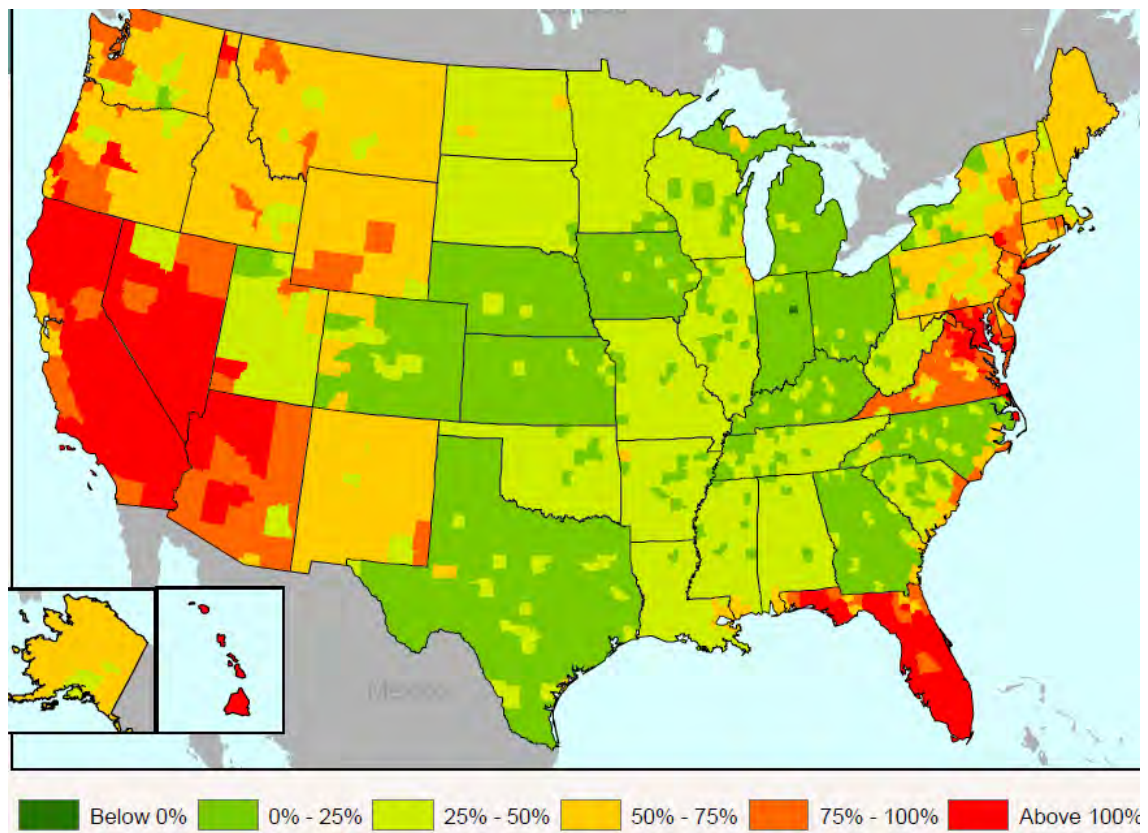
Sources: Office of Federal Housing Enterprise Oversight, LoanPerformance in Olson (2005)

**Figure 38. Foreclosure Rate by Metropolitan Statistical Areas in 2008**



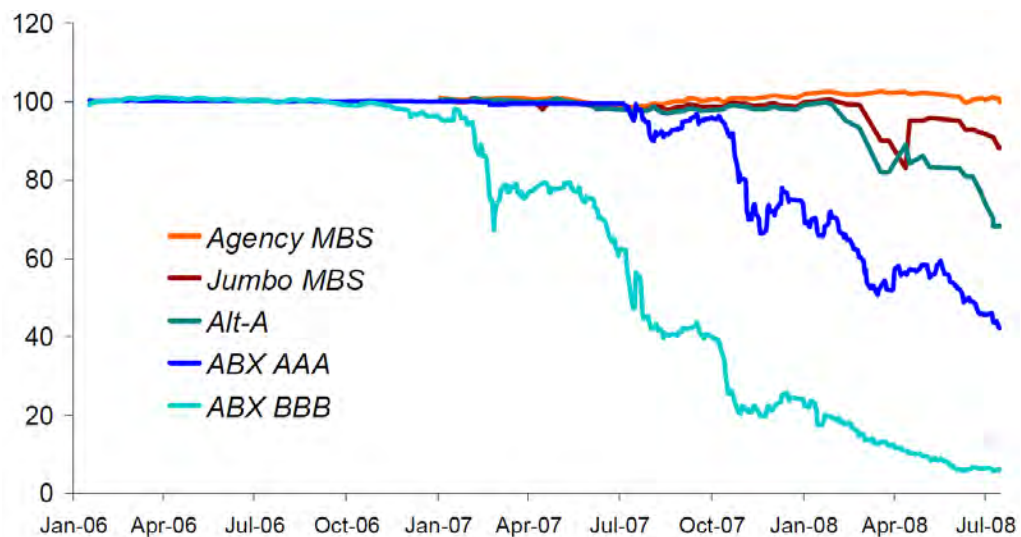
Source: Realtytrac

**Figure 39. Change in Home Price (2001Q1 to 2006Q3)**



Source: FNMA in Thompson (2007)

**Figure 40. Prices Indexes of U.S. Mortgage-Related Securities (100 = par value)**

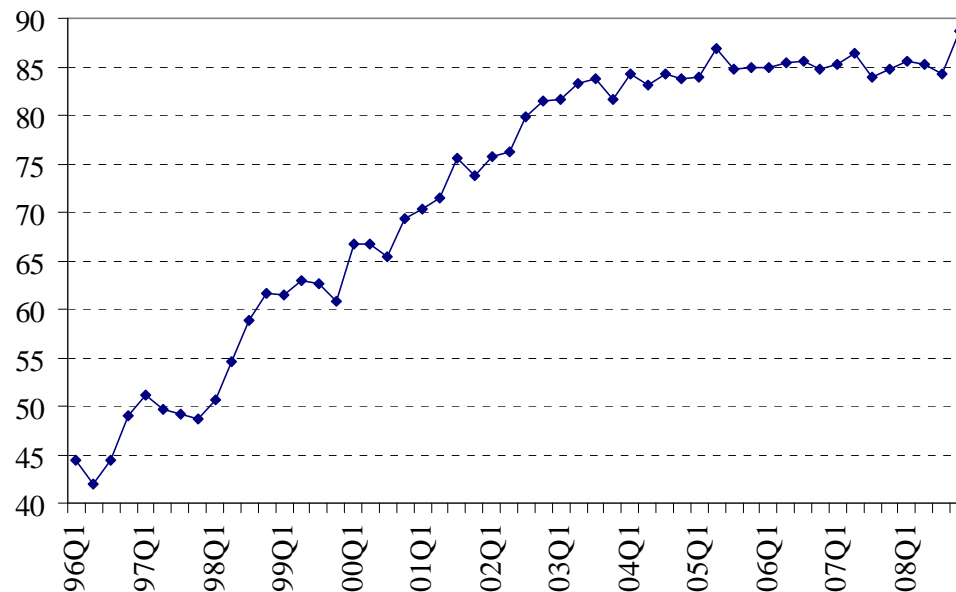


Sources: JPMorgan Chase & Co. and Lehman Brothers in International Monetary Fund (2008b: 6)

Note: ABX = index of credit default swaps on mortgage-related asset-backed securities.

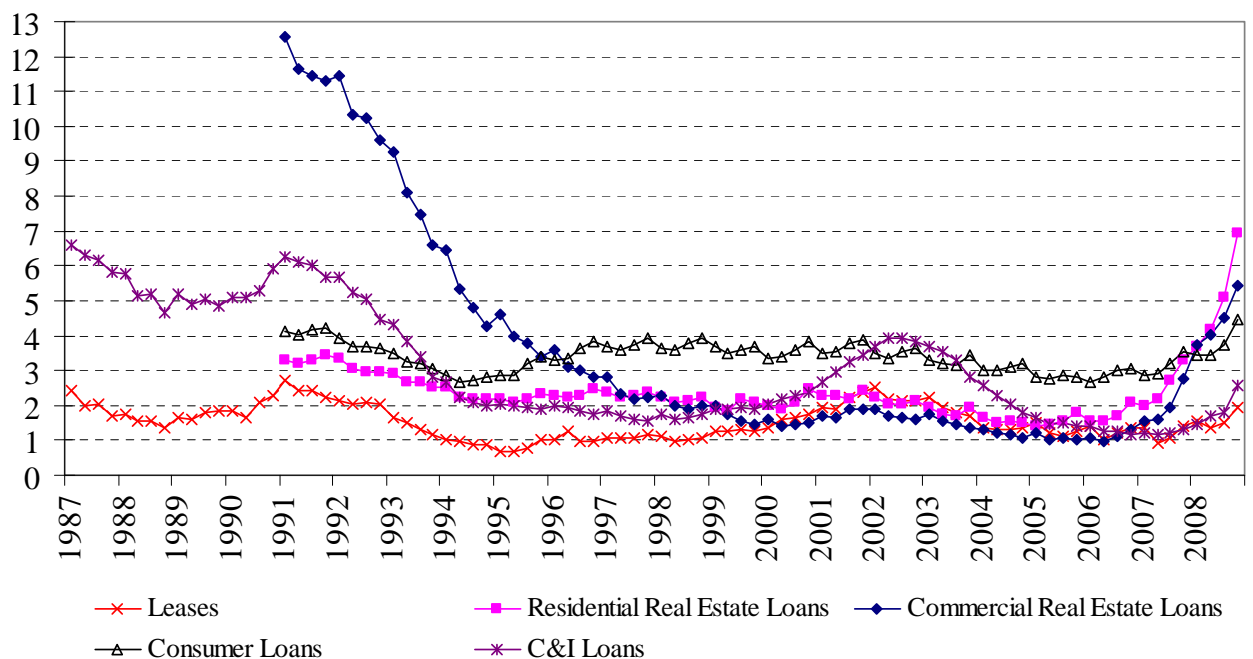


**Figure 41. Percentage of Gross Exposures Eliminated through Bilateral Netting (All Commercial Banks with Derivatives)**



Source: Office of the Comptroller of the Currency (2009)

**Figure 42. Delinquency Rates**



Source: Federal Reserve Board

**Table 1. Typical Collateral Composition of ABS CDOs (Percent)**

|               | High grade<br>ABS CDO | Mezzanine<br>ABS CDO |
|---------------|-----------------------|----------------------|
| Subprime RMBS | 50                    | 77                   |
| Other RMBS    | 25                    | 12                   |
| CDO           | 19                    | 6                    |
| Other         | 6                     | 5                    |

**Source:** Citigroup in Bank of International Settlement (2008: 5)

**Table 2. Market Participants in Credit Derivatives, 2004 and 2006 (in Percent of Total)**

|               | Protection Buyers |      | Protection Sellers |      | Net Protection Seller (+) or<br>Buyer (-) |      |
|---------------|-------------------|------|--------------------|------|---|------|
|               | 2004              | 2006 | 2004               | 2006 | 2004                                      | 2006 |
| Banks         | 67                | 59   | 54                 | 43   | -13                                       | -16  |
| Hedge funds   | 16                | 28   | 15                 | 31   | -1  | +3   |
| Pension funds | 3                 | 2    | 4                  | 4    | +1  | +2   |
| Insurance     | 7                 | 6    | 20                 | 17   | +13                                       | +11  |
| Corporations  | 3                 | 2    | 2                  | 1    | -1  | -1   |
| Mutual funds  | 3                 | 2    | 4                  | 3    | +1  | +1   |
| Other         | 1                 | 1    | 1                  | 1    | 0   | 0    |

**Source:** British Bankers' Association in International Monetary Fund (2008a)

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