

Syndicated Leveraged Loans During and After the Crisis and the Role of the Shadow Banking System

by Christopher L. Culp, Compass Lexecon and
The University of Chicago Booth School of Business*

In 1998 Nobel laureate Merton H. Miller wrote in this journal that the impact of banking crises on economic activity can be attenuated through relatively greater reliance by market participants on non-banking financial products and structures.¹ Although the focus of his article was the macroeconomic impacts of the Asian financial crisis of 1997, his conclusions about the causes of liquidity and banking crises—and his commentary on how regulation addresses those crises—go well beyond that specific historical episode and are equally relevant today.

In short, Miller viewed traditional commercial banking as inherently fragile and contended that “having a wide spectrum of financial markets available keeps a country from having to put all its development eggs in one basket...and, in particular, from relying too heavily on commercial banking.” As 1998 examples of “market substitutes for functions...performed by banks,” Miller used money market mutual funds (MMMFs) and high-yield (HY) debt. At the time of his writing, his characterization was essentially correct. Customers seeking alternatives to banks for the provision of liquid transaction accounts could rely instead on MMMFs, and relatively high-risk companies wishing to raise new funds could issue junk bonds in lieu of obtaining bank loans.

Yet, as Charles Calomiris pointed out in the Winter 2012 issue of this journal, Miller’s dichotomous characterization of “bank-based” and “market-based” finance perhaps exaggerated the degree of separation between the two systems.² Although Miller was right to say that the availability of non-bank sources of financing can help limit the impact of financial crises, he painted a black-and-white picture—though I think a plausible one, given the time of his article—of bank- and market-based financing. The reality, as has become especially clear since the recent crisis, is that the two work in concert and are strongly interrelated.

Miller’s description of the commercial banking system was essentially based on the traditional originate-and-hold

(O&H) business model in which banks retained all or most of the loans they originated on their balance sheets until those loans were repaid. Banks financed those loan assets primarily with deposits and other borrowings—including unsecured interbank borrowings, institutional certificates of deposit, commercial paper, and medium-term notes—as well as equity.

Beginning in the late 1970s with mortgage lending and in the 1990s with leveraged bank loans to commercial and industrial (C&I) borrowers, loan originators began to shift toward an originate-and-distribute (O&D) approach in which they underwrote and funded the loans but then sold large portions of their portfolios to non-bank investors. The cash proceeds received by O&D originators through sales to non-bank investors were used to finance new loan production.

Essential to the O&D banking business model is the “parallel” or “shadow” banking system, which can be viewed as the collection of financial products and structures that link banks with non-bank investors. The shadow banking system exists alongside but is distinct from the traditional commercial banking system. In 1998 when Miller’s article was published, syndicated leveraged loans were already beginning to displace HY debt as the main source of U.S. leveraged finance. But that apparent shift away from market-based financing back toward bank financing was, in reality, a shift away from *pure* market-based financing toward O&D bank financing that was heavily reliant on the shadow banking system. Even in 1998, the ability of banks to issue leveraged loans was heavily dependent on the willingness of *non*-bank investors to purchase some of those loans from bank originators.

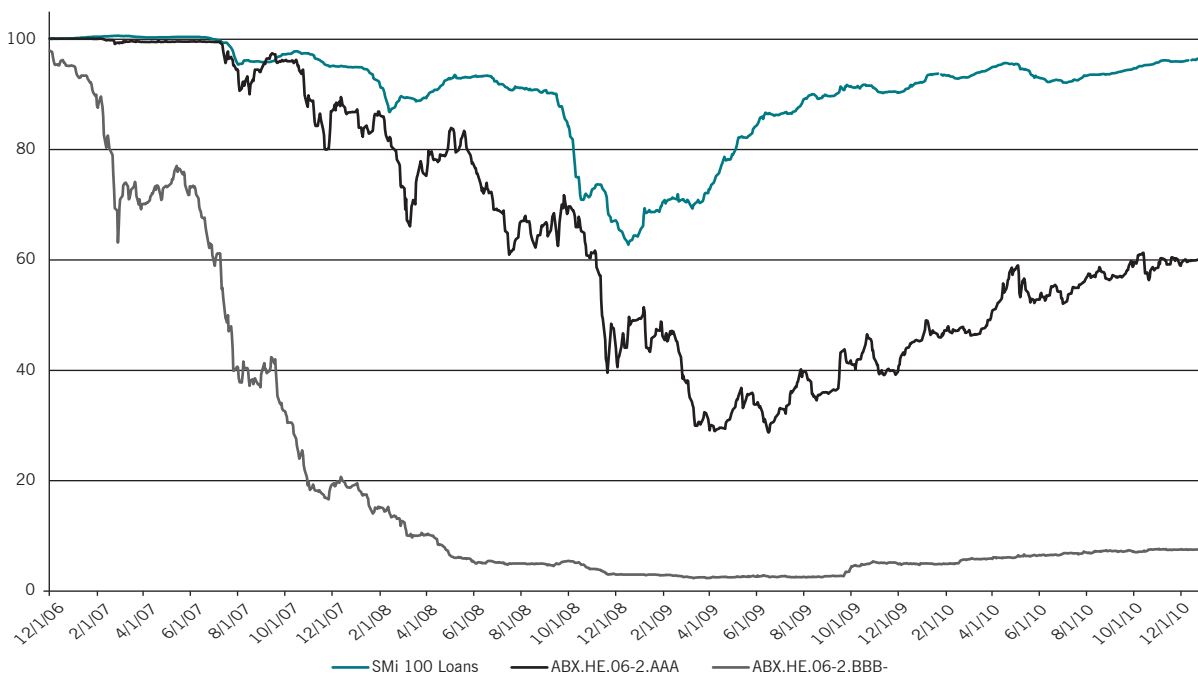
Had the shadow banking system been more fully evolved (outside the mortgage lending space) at the time of Miller’s writing, he likely would have argued that diversification of activities like leveraged finance out of the commercial banking sector into the shadow banking sector would also help reduce the impact of disruptive shocks within the banking system. And he would have been right. But the shadow banking

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1. M. H. Miller, “Financial Markets and Economic Growth,” *Journal of Applied Corporate Finance* Vol. 11, No. 3 (Fall 1998). The genesis of the present article was the editor Don Chew’s desire to re-print Miller’s 1998 article along with several more recent commentaries on whether Miller’s insights have proven prescient or off-base (or both) in the context of the financial crisis that began in 2007.

2. C. W. Calomiris, “A Look Back at Merton Miller’s ‘Financial Markets and Economic Growth,’” *Journal of Applied Corporate Finance* Vol. 24, No. 1 (Winter 2012).

Figure 1 U.S. Leveraged Loan and Subprime Home Equity ABS Indices, December 2006 - December 2010



Sources: Thomson Reuters LPC; Markit Group

system is *also* prone to liquidity shocks and credit freezes. Indeed, the outbreak of the global liquidity and credit crisis in mid-August 2007 began as a “run” on the shadow banking system that spread into the commercial banking system.³

Much of the discussion of the relation between the shadow and traditional banking systems has focused on subprime mortgages, and on asset-backed securities (ABS) based on subprime mortgages.⁴ As subprime loan delinquencies and defaults began to impact subprime-related ABS in 2007, demand contracted sharply for subprime-based products in the shadow banking system. And neither the U.S. subprime lending market nor the markets for subprime-related ABS (or any other private-label mortgage-backed securities) have since recovered.

The U.S. syndicated leveraged loan market, however, has been a very different story. Like subprime mortgages and related ABS, leveraged loans and their related shadow banking products—loan mutual funds and collateralized loan obligations (CLOs)—experienced a boom followed by a bust. But, unlike subprime, leveraged loan markets—both primary and their shadow banking analogues—experienced a spectacular recovery in 2011 and 2012.

Figure 1 shows index values for both the AAA and BBB-

tranches of Markit Group’s ABX index of subprime home equity loan-based ABS as well as the average bid prices for the 100 most actively traded U.S. leveraged loans that are captured by the “SMi 100” index.⁵ As can be seen in the figure, in June and July 2007 the AAA subprime-backed ABS and leveraged loans experienced similar price declines. The global credit crisis erupted around August 9, 2007, at which point the markets for virtually all structured credit products (as well as many traditional debt markets) were roiled. But up to that time, the *only* two major markets showing signs of significant distress were the subprime and leveraged finance markets. Indeed, Citibank aptly described the disruptions in 2007 and 2008 as a perfect storm caused by the convergence of “twin storms” in the subprime mortgage and leveraged loan markets.⁶

As discussed in more detail below, the experience of the U.S. syndicated leveraged loan market is essentially a validation (as well as perhaps an extension) of Miller’s basic thesis that non-bank investors are important sources of financial capital even when banks themselves act as the intermediaries that move that capital from investors into the hands of corporate borrowers. When non-bank investors exited the leveraged finance market from 2007 through 2009, leveraged loan prices fell sharply and leveraged bank lending virtually

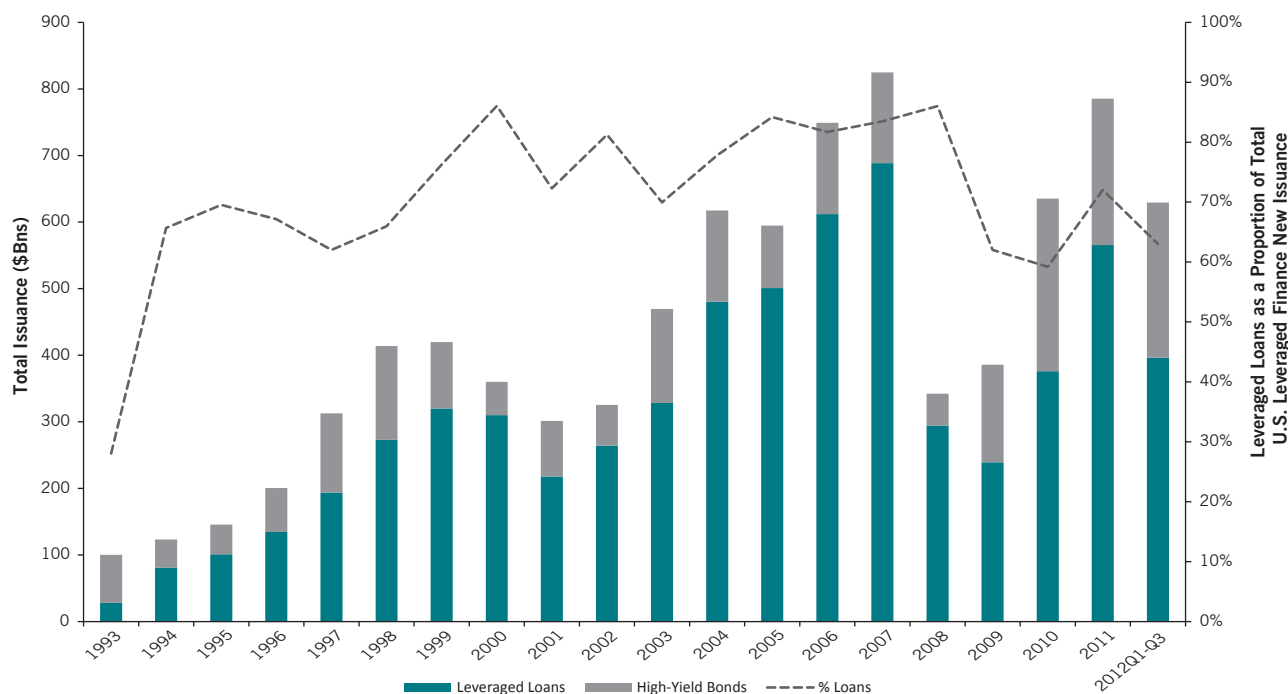
3. See, for example, G. B. Gorton, *Slapped by the Invisible Hand: The Panic of 2007* (Oxford: Oxford University Press, 2010).

4. In this article, no specific distinctions are drawn between residential mortgage-backed securities (“RMBS”) and mortgage-related ABS.

5. The loan prices in the SMi-100 index are tracked by the Secondary Market Intelligence unit of Reuters Loan Pricing Corp.

6. C. A. Leat, “Capital Markets Update,” *Citi Presentation* (June 5, 2008), available at http://www.citibank.com/transactionservices/home/sa/2009/sr_adv_bd/docs/chad_leat.pdf.

Figure 2 U.S. Leveraged Finance Issuance, 1993-2012



Source: Thomson Reuters LPC

ground to a halt. And when non-bank loan investors started to return in 2010, extensions of leveraged credit substantially rebounded. Miller’s failure to mention that commercial banks arranged the deals that connected those non-bank investors to corporate borrowers is most likely a result of the fact that, outside of the mortgage space, long-term sources of funds in the shadow banking system were only beginning to play an important role in the overall credit markets when he wrote his 1998 article. Except for its neglect of that institutional detail, Miller’s analysis of the role played by non-bank investors in transferring and cushioning the impact of risks was essentially correct.

This article begins with a discussion of the mechanics of the U.S. leveraged finance market, followed by a discussion of the U.S. shadow banking system and the role that system plays in both U.S. leveraged finance and private-label mortgage banking. The next several sections explain the evolution of the credit crisis in U.S. syndicated leveraged loan markets and, by comparison, U.S. subprime mortgage markets. I close with a brief discussion of the unintended and undesirable consequences of some proposed new regulations on shadow banking system products and participants.

The U.S. Leveraged Finance Market

Leveraged finance is the extension of credit to relatively low-rated, high-risk C&I borrowers for general corporate purposes or to finance highly leveraged transactions like leveraged

buyouts, mergers and acquisitions, restructurings, leveraged recapitalizations, and bankruptcy exits. The two principal financial instruments of the leveraged finance market are HY debt and leveraged loans. As Miller was always fond of noting, the HY debt market, one of the best performing asset classes of all time, is often called the “junk bond” market. HY debt can be issued on a senior secured, senior unsecured, senior subordinated, or subordinated basis. A leveraged loan is a floating-rate C&I loan (usually senior secured) to a below-investment-grade borrower with a credit spread that is about at least two percent above LIBOR.

Figure 2 shows the total issuance of U.S. leveraged loans and HY debt from 1993 through the third quarter (“3Q”) of 2012. In the 1980s and early 1990s, as Miller noted in his article, the dominant source of leveraged financing was the HY debt market. For example, leveraged loans accounted for only 28.1% of the leveraged finance market in 1993. But from 1994 through 2008, the majority of U.S. leveraged financing was provided through the loan market. And from the year after Miller’s article appeared (1999) through 2008, leveraged loans accounted for more than 70% of U.S. leveraged finance.

Leveraged Loan Facilities

In a typical leveraged loan facility, a group of bank lenders (known as a syndicate) provide financing to a corporate borrower through a facility that is designed, structured, and administered by one or more arrangers. The process by which

a newly funded leveraged loan is distributed to non-arranger syndicate members or outside investors is known as syndication.

In a “firm-commitment” syndication, the arrangers guarantee to fund the loan to the borrower on the strength of their balance sheets and *then* syndicate the loan. If syndication is not possible by the closing date, the arrangers generally fund the loan and absorb the unsyndicated portions on their balance sheets (and usually try to sell them again later).⁷ By contrast, in a “best-efforts” syndication the arrangers may either refuse to fund or substantially restructure the deal if their best syndication efforts fail.

A typical leveraged financing package generally contains most or all of the following major components:⁸

First are revolving credit facilities (“revolvers”), which are the corporate equivalents of credit cards. A borrower is charged a commitment fee on the entire amount, but the borrower incurs interest only on actual drawn amounts. Principal can be repaid on revolvers any time and can later be redrawn. Revolvers are usually either senior secured or asset-based lending facilities secured by the borrower’s receivables or inventories.

Second, a senior secured loan with a fixed maturity date (usually six or seven years after closing) with periodic interest payment dates is known as a term loan. Interest on term loans is typically floating-rate based on an interest rate index like LIBOR plus a credit spread that is fixed on the closing date. The proceeds of a term loan are usually drawn on the closing date and can be prepaid without penalty; but unlike revolvers, once a term loan is prepaid the proceeds cannot later be redrawn.⁹

Third, a letter of credit (“L/C”) is a financial guaranty made by a bank on behalf of the corporate borrower that can be pledged to a third party by the borrower as a performance guarantee on an obligation. If the borrower defaults, the obligee may draw down the L/C from the issuing bank to cover its losses. Many typical leveraged loan facilities include a senior secured L/C facility in which the borrower can direct lenders to post L/Cs with the borrower’s obligees.

Fourth, a bridge loan is a relatively short-term facility that is usually intended to provide interim financing for specific transactions like LBOs. Like term loans, bridge loans can typically be drawn only at closing and cannot be redrawn once repaid. Bridge loans often have a year or less to maturity and are intended to be repaid by the proceeds of a subsequent HY bond issue. The terms of a bridge loan usually closely mimic the planned terms of the future HY bond offering. If a bridge loan matures and the borrower has not yet success-

fully issued HY debt, the bridge loan generally converts into a traditional term loan, though often at a penalty rate.

Pro Rata vs. Institutional Leveraged Loan Tranches

In the 1980s and early 1990s, leveraged lending by banks was primarily based on the O&H business model. Most leveraged loans originated by arrangers were syndicated on a pro rata basis. In other words, bank syndicate members agreed to accept a certain proportion of each loan tranche (including proportional interest and principal payments) in return for providing a ratable amount of the funding. The primary components of leveraged loan packages in that era were revolvers, L/C facilities, and Term Loan As (TLAs)—that is, term loans with aggressive principal amortization schedules. Loans distributed to syndicate members are known as “pro rata” tranches.

As bank leveraged loan originators shifted toward the O&D model in the 1990s, syndicate members sold increasingly larger amounts of their loans (or loan participations) to non-bank institutional investors. Such investors are primarily interested in facilities that are fully funded at closing, senior secured, have medium-term maturities, cannot be redrawn if prepaid, and have bullet principal repayments at maturity or minimal amortization. Thus was born the Term Loan B (TLB), which has all of those characteristics.¹⁰ Institutional investors also sometimes invest in bridge loans as well. Together, TLBs and bridge loans syndicated to non-bank investors are known as “institutional” leveraged loans.

The Commoditization of the Leveraged Loan Market

In the 1990s, the leveraged loan market experienced significant increases in standardization and commoditization that fostered growing liquidity and secondary market trading. In 1995, the Loan Syndications and Trading Association (“LSTA”) was formed as a trade association dedicated to advancing the efficiency and liquidity of the floating-rate corporate loan asset class. Some of the significant contributions of the LSTA include the creation of a pricing service for marking secondary loans to market, the development of standardized documentation for loan-related transactions, the promulgation of a Code of Conduct, the creation (with S&P) of the S&P/LSTA Leveraged Loan Index, and successful efforts to facilitate the assignments of CUSIPs to loan tranches.

The commoditization of leveraged loans was also encouraged by the introduction of credit ratings for certain institutional loan tranches. S&P began to rate institutional loan tranches in 1996, and the proportion of leveraged loans rated by the rating agencies has increased steadily since then.

7. Loan commitment letters sometimes contain a material adverse change (“MAC”) clause that lets banks escape their commitment to fund the loan if conditions in the loan syndication market have deteriorated significantly. Such “Market MAC” clauses are distinct from (and less common than) traditional credit MAC clauses that are based on unexpected deteriorations in the financial conditions of borrowers. Unless Market MAC clauses contain precise definitions, however, they often just serve as an invitation for disputes or litigation.

8. See S. Miller, “Basic Loan Structures,” in *The Handbook of Loan Syndications and Trading*, A. Taylor and A. Sansone, eds. (New York: McGraw-Hill, 2007).

9. Some leveraged loan facilities also include a delayed-draw term loan, which is a term loan used to finance acquisitions or asset/equipment purchases (and hence which are often known as acquisition/equipment lines).

10. Leveraged loan facilities may have multiple institutional TLB tranches. In some cases, they are referred to as different numbered tranches of the TLB (e.g., TBL-1, TLB-2, TLB-3), whereas in other facilities they are called TLB, TLC, TLD, etc.

Following the Asian crisis of 1997—again, the focus of Miller’s article—and the Russian ruble crisis of 1998, leveraged loan market participants also began to change the way institutional loans were sold. Prior to 1998, arrangers of leveraged loans engaged in “price talk” with potential investors and then priced the various loan facilities based on a credit spread and fees that arrangers believed would clear the market. If the credit spread was too low, the syndication would be undersubscribed, either leaving arrangers with undesirably large holdings of the loan (firm-commitment syndications) or causing the loan syndication to fail (best-efforts syndications).

Beginning in 1998, loan commitment letters began to include the possibility for arrangers to use “market flex” in loan syndications. In a typical market-flex arrangement, syndicate members may change the credit spread over LIBOR that borrowers will ultimately pay to lenders in response to demand. Usually the amount by which the interest rate can be flexed is defined as a range. “Upward flex” occurs when arrangers receive insufficient interest from investors at the target spread, and “downward flex” occurs when a loan is oversubscribed at the target spread. In addition, standard market-flex language in loan commitment letters also permits arrangers to shift loan amounts between the tranches (say, by reducing the size of the TLB and increasing the size of the TLA).

As a result of all of the above changes to the documentation, syndication, and secondary market trading of leveraged loans, the market experienced a significant increase in secondary market liquidity and standardization starting in the late 1990s. Up to that point, non-bank investors faced significant challenges in becoming lenders to corporations on C&I loans. But as the leveraged loan commoditized, the traditional O&H model rapidly gave way to the O&D model—notably, *without* any involvement of a GSE as happened in the mortgage market. The leveraged loan market thus became increasingly integrated with, and dependent upon, non-bank institutional investors in the shadow banking system.

The Shadow Banking System and Institutional Leveraged Loans

The shadow banking system is depicted graphically in Figure 3. On the right-hand side of the figure in the box labeled “Investors” are the various types of institutions that invest money in products backed by assets originated by banks or non-bank originators. These investors include MMMFs, loan and bond mutual funds, participants in securities lending programs, asset managers, hedge funds, pension plans, insurance companies, and banks or investment banks (acting in their end-user investment capacity).

The financial instruments that connect investors on the right side of Figure 3 with banks on the left side can be distinguished by their maturities. The primary short-term financial instruments of the shadow banking system are repurchase agreements (“repos”), securities loans, and asset-backed commercial paper (ABCP). The primary long-term financial instruments in the shadow banking system are securitized products like ABS and CLOs. The financial instruments and structures that are most relevant to leveraged lending and subprime mortgage origination are discussed briefly in the sections below.

Short-Term Instruments/Structures in the Shadow Banking System

In a typical repo, a bank sells a loan or security for cash and simultaneously agrees to repurchase that asset on a later date.¹¹ Assets used as collateral for repos may include Treasuries, corporate bonds, ABS, or whole loans. The difference between the price at which the asset is initially sold and the fixed price at which the security is later repurchased is the secured borrowing rate paid by the repo borrower.

Repo lenders do not always advance cash in an amount equal to the full value of the underlying collateral. Discounts of cash provided to the value of the collateral pledged (known as “haircuts”) are intended to help lenders cover any unexpected losses they may incur from sales of collateral in the secondary market following a borrower default. Factors that cause lenders to increase repo haircut amounts include volatility and illiquidity of the underlying collateral, heightened uncertainty about the true nature of the collateral risks, and concern that would-be purchasers of the collateral are better informed about the risks of the collateral.¹²

Securities loans are similar to repos in that they involve the sale of a security by its beneficial owner to a counterparty (usually a broker/dealer that needs the security to manage its dealing inventory, market making, or customer activities) with an agreement that the security will later be repurchased by the original owner. Unlike repos, securities loans are generally undated, which means that the security can be sold back to the borrower any time either the borrower or lender wishes.

A third source of short-term financing available to banks through the shadow banking system is ABCP. Commercial paper (CP) is a relatively short-term promissory note that can be issued in maturities of up to 270 days (with an average maturity of about 30 days), and ABCP is the secured segment of the CP market. Whereas unsecured CP is issued directly by borrowers to investors as a recourse debenture, ABCP is issued through the shadow banking system using vehicles known as “conduits.”

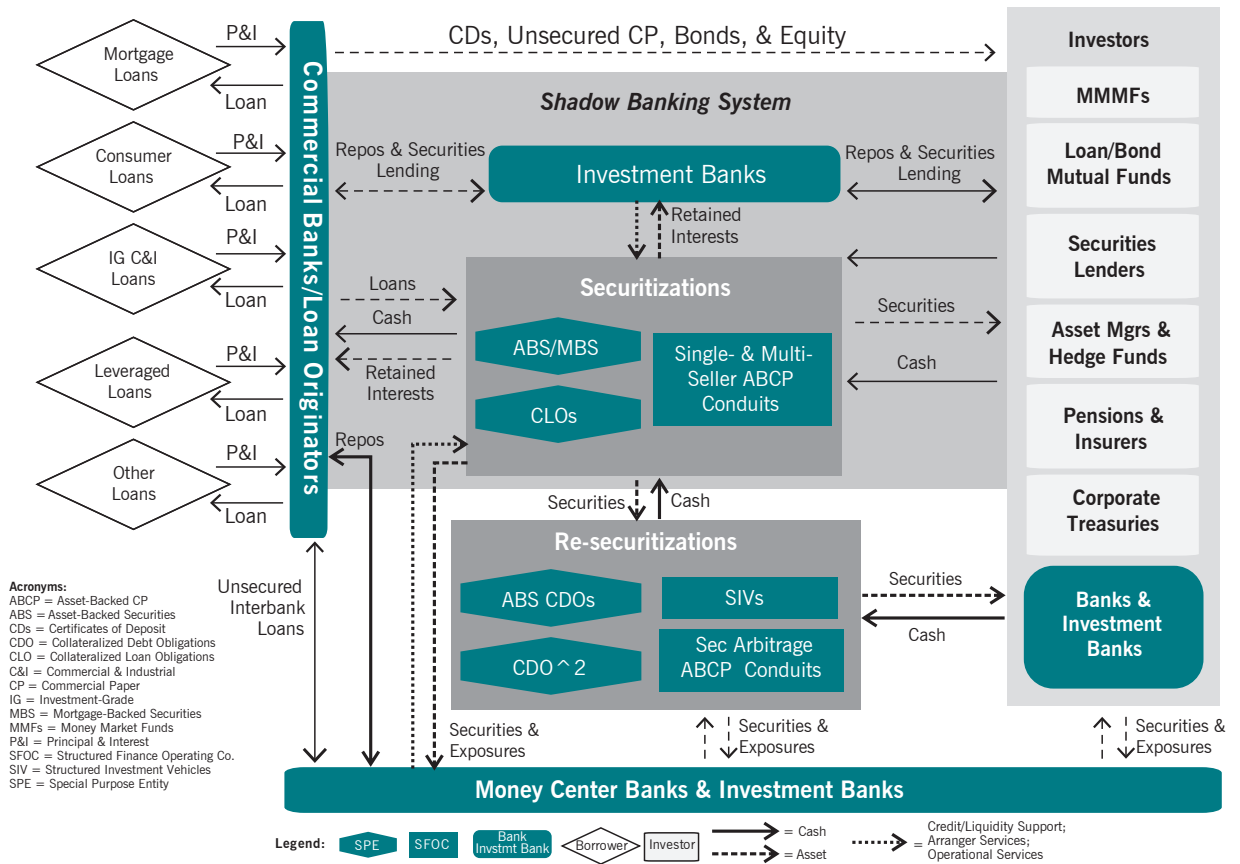
An ABCP conduit is a type of structured finance operating company (SFOC) that issues ABCP to finance the

11. Repos can be bilateral agreements between the borrower and lender or tri-party between borrower, lender, and a clearing bank.

12. See D. Duffie, “The Failure Mechanics of Dealer Banks,” *Journal of Economic Perspectives* Vol. 24, No. 1 (Winter 2010), G. Gorton and A. Metrick, “Haircuts,” *Federal Reserve Bank of St. Louis Review* (November/December 2010), A. Krishnamurthy,

“How Debt Markets Have Malfunctioned in the Crisis,” *Journal of Economic Perspectives* Vol. 24, No. 1 (Winter 2010), and G. Gorton and A. Metrick, “Securitized Banking and the Run on Repo,” *Journal of Financial Economics* Vol. 104 (2012).

Figure 3 The Commercial and Shadow Banking Systems



Notes: (i) Synthetic structures and CDS protection sales are not shown for simplicity; (ii) monolines and credit derivative product companies are not shown for simplicity; (iii) not all types of investors utilize all of the products indicated.

acquisition of assets from one or more originators or lenders. The primary purchasers of ABCP are MMMFs and other mutual funds.¹³ Banks may sell whole loans or other credit-sensitive assets into different types of ABCP conduits. In a multi-seller conduit, multiple institutions sell loans and other assets to the SFOC, which issues ABCP collateralized by the pool of assets purchased from all participating institutions. Multi-seller conduits are typically sponsored by banks, and are usually “fully supported” in the sense that external credit and liquidity guaranties ensure that investors in the ABCP have limited risk exposure to the underlying collateral.

A single-seller conduit, by contrast, is sponsored by one financial institution, and its CP is backed exclusively by credits originated by the sponsor. Single-seller conduits may be fully or partially supported. In the latter case, investors in the ABCP are exposed to some risk of loss if the collateral experiences mark-to-market losses or must be liquidated at

an actual loss to finance CP redemptions.

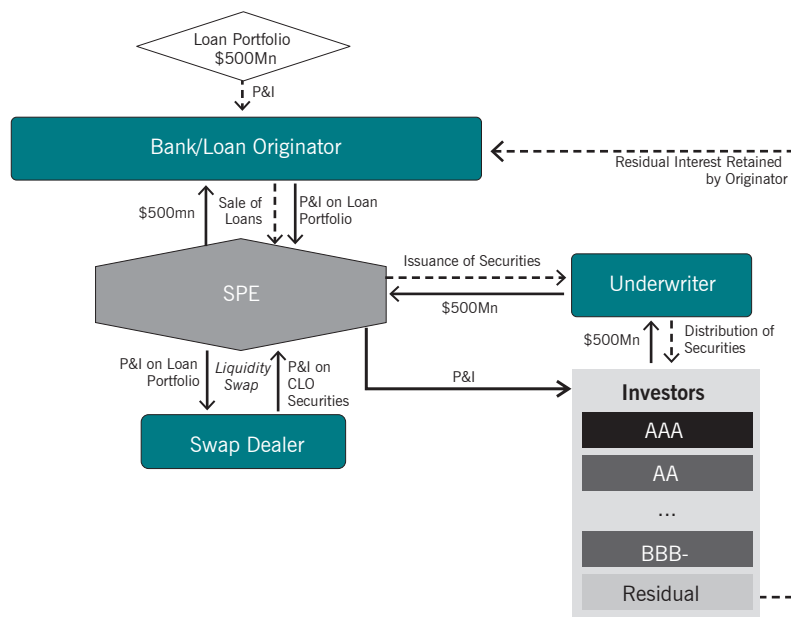
In addition to conduits, Structured Investment Vehicles (SIVs) also issue ABCP. SIVs are also SFOCs (often sponsored by banks) that issue ABCP, term debt, and capital notes to finance the acquisition of bonds in order to try and generate leveraged returns for investors in the SIV securities. Unlike bank-sponsored ABCP conduits, SIVs do not rely on explicit external credit or liquidity support but instead use dynamic asset/liability management to manage their liquidity risks.

Long-Term Instruments/Structures in the Shadow Banking System

Most long-term financing raised by banks and other originators through the shadow banking system is based on the securitization process. Securitizations in which loan or asset originators raise funds and/or manage their credit risks are known as “balance-sheet” securitizations. In a typical

13. M. Kacperczyk and P. Schnabl, “When Safe Proved Risky: Commercial Paper During the Financial Crisis of 2007-2009,” *Journal of Economic Perspectives* Vol. 24, No. 1 (Winter 2010).

Figure 4 Balance-Sheet CLO



balance-sheet securitization, the originator sells loans or loan portfolios to a special-purpose entity (SPE) formed exclusively to facilitate the securitization. Unlike SFOCs, SPEs have finite lives and wind down after the underlying collateral backing the securitization matures.

An SPE raises the funds needed to purchase assets from the sponsor by issuing ABS whose cash flows are backed by the assets being purchased. Popular types of ABS are backed by assets like residential and commercial mortgage loans, auto loans and leases, credit card receivables, and home equity loans. Most ABS structures involve the issuance of multiple classes of debt securities with claims of different priorities on the underlying loan portfolio. Different tranches are exposed to varying degrees of credit risk based on the depth of subordination of the security in the SPE's capital structure. Holders of more junior tranches bear the impact of defaults or declines in value in the underlying mortgages before investors in more senior tranches.

ABS also usually include credit enhancements to protect investors in relatively more senior tranches from losses on the underlying collateral. In addition to subordination, a customary credit enhancement is overcollateralization (O/C)—that is, a cushion between the value of the collateral and the specified values of the ABS tranches. It can be created at the inception of the ABS or built up over time by diverting any surplus income earned on the assets over expenses and interest to senior bond holders (“excess spread”) into a debt service reserve account. Investors in the most senior ABS do not experience losses until losses on the collateral exceed the value of all subordinated tranches *plus* the accumulated O/C

in the debt service reserve account.

Collateralized debt obligations (CDOs) are a particular type of ABS in which an SPE purchases debt using the proceeds from the issuance of securities whose cash flows are collateralized by that debt. CDOs backed primarily by bank loans, bonds, and ABS are known, respectively, as CLOs, collateralized bond obligations (CBOs), and ABS CDOs. ABS CDOs, in turn, are also often characterized as either mezzanine (Mezz) or high-grade (HG), according to whether the collateral underlying the CDO consists mainly of the Mezz or HG tranches of the underlying ABS.

CLOs are often balance-sheet structures in which the SPE issuer acquires the collateral from the originator of the underlying loans. CBOs and ABS CDOs, by contrast, have traditionally been “arbitrage” structures in which collateral managers select bonds to acquire in the open market using funds raised through the issuance of CDO securities in an effort to generate favorable excess spreads for investors in the CDO's subordinated debt and equity tranches.

Figure 4 depicts a typical balance-sheet CLO in which a bank originator sells a \$500 million loan portfolio to a SPE.¹⁴ The SPE issues different classes of securities and raises \$500 million in proceeds, which finances the purchase of the \$500 million loan portfolio from the originator. To manage the liquidity risk arising from any differences in the timing of interest payments on the loans and CLO liabilities, the SPE enters into a swap (below the SPE in Figure 4). The swap does not protect against *credit* losses, but rather provides external liquidity support to address temporary cash shortfalls.

To limit moral hazard and align incentives in balance-sheet CLOs, the originator/sponsor usually retains the residual/equity tranche. If the loan portfolio does not experience significant credit losses, the originator earns the residual income in the structure (excess spread) as a dividend on its retained equity tranche. If the collateral does experience losses, the originator is the first investor to experience those losses. The retention of the residual tranche by the originator in a balance-sheet CLO thus functions as a kind of “deductible” in a credit risk insurance policy.

The O&D Business Model and the Shadow Banking System *Mortgage Banking*

Until the late 1970s and early 1980s, savings institutions and commercial banks were the primary lenders to homeowners and pursued the traditional O&H approach implicit in Miller’s description of commercial banking. Beginning in the late 1970s, mortgage originators began to shift toward the O&D business model in which mortgage bankers underwrote mortgage loans and sold them to one of the housing government-sponsored enterprises (GSEs). The GSEs then bundled those loans into portfolios that could be sold to capital-market participants as Agency mortgage-backed securities that included the GSE credit guaranty in the event of a borrower default.¹⁵ The cash proceeds received by originators through these securitizations were used to finance ongoing long-term loan production.

In the 1980s, a “private-label” mortgage-related ABS market also began to develop in which mortgages ineligible for sale to a GSE were securitized. Those private-label mortgage-related ABS did not include any credit guaranty for investors against the risk of homeowner defaults and were sold primarily to non-bank investors in the shadow banking system.

Both investor expectations and rating agency guidance force mortgage originators to securitize only pools of mortgages that are large and diversified. Until a whole portfolio of loans is ready for securitization, mortgage originators must hold and finance loans awaiting securitization in mortgage “warehouses.”

Commercial banks with access to large pools of core deposits and interbank borrowings can finance mortgage warehouses with their balance sheets. Non-bank mortgage originators, however, relied primarily on ABCP conduits—and in some cases, repos—for short-term warehouse financing

prior to mid-2007. Many of those non-bank originators had dedicated single-seller ABCP conduits, and some larger originators also participated in multi-seller conduits. The reliance on the shadow banking system for warehouse financing, moreover, was not limited to private-label mortgage products. Originators of conforming mortgages eligible for sale to a GSE also relied on ABCP conduits for warehouse financing.

Leveraged Loan Syndicates

Unlike mortgage originators, leveraged loan syndicate underwriters have not historically relied on the short-term financial instruments of the shadow banking system. Individual leveraged loans are syndicated and sold to institutional investors one at a time rather than pooled for a securitization, which means that such loans need not be warehoused by syndicate members.¹⁶ In addition, leveraged loan syndicate members are primarily commercial banks with access to short-term financing through interbank markets and core deposits.

Yet, leveraged loan syndicates rely heavily on the long-term financial instruments within the shadow banking system to sell institutional leveraged loan tranches. As the loan market was commoditizing in the mid-to-late 1990s, the primary institutional buyers of leveraged loans were mutual funds (then known as “prime funds” and now called “loan funds”). By the turn of the century—and thus shortly after Miller wrote his article—the primary source of funds for institutional leveraged loans had shifted away from loan funds toward CLOs.

Figure 5 shows total U.S. leveraged loan issuance from 2002 through 2012. The green bars represent the pro rata portions of new leveraged loan facilities, and the several different shadings of gray distinguish between institutional issuance to refinance existing leveraged loans and issuance intended to fund new extensions of leveraged credit.¹⁷

As can be seen in Figure 5, pro rata lending dominated institutional leveraged lending through 2003. Then from 2004 through Q3 2005, institutional leveraged loan tranches accounted for between 44% and 50% of new leveraged issuance. From 4Q 2005 through the end of 2007, institutional syndications accounted for the majority of new leveraged loan issuance, reaching a peak of \$208.75 billion, or nearly 70% of total issuance, in Q1 2007. From 2005 through 2007, moreover, over half of institutional issuance represented extensions of new credit.

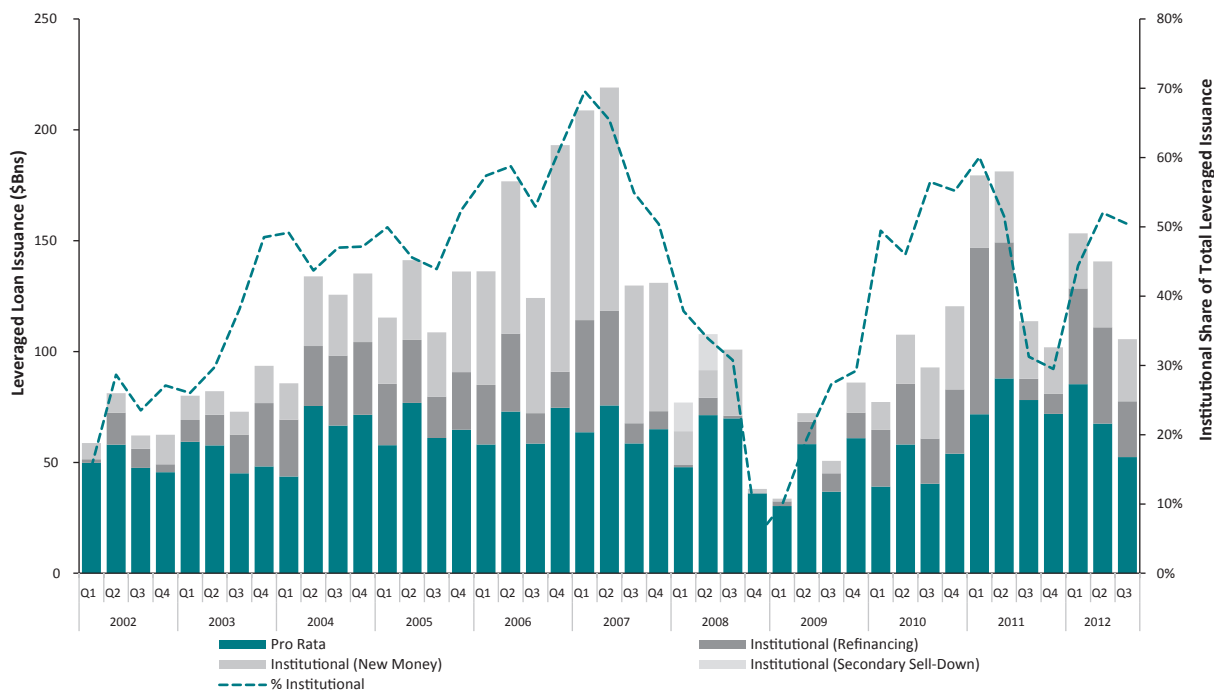
14. The CLO depicted in Figure 4 is a “cash” CLO because the SPE pays cash to acquire the collateral. CLOs may also be “synthetic” in which case the SPE sells credit protection (using credit derivatives) to one or more counterparties on a reference portfolio. The proceeds of the CLO securities issuance are pledged to the credit derivatives counterparties as collateral. Like cash CLOs, synthetic structures provide investors with exposures that are virtually equivalent economically to cash structures (assuming an identical reference collateral pool) and help originators manage their credit risks and regulatory capital requirements. Unlike cash CLOs, synthetic CLOs do not enable originators to raise new funds. As such, I do not separately discuss synthetic structures in this article.

15. See, for example, R. K. Green and S. M. Wachter, “The American Mortgage in Historical and International Context,” *Journal of Economic Perspectives* Vol. 19, No. 4 (Fall 2005), and T. Adrian and H. S. Shin, “The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09,” *Federal Reserve Bank of New York Staff Report No. 439* (March 2010).

16. Bank syndicate members are also often CLO arrangers. Unlike primary leveraged loans, cash CLOs do require warehouse financing during their ramp-up periods, and arrangers may rely on the short-term instruments within the shadow banking system for that purpose.

17. The third type of institutional loan shown in Figure 5, “secondary sell-downs,” is discussed later.

Figure 5 Total Leveraged Loan Issuance, 2002-2012



Source: Thomson Reuters LPC

Figure 6 shows the flows of funds for CLOs and loan funds from 2005 through Q3 2012. From 2005 through Q3 2007, net cash flows into loan funds totaled about \$16 billion, as compared to \$226 billion in new cumulative CLO issuance during the same period. In 2007, before the outbreak of the credit crisis, CLOs accounted for as much as 70% of institutional leveraged loan purchases.

When viewed together, Figures 5 and 6 show the important role played by non-bank investors in financing U.S. leveraged loans through the shadow banking system. Particularly striking is the pattern evident in Figure 5 that shows pro rata leveraged lending covering what might be viewed as “core” leveraged loan demand while institutional leveraged lending provides the marginal additional capital that helps explain the broad variations in the availability of leveraged credit (both expansions and contractions). We come back to this idea later.

Price Discovery and the Shadow Banking System

The shadow banking system also serves as an important disciplining mechanism on the relatively more opaque commercial banking system. Despite being called the “shadow” banking system, many of the transactions (thought admittedly not all) in this system are more transparent than corresponding financial products in the classical banking system. As such, shadow

banking products and markets can serve a valuable function in providing price discovery for the values of assets and liabilities.

For example, before the introduction of the ABX index of shadow banking home equity-based subprime ABS deals, there was essentially no good price discovery mechanism for U.S. subprime ABS. Indeed, some have argued that the introduction of the ABX is one of the factors that led to the bursting of the so-called subprime housing bubble—that is, before the ABX there was no good aggregator of market participants’ sentiments about mortgage ABS values.¹⁸

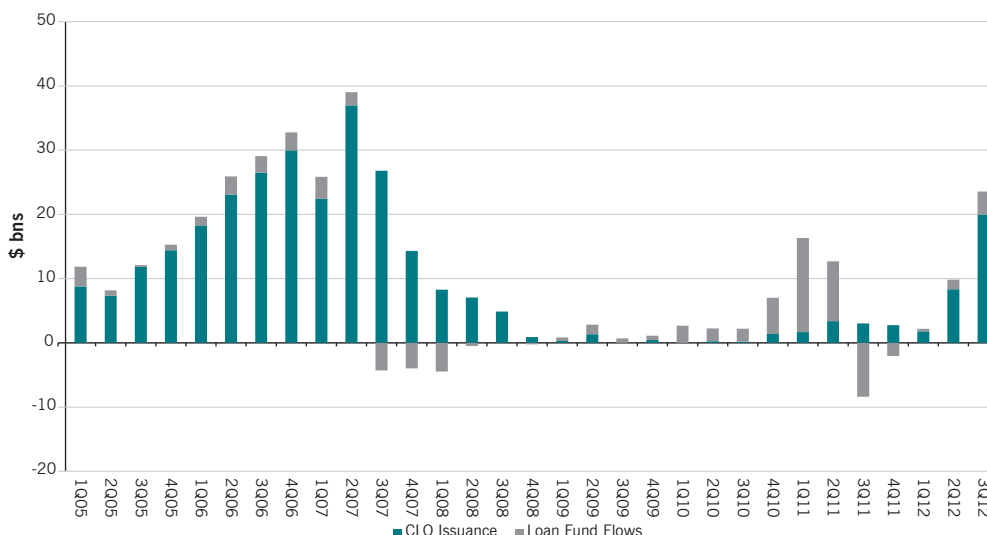
Similarly, the commoditization of the syndicated loan market through the expanded participation of institutional loan market participants gave rise to leveraged loan indices like the SMi-100, the S&P/LSTA leveraged loan index, and Markit’s measures of loan credit default swap spreads via the LCDX and LevX.

Foundations of the Credit Crisis

In his article on the Asian crisis of 1997, Miller identified the origin of the crisis as the Japanese banking system. Specifically, Miller noted that Japanese banks in the 1990s had difficulties maintaining adequate capitalization as a result of losses from three sources: the sustained and dramatic fall in the 1990s of Japanese stock prices; the decline in Japanese real estate prices; and the poor performance of Japanese

18. See Gorton, *op. cit.*

Figure 6 U.S. CLO Issuance and Retail Loan Fund Flows, 2005-2012 Q3



Source: Thomson Reuters LPC.

C&I loans to businesses (which Miller considered the “most devastating blow to bank capital”). Japanese banks were overextended in all three of these areas, which made them especially vulnerable to the downturns that occurred.

The response of the Japanese Ministry of Finance to the growing undercapitalization of Japanese banks was to lower short-term interest rates in an effort to boost Japanese banks’ net interest income to help them absorb accumulating losses and write off bad debts. As a consequence, the value of the dollar surged vis-à-vis the yen, which precipitated a contagion throughout many Southeast Asian countries. Indonesia, Malaysia, South Korea, and Thailand all began to experience exchange rate crises, liquidity shocks and bank runs, and economic downturns.

As in the case of the Asian crisis, the root causes of the global credit crisis that began a decade later in 2007 lay within the banking system. But if the two episodes have that basic similarity, the proximate causes of the 2007 crisis differed in some important ways.

Macroeconomic Foundations of the 2007 Crisis

The period from 2001 through 2004 was a time of significant monetary easing and relatively low interest rates, which are historically associated with expansions in lending and credit and rising asset prices, particularly real estate.¹⁹ Not surpris-

ingly, the low interest rate environment from 2001 through 2004 was accompanied by expansions of credit, especially mortgage and leveraged loans, and rising housing prices.²⁰

The Fed did not begin to raise target interest rates until June 2004, at which point it continued to increase rates periodically until August 2006. Despite the Fed’s tightening from 2004 to 2006, those rate increases have been viewed by many as being too little and too late.²¹ The rate increases between 2004 and 2006 proved inadequate to stop the expansion of credit. Non-financial sector credit grew at a quarterly average of 7.4% on a year-over-year basis from Q1 2001 (when the Fed began to ease) through Q2 2004 (when the Fed began to tighten). But from Q3 2004 through Q3 2006, non-financial credit grew by an even higher average of 9.5% per quarter on a year-over-year basis—that is, despite the Fed’s tightening, credit continued to expand.

The international balance of payments situation leading up to the outbreak of the crisis in mid-2007 also put significant upward pressure on U.S. asset and credit markets and helps explain why credit continued to expand even after the Fed began to tighten its monetary belt.²² The U.S. current account deficit grew from \$414 billion in 2000 to \$811.5 billion in 2006. Over the same period, current account surpluses grew significantly in many emerging-market economies, Japan, and, especially of course, China. As a result of

19. See, for example, C. Borio, C. Furfine, and P. Lowe, “Procyclicality of the Financial System and Financial Stability: Issues and Policy Options,” in *BIS Papers No. 1: Marrying the Macro- and Micro prudential Dimensions of Financial Stability* (March 2001), C. Borio and P. Lowe, “Asset Prices, Financial and Monetary Stability: Exploring the Nexus,” *BIS Working Papers No. 114* (July 2002), J. B. Taylor, “Economic Policy and the Financial Crisis: An Empirical Analysis of What Went Wrong,” *Critical Review* Vol. 21, Nos. 2-3 (2009), and R. Ahrend, “Monetary Ease: A Factor Behind Financial Crises? Some Evidence from OECD Countries,” *Economics* Vol. 4 (April 14, 2010).

20. See, for example, L. H. White, “Federal Reserve Policy and the Housing Bubble,” *Cato Journal* Vol. 29, No. 1 (Winter 2009), and G. Gorton and A. Metrick, “Getting Up to Speed on the Financial Crisis: A One-Weekend-Reader’s Guide,” *Journal of Economic Literature* Vol. 50, No. 1 (2012) (and the references cited therein).

21. See, for example, Taylor, *op. cit.*

22. See generally C. M. Reinhart and K. S. Rogoff, “Is the 2007 U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison,” *American Economic Review* Vol. 98, No. 2 (May 2008).

significant increases in savings relative to investment in those countries, they become major net lenders to global capital markets.²³

The global excess of savings vis-à-vis investment caused real interest rates to decline steadily in much of the world from 1996 to 2004. In countries with surplus investable funds, U.S. investments became relatively more attractive. By 2006, U.S. external borrowing had risen to 6% of GDP. The demand by foreign investors to hold relatively safe U.S. Treasury and Agency securities was especially pronounced.²⁴

Significant capital inflows and low real (and nominal) interest rates can have several impacts on the availability of credit and asset prices. Low nominal interest rates, for example, reduce borrowing costs for banks and other lenders and thus enable them to finance more loans at a lower cost of funds. And low loan rates lead to increased demand for mortgage loans, which in turn can increase the demand for housing and put upward pressure on housing prices.²⁵

The Relaxation of Mortgage Underwriting Standards

Until the onset of the recent crisis, U.S. housing prices (on a national basis) had experienced a period of largely consistent and sustained growth since the end of WWII. That gave (false) comfort to many homeowners and investors that there was no such thing as negative equity in a leveraged residential real estate purchase.

The appreciation in housing prices also made home ownership relatively less affordable to many Americans. As housing prices rose, new products were developed that increased access to mortgage credit, especially for borrowers with relatively lower credit quality. Mortgage loans are generally classified as being relatively high-risk (subprime), low-risk (prime), or in between (Alt-A). Starting around 2003, subprime and Alt-A mortgage issuances began to rise significantly both in dollar terms and as a proportion of total mortgage loan originations. And subprime lending

grew significantly from 2002 through 2005, despite a relative decline in income growth by borrowers.²⁶

The wider availability of more affordable mortgage products increased the demand for home purchases and fueled a further increase in housing prices. Increases in housing prices also facilitated additional extensions of mortgage credit through home equity loans and related products.²⁷ Private-label issuance of mortgage-related ABS grew significantly from 2004 through 2006 based on the O&D business model adopted by most mortgage bankers.

A relaxation of lending standards is the historical norm during periods of low interest rates, loose monetary policies, expanding credit, and rising asset prices.²⁸ So, not surprisingly, many mortgage bankers relaxed (at least some aspects of) their loan underwriting standards in the years leading up to the 2007 credit crisis.^{29,30}

But if such macroeconomic factors fueled demand for mortgage-related ABS, those factors cannot fully explain the substantial rise in U.S. housing prices or the relative increase in higher-risk loan production that occurred in the period from 2001 through 2006.³¹ The unusually large increase in home prices and shift in mortgage underwriting toward riskier borrowers was also in part—if not indeed primarily—the result of decades of political and social policies promulgated by the U.S. Congress and federal agencies with the aim of expanding mortgage lending to low-income, higher-risk borrowers.³²

The Relaxation of Syndicated Leveraged C&I Loan Underwriting Standards

Default rates on leveraged loans and HY debt in 2007 were 0.2% and 0.4%, respectively, as compared to average default rates from 1998 through 2006 of 3.8% and 3.5%. Indeed, default rates on U.S. leveraged debt were lower in 2007 than in any previous year (dating back to 1982 for HY debt and to 1998 for leveraged loans). From 2004 through 2006, more-

23. B. S. Bernanke, "The Global Saving Glut and the U.S. Current Account Deficit," *Remarks at the Sandridge Lecture, Virginia Association of Economists* (March 10, 2005), B. S. Bernanke, "Global Imbalances: Recent Developments and Prospects," *Speech at the Bundesbank Lecture* (September 11, 2007), M. Obstfeld and K. Rogoff, "Global Imbalances and the Financial Crisis: Products of Common Causes," *Paper Prepared for the Federal Reserve Bank of San Francisco Asia Economic Policy Conference* (October 2009), A. Greenspan, "The Crisis," *Brookings Papers on Economic Activity* (Spring 2010), and H. Mees, "Changing Fortunes: How China's Boom Caused the Financial Crisis," *Ph.D. Dissertation, Erasmus University* (August 28, 2012).

24. See Z. Poszar, "Institutional Cash Pools and the Triffin Dilemma of the U.S. Banking System," *International Monetary Fund Working Paper WP/11/190* (August 2011), and Gorton and Metrick (2012), *op. cit.*

25. The empirical evidence confirms that significant capital inflows and low interest rates are historically associated with substantial increases in housing prices. See, for example, C. M. Reinhart and V. R. Reinhart, "Capital Flow Bonanzas: An Encompassing View of the Past and Present," *NBER Working Paper 14321* (September 2008), J. Aizenman and Y. Jinjarak, "Current Account Patterns and National Real Estate Markets," *Journal of Urban Economics* Vol. 66 (2009), and Obstfeld and Rogoff, *op. cit.*

26. A. Mian and A. Sufi, "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis," *Quarterly Journal of Economics* Vol. 124, No. 4 (2009).

27. A. Mian and A. Sufi, "House Prices, Home Equity-Based Borrowing, and the U.S. Household Leverage Crisis," *American Economic Review* Vol. 101, No. 5 (August 2011).

28. See, for example, G. B. Gorton and P. He, "Bank Credit Cycles," *Review of Economic Studies* Vol. 75, No. 4 (2008) (and the references cited therein), and R. E. Hall, "The Long Slump," *American Economic Review* Vol. 101 (April 2011).

29. See, for example, C. Mayer, K. Pence, and S. M. Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives* Vol. 23, No. 1 (Winter 2009), and Y. Demmyanyk and O. Van Hemert, "Understanding the Subprime Mortgage Crisis," *Review of Financial Studies* Vol. 24, No. 6 (2011). Note, however, that some research also indicates that even if subprime underwriting standards were relaxed along some dimensions from 2004 through 2007, such standards were tightened along other dimensions. See G. Bhardwaj and R. Sengupta, "Where's the Smoking Gun? A Study of Underwriting Standards for U.S. Subprime Mortgages," *Federal Reserve Bank of St. Louis Working Paper No. 2008-36B* (May 2009).

30. Looser loan underwriting standards are not a priori "bad."

31. P. J. Wallison, "Three Narratives About the Financial Crisis," *Cato Journal* Vol. 29, No. 1 (Winter 2009).

32. An in-depth discussion of these policies is beyond the scope of this article, but interested readers should see the comprehensive analysis in P. J. Wallison, "Dissent from the Majority Report of the Financial Crisis Inquiry Commission," *The Financial Crisis Inquiry Report* (January 2011). See also E. J. Pinto, "Government Housing Policies in the Lead-up to the Financial Crisis: A Forensic Study," *American Enterprise Institute Discussion Draft* (February 5, 2011).

Table 1 Risk Characteristics of U.S. Leveraged Loans

	2003-2005	2006-2007	2008-2009	2010-2012 Q3
Panel (a): Responses to OCC Surveys of Senior Credit Officers				
Eased Underwriting Standards ^a	16%	64%	10%	25%
Increased Loan Portfolio Risk ^b	15%	65%	84%	44%
Panel (b): Maximum Leverage Covenants				
Avg Max Debt:EBITDA Covenant ^c	4.65	5.01	3.95	4.52
Panel (c): New Low-Rated Issuance				
HY Debt ^d	16%	29%	18%	18%
Leveraged Loans ^d	2%	5%	5%	1%

^a: Percentage of respondents reporting that U.S. C&I leveraged loan underwriting standards were eased ^b: Percentage of respondents reporting that U.S. C&I leveraged loan portfolio risks were increasing ^c: Average value of maximum Debt:EBITDA covenant (x:1) ^d: “Low-rated” is defined as Split B or lower (i.e., all bonds rated CCC or below and bonds for which at least one rating agency has assigned a rating of B)

Sources: Thomson Reuters LPC; J.P. Morgan; OCC

over, recovery rates were also relatively high on senior secured HY debt and first-lien leveraged loans.

Despite relatively low default and high recovery rates, the U.S. leveraged finance market during the two years preceding the outbreak of the crisis was—like the subprime mortgage market—starting to show significant signs of increased risks in new loan production.

Underwriting Standards, Covenants, and Low-Rated Issuance

One gauge of the relative risks of U.S. leveraged loans is the survey of senior loan officers at nationally chartered banks conducted annually by the U.S. Office of the Comptroller of the Currency (OCC).³³ As shown in Panel (a) of Table 1, 64% of the respondents to the OCC survey in 2006 through 2007 (on average) reported easing their leveraged loan underwriting standards (as compared to only 16% of respondents on average indicating easier leveraged loan underwriting standards during the 2003-2005 period).

The OCC survey also asks banks to note any changes in the relative risks of their U.S. leveraged loan portfolios from the previous year. Banks’ average responses to that question (see Table 1, Panel (a)) indicate increasing risks in the 2006 and 2007 pre-crisis period. For example, 65% of the respondents indicated higher risks in their leveraged loan portfolios in 2006-2007, as compared to the 15% of respondents that believed their leveraged loans were riskier on average in 2003-2005.

The risk of leveraged loans is also indicated by the constraints reflected in certain leveraged-loan covenants. In particular, a borrower’s maximum leverage is generally defined by a maximum ratio of total debt to EBITDA. As reported

in Panel (b) of Table 1, from 2003 through 2005 the average maximum Debt:EBITDA covenant was 4.65:1. In 2006 and 2007, that leverage restriction rose to 5.01:1 on average.

Market participants also consider increases in low-rated leveraged debt issuance to be a leading indicator of default risk. Panel (c) of Table 1 shows that low-rated HY bond and leveraged loan issuance (as a proportion of total issuance) was significantly higher in the 2006-2007 period than in the 2003-2005 period. In particular, low-rated institutional leveraged loan and HY bond issuance rose dramatically in 2007. As a proportion of total institutional leveraged-loan and HY issuance, low-rated leveraged loan and HY debt issuance rose to 6.2% and 36%, respectively, from their 2006 values of 2.9% and 21%.³⁴

Borrower-Friendly Leveraged Debt Issuance

Also notable in 2006 and 2007 was a surge in the issuance of two kinds of leveraged loans with terms that, while providing flexibility to borrowers, exposed lenders and investors to relatively higher risks (and paid higher spreads in return). Especially prominent among such “borrower-friendly” leveraged loans were loans with few or no financial covenants (covenant-lite or “cov-lite” loans) and second-lien tranches. Cov-lite loans were popular with CLOs because of the higher expected returns that were commensurate with their relatively higher risks (for a given credit rating).³⁵ Although cov-lite loans accounted for a negligible portion of institutional issuance prior to 2006, as shown in Figure 7, cov-lite leveraged loans accounted for 7.5% of institutional issuance in 2006, and as much as a third of institutional volume in the first half of 2007.

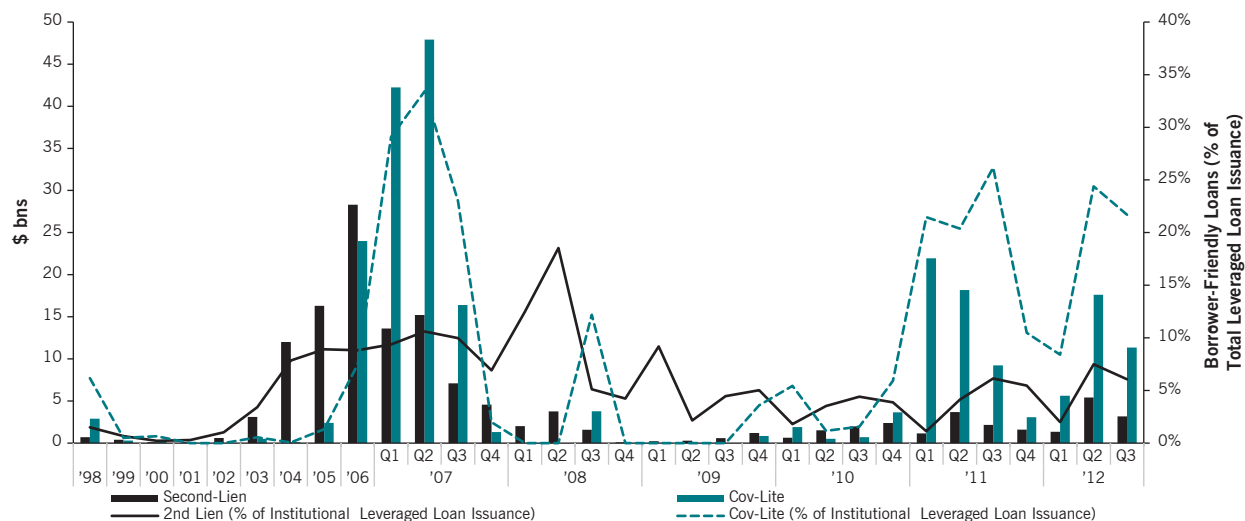
Second-lien loans, also popular with CLOs, emerged around 1997 as a kind of rescue financing for companies

33. The Federal Reserve conducts a similar survey on a quarterly basis. The results are broadly consistent with the OCC survey results discussed here.

34. J.P. Morgan, “Default Monitor,” *Global High Yield and Leveraged Loan Research* (November 1, 2012).

35. Fitch Ratings, “CLOs More Concentrated in Shareholder-Friendly and Covenant Light Loans,” *Credit Market Research* (December 21, 2006).

Figure 7 **Borrower-Friendly Leveraged Loan Issuance, 1998-2012 Q3**



Sources: Thomson Reuters LPC; J.P. Morgan

with limited access to traditional senior secured first-lien loans. In the event of a borrower default, second-lien loans are paid *after* all first-lien loans on the same collateral are fully repaid but *before* any payments on subordinated obligations, thereby making them riskier than typical senior secured first-lien leveraged loans but less risky than most HY bonds. As can also be seen in Figure 7, second-lien leveraged loans rose steadily from about 2002 on as a proportion of institutional leveraged issuance, and reached a peak of 10.6% in the middle of 2007.

Together, cov-lite and second-lien leveraged loans accounted for 38.5% of institutional issuance in Q1 2007 and 44.0% in Q2 2007. What's more, from January through the end of June of 2007, about 20% of all cov-lite issuance was also second-lien.³⁶ In other words, by the middle of 2007, a relatively large proportion of institutional loans to be syndicated were relatively high-risk, borrower-friendly loans.

Low Credit Spreads and the Demand for Structured Products

Credit spreads on both short- and long-term debt declined to relatively low levels in the 2002 through mid-2007 period, indicating that investors demanded very little compensation for investing in riskier debt. Whereas low interest rates are generally associated with expansions of credit generally, low credit spreads encourage borrowing by relatively higher-risk borrowers in particular.

Low interest rates and credit spreads can also increase risk taking by banks and other investors. When such investors (including many foreign investors) could not achieve their desired yield targets using traditional debt instruments during this period, they began to look increasingly toward structured credit products in which financial assets were repackaged to engineer higher yields (while, of course, creating the greater risk that comes with such yields).³⁷

Subprime mortgage-based financial instruments were popular sources of collateral for structured products sought by investors seeking to meet yield and asset-class allocation targets from 2001 to early 2007.³⁸ Some investors obtained mortgage exposures directly through subprime-based ABS, whereas others sought securities based *indirectly* on mortgage loans with different risk/return profiles than those available through existing ABS offerings. To accommodate that demand, banks offered new investments based on ABS themselves, including Mezz and HG ABS CDOs and SIVs.³⁹ In addition to mortgage-based structured products, investor demand for CLOs backed by leveraged loans, and CDOs backed by HY bonds, also surged in 2005 and 2006.

Table 2 shows credit spreads for CDOs based on HY bonds and Mezz ABS, CLOs collateralized by leveraged loans, ABS backed by subprime home equity loans and credit cards, and corporate debt in October 2006. Spreads on HY bond and Mezz ABS CDO and CLO tranches were

36. Standard & Poor's, "The Leveraging of America: Covenant-Lite Loan Structures Diminish Recovery Prospects," *S&P RatingsDirect* (July 18, 2007).

37. See, for example, M. G. Crouhy, R. A. Jarrow, and S. M. Turnbull, "The Subprime Credit Crisis of 2007," *Journal of Derivatives* Vol. 16, No. 1 (Fall 2008).

38. See, for example, Greenspan, *op. cit.*

39. The demand for products like ABS CDOs, SIVs, and ABCP was also fueled by large banks seeking to optimize their mortgage-related investment returns relative to regulatory capital requirements. See, for example, I. Erel, T. Nadauld, and R. Stulz, "Why Did U.S. Banks Invest in Highly-Rated Securitization Tranches?" The Ohio State University Fisher College of Business, Charles A. Dice Center for Research in Financial Economics Working Paper 2011-16 (April 2012).

Table 2 Selected Credit Spreads Over 3-month LIBOR in October 2006

	Tranche Credit Rating			
	AAA	AA	A	BBB
HY Bond CDO ^a	53	90	150	300
Mezz ABS CDO ^a	31	52	140	325
Leveraged Loan CLO ^a	24	39	70	145
ABS (Subprime Home Equity Loan) ^{b,e}	11	12	47	115
ABS (Credit Card) ^{c,f}	3	-	24	38
Corporate Bonds ^{d,f}	15	21	40	79

Sources: ^a: Bear Stearns, *CDO Perspectives* (November 2006) ^b: Markit Group ^c: Barclays ^d: Bloomberg (reporting Merrill Lynch U.S. corporate bond index values)

Notes: ^e: Based on ABX index (06-1 vintage) ^f: Asset swap spreads

significantly higher than both ABS and corporate credit spreads, which helps explain the relatively strong demand for those structured products leading up to the crisis.

To CLO investors seeking relatively high spreads on loan collateral, the higher spreads on borrower-friendly leveraged loans made such loans especially attractive. Indeed, in June 2007, S&P warned that the cov-lite “juggernaut” was increasing risks within CLOs.⁴⁰ But even more dramatic was the sharp increase in the issuance of “Other CDOs” in 2006 and through the middle of 2007 (which can be seen in Figure 8). That increase, which reflects mainly the surge in ABS CDO issuance, demonstrates the strong appeal of such products until the first indications of certain previously unrecognized risks began to materialize.

Subprime and Leveraged Loan Markets in 2007 The Subprime Mortgage Market

Market participants began to recognize mounting pressures on the U.S. subprime mortgage market as early as 2005.⁴¹ A report issued on November 30, 2005 by S&P described 2005 as “the year of ‘warnings’ for the mortgage sector.”⁴² Yet, the historical trend of long and stable house price appreciation evidently lulled many market participants into perceiving

little (if any) risk of a decline in the rate of house price appreciation.⁴³

When house price appreciation began to slow in 2006, subprime mortgage delinquencies and foreclosures rose and mortgage lenders started to realize losses.⁴⁴ In late 2006, the price of the BBB- tranche of the ABX index began to decline (see Figure 1). Although market participants recognized the growing instability in the subprime loan market, these developments did not significantly affect subprime-backed ABS prices until February 2007, when price declines in the BBB- ABX tranche suddenly accelerated.⁴⁵ Subordinated tranches of Mezz ABS CDOs also began to experience price declines at that time.

Following their initial declines in February 2007, market prices stabilized for the low-rated tranches in many subprime ABS and Mezz ABS CDO.⁴⁶ Yet, adverse market developments continued, and in late May 2007 subprime ABS prices began to decline again.⁴⁷ Throughout June and July 2007, subprime ABS prices tumbled as one piece of bad news followed another and rating agencies began more aggressively to downgrade lower-rated tranches of mortgage ABS and ABS CDOs. By July 2007 even the AAA tranche of the ABX index—which is based on the highest-rated, lowest-risk tranches of subprime ABS—had fallen appreciably below its par value (Figure 1).

40. Standard & Poor’s, “The Covenant-Lite Juggernaut is Raising CLO Risks – And Standard & Poor’s is Responding,” *S&P RatingsDirect* (June 12, 2007).

41. There was discussion of a possible “bubble” in housing prices even earlier than 2005, but those discussions were generally at a broad macroeconomic level and did not focus on subprime lending or securitized product markets. See, for example, K. E. Case and R. J. Shiller, “Is There a Bubble in the Housing Market?” *Brookings Papers on Economic Activity* No. 2 (2003).

42. Standard & Poor’s, “U.S. Mortgage Industry Outlook 2006: Banks Facing Higher But Manageable Credit Risk Challenges,” *RatingsDirect* (November 30, 2005).

43. See, for example, K. S. Gerardi, A. Lehnert, S. M. Sherland, and P. S. Willen, “Making Sense of the Subprime Crisis,” *Federal Reserve Bank of Atlanta Working Paper 2009-2* (February 2009), K. S. Gerardi, C. L. Foote, and P. S. Willen, “Reasonable People Did Disagree: Optimism and Pessimism About the U.S. Housing Market Before the Crash,” *Federal Reserve Bank of Boston Public Policy Discussion Paper No. 10-5* (September 2010), W. N. Goetzmann, L. Peng, and J. Yen, “The Subprime Crisis and House Price Appreciation,” *Journal of Real Estate Finance and Economics* Vol. 44, No. 1 (2012), and R. Jagannathan, M. Kapoor, and E. Schaumburg, “Causes of the Great Recession of 2007-9: The Financial Crisis was the Symptom not the Disease!” *Journal of Financial Intermediation* (2012).

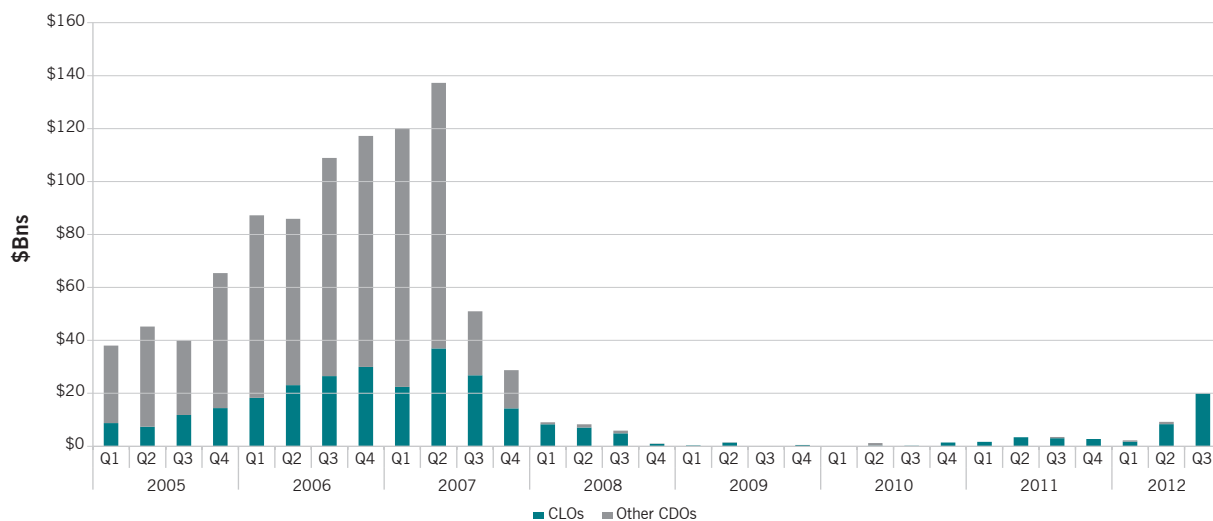
44. The rating agencies began to issue warnings in late 2006 about the risks of certain mortgage-related ABS in the event that borrowers faced further payment increases in 2007. See, for example, Standard & Poor’s, “U.S. Mortgage Banking Outlook 2007: Navigating Through Correcting Housing Markets,” *RatingsDirect* (November 1, 2006), and Fitch Ratings, “2007 Global Structured Finance Outlook: Economic and Sector-by-Sector Analysis,” *Credit Policy Special Report* (December 11, 2006).

45. The beginning of the February 2007 price decline was coincident with two announcements on February 7, 2007: (1) large subprime mortgage underwriter New Century Financial announced a restatement of its financial results for three quarters of 2006 to correct errors in its accounting for loan repurchase losses that reflected higher realized losses; and (2) HSBC announced that its year-end 2006 loan impairment provisions would be higher than expected. HSBC fired its U.S. head of subprime mortgage lending on February 22, 2007, after losses reached \$10.5 billion.

46. Although this period of price stability in the subordinated ABX tranches was short-lived, many market participants perceived the subprime sell-off to have subsided and the problems of that sector to be contained at that time. See, for example, C. Borio, “The Financial Turmoil of 2007-: A Preliminary Assessment and Some Policy Considerations,” *BIS Working Papers No. 251* (March 2008).

47. M. K. Brunnermeier, “Deciphering the Liquidity and Credit Crunch of 2007-2008,” *Journal of Economic Perspectives* Vol. 23, No. 1 (Winter 2009).

Figure 8 U.S. CDO & CLO Issuance, 2005-2012 Q3



Source: Thomson Reuters LPC; Note: "U.S. issuance" includes Cayman Islands issuance

By late July 2007, trading in subprime ABS and Mezz ABS CDO markets had nearly ground to a halt. With so little trading activity and liquidity, market participants faced significant challenges to determine the actual values of their ABS investments. Making matters worse, investors were beginning to sell distressed subprime securities at fire-sale prices to generate cash, leading many to question whether current mark-to-market prices reflected real fundamental values or merely depressed fire-sale prices.⁴⁸

The U.S. Leveraged Loan Market

In contrast to the subprime ABS market, the first half of 2007 was a period of relative calm and stability in U.S. leveraged finance markets. In the summer of 2007, when the subprime ABS markets began to fall apart, however, the U.S. leveraged loan market was vulnerable in terms of both supply and demand. The shock to the leveraged loan market did not emanate inside the leveraged loan market itself—higher leveraged loan default rates did not materialize until 2009, after all—but the disruptions in the subprime market were enough to topple the leveraged loan market.

U.S. Leveraged Loan Supply in 2007

By the end of July 2007, commitments made by global banks to fund new U.S. leveraged loans had reached staggering levels. Loans in the pipeline for future financing and syndica-

tion (known as the forward calendar) stood at \$251.5 billion, of which \$128 billion (just over half) represented institutional tranches.

As discussed earlier, U.S. leveraged loans had become riskier for investors on average through mid-2007, thanks to a relaxation in covenants and the proliferation of borrower-friendly loans. And a significant amount of leveraged loans issued in 2006 and the first half of 2007 were intended to finance the burst of LBO activity in those years. Sponsored LBO issuance grew fairly steadily from 2004 through the first half of 2007. In Q2 2007, sponsored LBO loans accounted for about a fourth of total leveraged loan issuance, and in Q3 2007 sponsored LBO loans—all legacy deals from before the crisis outbreak—represented nearly half of total leveraged loan market volume.

Table 3 summarizes the average Debt: EBITDA ratios and average equity contributions of sponsored U.S. LBOs that closed in the period from 2003 through the Q3 2012. As reported in the table, the average equity contribution in sponsored LBOs from 2003 through 2007 was fairly stable at around 33%. The average leverage of U.S. sponsored LBOs, however, rose steadily from 2003 to 2007, and reached a peak of over 7:1 in 2007.

Many of the LBO loans on the forward calendar in mid-2007, moreover, were "Jumbo" loans (\$5 billion or higher) for which banks had signed commitment letters but

48. For good discussions of liquidity crises, forced asset liquidations, and fire-sale prices written in the aftermath of the recent crisis, see especially M. K. Brunnermeier and L. H. Pedersen, "Market Liquidity and Funding Liquidity," *Review of Financial Studies* Vol. 22, No. 6 (2009), C. Smithson, "Valuing 'Hard-to-Value' Assets and Liabilities: Notes on Valuing Structured Credit Products," *Journal of Applied Finance* Nos. 1 & 2

(2009), A. Shleifer and R. Vishny, "Fire Sales in Finance and Macroeconomics," *Journal of Economic Perspectives* Vol. 25, No. 1 (Winter 2011), and D. W. Diamond and R. G. Rajan, "Fear of Fire Sales, Illiquidity Seeking, and Credit Freezes," *Quarterly Journal of Economics* Vol. 126, No. 2 (May 2011).

Table 3 **Risk Characteristics of U.S. Sponsored LBOs, 2003 – 2012 Q3**

	Average Debt: EBITDA Ratio (x:1)	Average Equity Contribution
2003 – 2005	4.64	34%
2006 – 2007	5.40	32%
2008 – 2009	4.14	47%
2010 – 2012 Q3	4.65	43%

Source: Thomson Reuters LPC

that had not yet been syndicated. From 1985 through 2007, the average size of the largest U.S. leveraged loan deal closed in each quarter was \$5.1 billion. Even during the LBO boom of 2006 and the first half of 2007, the average maximum deal size per quarter was just over \$13 billion. But as of June 2007, several LBO loans on the forward calendar greatly exceeded those amounts. Among the loans were those for TXU Corp. (\$35.75 billion), BCE Inc. (\$23.05 billion), Lyondell Basell (\$22.6 billion), Clear Channel Communications (\$22.125 billion), Alltel Corp. (\$16.25 billion), and First Data Corp. (\$16.25 billion). Many of those deals originally included huge institutional TLBs—for example, the original Clear Channel TLB was \$12.15 billion. As events demonstrated, syndications of such large LBO loans and TLB tranches to institutional investors proved next to impossible once credit markets destabilized.

U.S. Leveraged Loan Demand in 2007

Despite the lack of any direct subprime exposure in CLOs, the similarity in the design of ABS CDOs and CLOs seemed to create a “contagious link” between the two products. As confidence in structured credit markets was shaken by losses on subprime-related ABS and ABS CDOs in the summer of 2007, the demand for new CLO securities waned (despite the dissimilarity of the underlying collateral). That reduced demand placed upward pressure on the CLO tranche spreads demanded by investors as compensation for bearing the risk of newly issued CLOs.

Loans available for syndication and inclusion in new CLOs in the warehouse or ramp-up stage, moreover, were almost exclusively based on commitment letters that pre-dated the growing instability in the market—that is, the loans on the forward calendar had interest rates and other terms that were based on pre-crisis market conditions. With CLO investors demanding higher spreads on CLO debt, the cost of issuing new CLO securities thus began rapidly to exceed the spread that loans on the forward calendar promised. In

addition, banks that provided warehouse lines to finance the acquisition of CLO collateral were essentially the same banks that financed similar warehouse lines for ABS CDOs and thus were reluctant to provide warehouse financing for new CLOs on pre-crisis terms.

New CLO issuance declined significantly in the last half of 2007, and then virtually disappeared in 2008 (see Figures 6 and 9). In addition, cash was being withdrawn on net from loan funds in the second half of 2007 and early 2008 (Figure 6). With *both* primary sources of institutional demand for leveraged loans languishing, total leveraged loan issuance declined significantly, reaching a low of \$32.77 billion in Q1 2009 (down 84% from Q1 2007). The institutional share of total leveraged loan volume also declined dramatically from Q3 2007 through the end of 2008 (Figure 5). In Q4 2008, institutional purchases of leveraged loan tranches accounted for a meager 5% of the \$38 billion in syndicated leveraged loans.

Leveraged Loan Prices

The combination of a huge forward loan-calendar—consisting mainly of relatively high-risk loans negotiated on pre-crisis terms—with the rapid and significant decline in funds available from the shadow banking system to buy institutional loan tranches placed significant downward pressure on leveraged loan prices beginning in late June 2007 (see Figure 1).⁴⁹ Comparable price declines also occurred in European leveraged loan markets in June and July 2007.

The deterioration of leveraged loan prices from late June through the end of July 2007 generated significant mark-to-market losses for banks on their pro rata portions of those leveraged loans. As CLOs disappeared and new leveraged loan syndications became increasingly challenging, banks faced potentially significant further mark-to-market losses on firm-commitment leveraged loans—if banks could not syndicate them, the loans would have to be absorbed onto their balance sheets at significant discounts to par.⁵⁰ In sum, the events in the leveraged loan markets from late June through the end of July 2007 placed major stresses on the balance sheets of money center banks, which contributed significantly to their overall strained liquidity and balance-sheet exposures in early August 2007.

August 2007-2009

As Miller explained in his article, the response of the Japanese Ministry of Finance in 1997 to the growing undercapitalization of Japanese banks was to lower short-term interest rates in an effort to boost banks’ net interest income so they might be better able to absorb their losses and write off bad

49. The July 2007 price decline may not seem precipitous on Figure 1, but it was viewed as such at the time.

50. See, for example, Standard & Poor’s, “Banks Begin To Clear The Leveraged Finance Overhang,” *RatingsDirect* (November 1, 2007), and Fitch Ratings, “Leveraged Loan Enhancements: Blue-Light Special on Leveraged Loans,” *Leveraged Finance US Special Report* (March 14, 2008).

debts. As a consequence, the value of the dollar surged vis-à-vis the yen, which helped precipitate a speculative run on the Thai bhat, Malaysian ringgit, South Korean won, Indonesian rupiah, and other Southeast Asian currencies. For banks and companies in those countries borrowing in dollars, that meant a sharp and sudden increase in their debt burdens. As Miller summarized the situation,

[E]fforts by the Japanese to protect the capital of their own banks by lowering interest rates, and by calling (or refusing to roll over) loans to Asian firms and banks, served to destabilize much of the rest of Asia—and especially the banks in the rest of Asia. Runs by depositors began occurring on a massive scale in Thailand and depositor concern was felt even in countries with “strong” banking systems like Hong Kong and Singapore. The scramble for liquidity (and the efforts by some countries to defend their currencies by raising interest rates) brought stock prices and real estate prices down sharply. Banks throughout the region and not just in Japan then faced capital compliance problems. They too responded by calling loans where they could and refusing to make new ones. Soon ordinary trade credits were being denied even to sound businesses, including companies with firm export orders in hand. Like an automobile engine that has lost its oil, the system of bank-led development was in a freeze-up.

In early August 2007, market disruptions that had previously been confined to mortgage and leveraged loan markets began to spread through other credit markets, most of which had little or no direct exposure to subprime mortgages or leveraged loans. The sudden transmission of disruptions in subprime-related ABS and leveraged loan markets to broader credit markets in August 2007 was in many ways similar to the “contagion” experience during the Asian crisis of 1997.

On August 9, 2007, virtually all structured credit markets—and repo markets—were struck with a tidal wave of illiquidity and volatility.⁵¹ Although subprime mortgage and leveraged loan markets were under pressure before then, the sizes of those markets, while large, were not so big that disruptions confined to those two markets could have precipitated the sudden banking system panic that began in August 2007. Whereas the 1997 Asian macroeconomic “contagion” was transmitted largely through exchange-rate shocks and classic runs on deposits at Asian commercial banks, the August 2007 panic originated primarily in the shadow banking system and fed back into the traditional commercial banking system.

More specifically, in August 2007, market participants began to recognize that previous credit spreads had been too low when compared to the nature of the risks surfacing in certain subprime- and leveraged loan-based structured credit products.⁵² Those concerns were exacerbated considerably by information “asymmetries”—in the form of investors’ growing fears that subprime and leveraged loan exposures were hidden in markets with little or no apparent connection to those markets, especially in relatively opaque products like SIVs and ABCP conduits and in relatively more complex and harder-to-analyze products like ABS CDOs.⁵³

Uncertainties about the true values and risks of certain structured credit instruments showed up in repo markets in early August 2007. Professors Gary Gorton and Andrew Metrick aptly describe the crisis that began in August 2007 as a “run on repo.”⁵⁴ In August 2007, repo haircuts suddenly began to rise—not only on subprime mortgage collateral, but on virtually all structured credit instruments. Instead of a classic bank run in which depositors withdraw funds, the August 2007 crisis was spawned by a sudden and unanticipated increase in repo haircuts, which forced financial institutions reliant on repos for borrowing to replace those lost funds. So, they sold assets (further depressing asset prices), hoarded cash, and restricted access to short-term credit.⁵⁵

As banks scrambled for liquidity in unsecured interbank markets to replace their reduced access to repo markets in August 2007, unsecured interbank rates (like LIBOR and EURIBOR) began to rise sharply. Around the same time, Treasury yields fell precipitously as investors rebalanced out of risky debt into government obligations. Perceptions of the rapidly deteriorating financial condition of the commercial banking system further exacerbated increases in short-term funding rates and rate/spread volatility.

Another significant part of the shadow banking system—ABCP programs—also experienced catastrophic problems in August 2007. In late July and early August 2007, some ABCP conduits began to encounter difficulties rolling over their maturing CP. Particularly hard-hit were single-seller ABCP conduits and SIVs without full external liquidity support. Many of those SFOC issuers of ABCP were forced to sell assets (almost certainly at fire-sale prices) to finance CP repayments, which further exacerbated the problems they were already experiencing and added selling pressure to the languishing ABS and CDO markets. By the end of August 2007, numerous U.S. ABCP markets had virtually shut down.

51. See, for example, D. Greenlaw, J. Hatzius, A. K. Kashyap, and H. S. Shin, “Leveraged Losses: Lessons from the Mortgage Market Meltdown,” U.S. Monetary Policy Forum, Report No. 2, (2008), and V. V. Acharya and P. Schnabl, “Do Global Banks Spread Global Imbalances? Asset-Backed Commercial Paper during the Financial Crisis of 2007-09,” *IMF Economic Review* Vol. 58, No. 1 (2010).

52. Greenspan, *op. cit.*

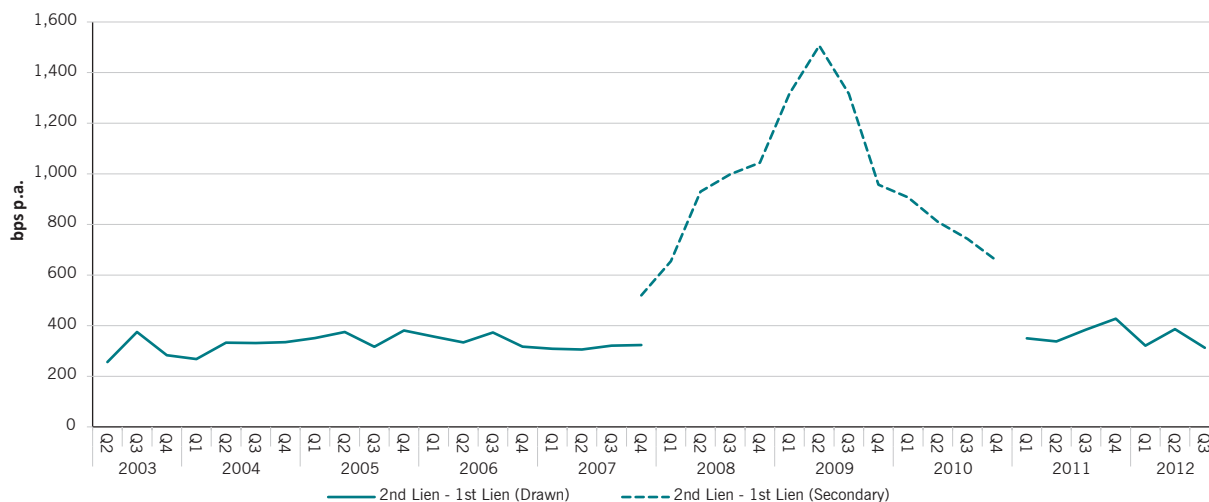
53. Even as late as November 2007, Citibank indicated that “[o]f the many skeletons hiding in the subprime closet, writedowns on banks’ positions on CDOs of ABS are prob-

ably the scariest.” See M. King et. al., “Estimating CDO of ABS Writedowns,” Citigroup Global Markets Ltd., Fixed Income Quantitative Research, Structured Credit Strategy (November 6, 2007).

54. Gorton and Metrick (2012), *op. cit.*

55. See, for example, Gorton and Metrick (2012), *op. cit.*, Duffie, *op. cit.*, and Krishnamurthy, *op. cit.*

Figure 9 Spreads Between 2nd and 1st Lien U.S. Leveraged TLBs



Source: Thomson Reuters LPC

The Leveraged Loan Market

Immediately following the beginning of the run on repo and the outbreak of disruptions in credit markets on August 9, 2007, leveraged loan markets experienced a virtual liquidity freeze. As the initial panic subsided toward the end of August, the leveraged loan market appeared to recover its footing; it remained skittish but stable in September and October. Yet, new CLO issuance continued to plummet, and loan mutual fund flows turned negative (see Figure 6). As bank losses on subprime loans and ABS mounted, their capacity to replace evaporating institutional leveraged loan demand with expanded pro rata lending declined. So, inevitably, in November 2007, leverage loan prices resumed their downward slide.

In 2008, institutional leveraged loan demand continued to shrink, the huge forward calendar for leveraged loans remained saturated with relatively high-risk and Jumbo LBO loans, and worldwide credit markets continued to deteriorate.⁵⁶ Lehman Brothers filed for bankruptcy protection on September 15, 2008, followed a few days later by the bailout of AIG. The September 2008 events had a profound impact on leveraged loan prices. From September 15, 2008, through the end of the year, the average bid price of SMI-100 loans experienced a staggering 27% decline (see Figure 1).

U.S. leveraged loans also began to experience fundamental credit quality deteriorations in 2008 and 2009. In 2008, default rates on leveraged loans and HY debt crept up

from their 2007 historical lows to 3.9 and 2.2%, respectively. Then in 2009, default rates on leveraged loans and HY debt skyrocketed to 12.8 and 10.3%. HY bonds had not experienced such a high default rate since 1990 and 1991, and the 2009 leveraged-loan default rate was nearly double the highest default rate observed since 1998.

As market participants continued to reprice risks, moreover, the *relative* pricing of leveraged loans with different risk characteristics changed dramatically. For example, as can be seen in Figure 9, in 2008 and early 2009 secondary market spreads between first- and second-lien TLBs rose dramatically relative to first-lien loans, peaking at 15% per annum in the first quarter of 2009.⁵⁷

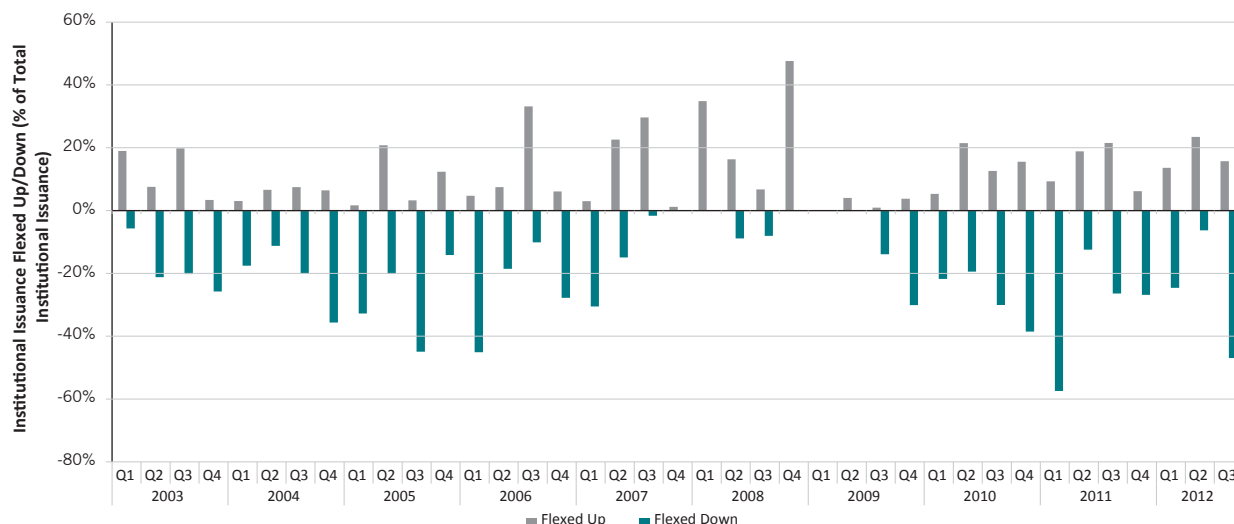
Dealing With the Overhang in Leveraged Loan Commitments

Starting in Q3 2007, leveraged loan originators began to encounter significant problems syndicating leveraged loans with terms specified in pre-crisis commitment letters. For institutional tranches that could not be syndicated to participants in the shadow banking system, syndicate members essentially faced three choices: (1) take up the slack by converting institutional to pro rata tranches; (2) restructure institutional tranches to make them more attractive for investors; or (3) try and escape from loan commitments altogether. In 2008 and 2009, virtually all banks active in the U.S. leveraged loan market attempted all three.

56. In late January and early February 2008, several of the major U.S. monoline insurance providers of bond insurance were downgraded, which led to renewed credit market instability. The acquisition of a liquidity-squeezed and troubled Bear Stearns by JPMorgan in March 2008 further heightened market participants' fears.

57. Drawn spread data is not available for 2008 through 2010, and secondary market spread data is not available prior to 2008.

Figure 10 U.S. Leveraged Institutional Loans Flexed in Syndication



Source: Thomson Reuters LPC

Increased Pro Rata Lending

Some of the leveraged loans on the forward calendar in the summer of 2007 were closed without the institutional tranches being sold in their original amounts to institutional purchasers. Instead, banks restructured the loans to replace institutional tranches with higher amounts of pro rata tranches. When institutional shares of leveraged loans declined in 2007, most of the slack was initially taken up by larger TLA issuance. From Q1 2008 onwards, revolvers took up the slack and accounted for more than 50% of new leveraged issuance on average.

Upward Flex

From the banks' perspective, the most obvious way to make institutional tranches more attractive to institutional investors (including some opportunistic new entrants) was to exercise their ability to use upward flex to give investors a higher interest rate at the expense of borrowers. As shown in Figure 10, downward flex volume appeared more the norm in the years leading up the crisis. By Q3 2007, however, about 30% of new loan issuance was flexed upward as compared to only 2% flexed down. And from Q1 2008 through Q2 2009, upward flex almost completely dominated the little downward flex activity.

Original Issue Discounts, Restructured TLBs, MFN Clauses, and LIBOR Floors

Bank syndicate members also began in Q1 2008 to sell insti-

tutional tranches at original issue discounts ("OIDs")—that is, at prices below the amount of funds advanced to borrowers by bank syndicate members. Unlike upward flex, syndicate members absorbed some or all of the cost of such OID issuance.⁵⁸

In addition, bank syndicates attempted to break the logjam in leveraged loan syndications by splitting Jumbo TLBs into smaller facilities distinguished by differentiated call protection. For example, Harrah's Entertainment had negotiated a \$16.025 billion leveraged loan facility consisting of a \$7.25 billion TLB, a \$2 billion revolver, and a \$6.775 billion bridge loan facility that went into syndication in January 2008. Because of the dislocated market, the original \$7.25 billion single TLB was syndicated as a \$2.25 billion tranche with no call protection, a \$3 billion tranche with soft call protection,⁵⁹ and a \$2 billion tranche that is non-callable in the first three years and then callable thereafter.⁶⁰

Along with OID syndications and restructured TLB tranches came the inclusion of most-favored nation ("MFN") clauses in some institutional leveraged loans. MFN clauses guaranteed institutional purchasers a refund on any difference between the price they paid and any lower price at which the same syndicate arrangers subsequently sold additional portions of the loan facility. Such MFN clauses arose in response to the inability of banks to syndicate fully their facilities on several Jumbo LBO loans in late 2007. For example, the \$11.775 billion First Data Corporation TLB

58. That was not always the case. In some instances, banks that were forced to sell institutional TLBs at OIDs apparently covered the discount by increasing the size of the revolver tranche.

59. Soft call protection specifies the minimum price at which the loan can be prepaid early. The Harrah's TLB-2 tranche had soft call protection of 103, 102, and 101, which

means that for the first three years of the TLB-2 Harrah's could only prepay at 3, 2, and 1 percent premiums (respectively) to the par value of the loan.

60. Reuters LPC, "Harrah's Funds \$21.8B LBO Debt Financing," *Gold Sheets* (January 28, 2008).

went into syndication in September 2007 when institutional investors in the shadow banking system were fleeing. The TLB could not be fully syndicated (even when split into three tranches), so arrangers agreed that if a second offering of the TLB tranches occurred at a deeper discount the first-round investors would be reimbursed for the difference.⁶¹

Banks also attempted to attract more institutional interest through the inclusion of LIBOR floors that guaranteed a minimum LIBOR on the floating component of investors' interest payments. Like upward flex and unlike OID issuance, borrowers would generally bear this cost if LIBOR fell below the guaranteed minimum.⁶²

Secondary Sell-Downs

As market conditions deteriorated and fears of losses mounted among bankers in early 2008, some syndicate members broke with normal market practices and began to offload their institutional exposures directly in the secondary market (in effect, breaking with their syndicates). Such "secondary sell-downs" occurred only in Q1 and Q2 2008 (see Figure 5), totaled \$12.91 billion and \$16.19 billion, respectively, while accounting for 44% of total institutional issuance in the two quarters.

As one example, the \$7.25 billion Harrah's TLB encountered significant difficulties when arrangers began to try and syndicate the deal at the end of January 2008. One of those arrangers (Credit Suisse) reportedly contacted investors directly and asked at what price they would be willing to purchase the bank's Harrah's TLB.⁶³ And Credit Suisse was not alone; a number of banks reportedly engaged in similar behavior in the first half of 2008 in the case of the Harrah's loan and several others.

Litigation and Cancellations

A third alternative pursued by some banks was to try and walk away from their original commitments to borrowers. Several such situations resulted in litigation between the borrowers and/or sponsors and bank syndicate arrangers. Most of the legal disputes were settled by the parties in the course of litigation. Some deals—many of them Jumbo LBO loans—were simply cancelled when all parties agreed they had become non-economic in the current market environment.⁶⁴

The Recovery of the U.S. Leveraged Loan Market in 2011 and 2012

Institutional investments in U.S. leveraged loans through the

shadow banking system began to trickle back in Q2 2009 (see Figure 6). By 2010, moreover, default rates on leveraged loans and HY debt had retreated from their 2009 record highs to 1.8% and 0.8%, respectively. The gradual flow of institutional capital back into the market, together with improving fundamentals, brought about a recovery in leveraged loan prices. By the end of 2010, the SMi-100 had recovered from a low of 62.78 (December 17, 2008) to 96.61 (see Figure 1), representing a 54% increase over about two years. And by the end of October 2012, the loan index had further rebounded to over 98.

Total leveraged loan issuance also began to recover in 2009 (see Figure 5), and so did the proportion of loans sold to institutional participants. By Q1 2011, new issuance was up to \$174 billion, of which 60% was to institutions. New leveraged issuance in the first three quarters of 2012 remained brisk, and more than 50% of new loans were syndicated to institutional participants in each of those quarters. By Q3 2012, moreover, the risk premium paid to second-lien loan investors vis-à-vis first-lien loans had fallen to 441 basis points—still above the pre-crisis average of 329 basis points, though not by much.

Some have expressed concern that the remarkable recovery of the leveraged loan market in 2011 and 2012 resembles the pre-crisis situation. In this view, low interest rates and declining credit spreads have lured unsuspecting investors in blind pursuit of yields back into the market, which will again fuel a bubble and its inevitable bursting. A number of features of the rebounding leveraged finance market, however, suggest that current market conditions are not as similar to pre-crisis conditions as might appear when looking just at loan prices and new issuance.

Risk Attributes of New U.S. Leveraged Loans

As we saw earlier (in Panel (a) of Table 1), in 2008 and 2009 only 10% of respondents to the OCC survey of senior credit officers indicated any easing in leveraged C&I loan underwriting standards (as compared to 64% that indicated easing in 2006 and 2007). From 2010 through 2012, however, 25% of respondents indicating a loosening of leveraged loan underwriting standards (which was even higher than the 16% who said they were easing leveraged loan standards between 2003 and 2005). So, based on this piece of evidence alone, syndicate members seem to have loosened their leveraged loan underwriting criteria significantly in the last three years.

61. Fitch Ratings (March 14, 2008), *op. cit.*

62. Bank syndicate members could also absorb some or all of this cost by entering into LIBOR derivatives to offset some or all of the interest rate risk of the LIBOR floor provided to investors in the loans.

63. M. Davies and J. Keehner, "CS Looks to Sell Clear Channel Loans," *Reuters LPC News* (February 27, 2008), and S. Madhur, "A Time to Bicker: Prolonged Downturn Brings Loan Market Squabbles to the Forefront," *Reuters LPC Feature* (March 17, 2008).

64. For example, in mid-2007 Deutsche Bank and Wachovia Securities agreed to provide \$7.1 billion in leveraged loans to finance the acquisition of Penn National Gam-

ing by Fortress Investment Group and Centerbridge Partners. The \$5.1 billion senior secured facility consisting of a \$4.6 billion cov-lite TLB and a \$500 million revolver (plus a \$2 billion senior unsecured TLB). By mid-2008, Deutsche Bank and Wachovia concluded that it was better to cover their costs and terminate the deal than to incur the losses associated with funding the loans on their original terms. The banks agreed to pay \$550 million to escape their loan commitments on the deal—\$225 million to cover the break-up fee owed to Penn National, and \$325 million owed to the sponsors to cover expenses and legal fees. See P. Lattman and T. Audi, "Wachovia, Deutsche Bank Bring End to Penn National Deal," *Wall Street Journal* (July 4, 2008).

At the same time, however, only 44% of respondents on average indicated that the risks of their leveraged loan portfolios were increasing between 2010 and 2012. That stands in sharp contrast to the 84% and 65% of respondents (on average) that identified higher leveraged loan risks in the 2008-2009 and 2006-2007 periods, respectively. One possible interpretation of this data is that underwriting standards became *so* strict in the two years following the crisis that the recent loosening of those standards is just returning them closer to normal.

Consistent with this interpretation, the average values for maximum leverage covenants on U.S. leveraged loans (reported earlier in Panel (b) of Table 1) were well below pre-crisis levels in the period from 2010 through Q3 2012. Though that leverage ratio increased to 4.52:1 in the most recent period from 3.95:1 in the 2008-2009 post-crisis period, it is still considerably lower than the 5:1 average ratio that prevailed during the period 2006-2007.

New low-rated issuance of U.S. leveraged loans in the most recent period also suggests a more conservative market today. Whereas new low-rated issuance accounted for about 5% of total new leveraged loan issuance from 2006 through 2009, low-rated issuance in the most recent period was only 1% of total issuance (as reported in Panel (c) of Table 1).

At the same time, the proportion of new borrower-friendly U.S. leveraged loans (especially cov-lite, as shown in Figure 7) has increased significantly in 2011 and 2012 from the period 2008-2010 when such loans virtually disappeared. Cov-lite loans, however, are not inherently riskier than other leveraged loans if the cov-lite loans are primarily in relatively higher-rated leveraged loan tranches. In other words, a cov-lite TLB rated BB may be a lower-risk loan than an otherwise similar TLB rated CCC with average covenant levels. And new cov-lite issuance is primarily at the higher end of the credit spectrum.

LBO Leveraged Loans

LBO-related loan syndications virtually disappeared in 2008 and only gradually began to return in 2011 and 2012. The risks to investors in recent LBO-related leveraged loans, moreover, changed significantly after the outbreak of the crisis. As we saw earlier in Table 3, in 2008 and 2009, equity participation rose and leverage ratios declined for sponsored LBOs. From 2010 through 2012 to date, LBOs have become a bit riskier but remain far less risky than the deals executed in 2006 and 2007.

CLOs

The return of CLOs to the marketplace has played an important role in the revitalization of the leveraged loan market.

In November 2012, CLOs held about 47% of all leveraged loans outstanding, and loan mutual funds accounted for about 15% of leveraged loan holdings (with the remaining 38% accounted for by banks, hedge funds, and other investors).⁶⁵ And post-crisis CLOs appear to have some important differences from their pre-crisis counterparts. In particular, investors seem much more cognizant today of the need to evaluate the risks of structured products relative to expected returns while reducing their reliance on credit ratings. The information available to investors is also often more transparent and detailed today than in many pre-crisis offerings.⁶⁶ In addition, the crisis highlighted some deficiencies in the documentation and contractual aspects of CLOs that market participants have now addressed (including more explicit restrictions on certain types of collateral like cov-lite loans).⁶⁷

A Different Story for Private-Label Mortgage-Based Products

In stark contrast to the leveraged loan and CLO markets, the private-label mortgage-related ABS and CDO markets have not recovered. Low-rated subprime ABS prices continue to exhibit deeply depressed discounts to par, as we saw earlier in Figure 1. But, as shown in the figure, highly rated tranches of subprime home equity ABS did experience at least partial recoveries in value from mid-2009 through 2012. And such recoveries, which were achieved despite the continued lackluster performance of subprime mortgages themselves, can be attributed to a number of factors: better-than-expected performance of senior tranches resulting from credit enhancements and loss absorption by the more junior tranches; replacements of mortgages that violated ABS representations and warranties with compliant mortgages; and reversals of default-related principal write downs that proved instead to be long-dated delinquencies.

Nevertheless, new issuance of private-label mortgage-related ABS has remained moribund since mid-2007 for *all* types of mortgage collateral. From 2004 through 2006, private-label non-Agency mortgage-related ABS and RMBS accounted for more than 80% of the U.S. ABS market. In 2011 and 2012 (through October), however, private-label mortgage securitizations have accounted for less than 5% of the U.S. non-CDO ABS market.

One obvious reason for the lack of any resurgence in the private-label mortgage-related ABS market is that the performance of the underlying mortgage loans has not yet recovered (in sharp contrast to leveraged loans). In addition, a significant demand for subprime-backed ABS came from participants in the shadow banking system that sought mortgage-related exposure through ABS CDOs. The scarcity

65. C. Doherty and H. Pereira, "Leveraged Loan Monthly," *Thomson Reuters LPC* (December 2012).

66. See C. L. Culp and J. P. Forrester, "The Shape of CDOs to Come," *Cayman Financial Review* No. 18, First Quarter (2010).

67. The recent changes in CLOs that address problems identified during the crisis are discussed in C. L. Culp and J. P. Forrester, "U.S. Structured Finance Markets: Recent Recoveries, Post-Crisis Developments, and Ongoing Regulatory Uncertainties," *Journal of Structured Finance* Vol. 18, No. 4 (Winter 2012).

of new ABS CDO issuance thus provides part of the explanation for the lack of new issuance of mortgage-related ABS.

Not all ABS issuance has remained as depressed as mortgage-related ABS and non-CLO CDO markets.⁶⁸ In particular, ABS based on auto loans, credit card receivables, and student loans have all emerged from post-crisis slumps with robust new issuance and strong secondary market activity (albeit still well below pre-crisis levels). Also indicative of a recovery in ABS markets is heightened investor interest in ABS based on exotic collateral such as cell tower leases, franchise fees, timeshare receivables, drug royalties, and structured settlements.

Total non-mortgage ABS issuance in the United States (excluding CDOs) for the third quarter of 2012 was \$51.2 billion, representing an over 90% increase over the corresponding Q3 2011 period. Auto loan-based ABS led new issuance with \$22.4 billion, while credit card ABS issuance for Q3 2012 was also a robust \$13.4 billion. Also worth noting, subprime auto loan-backed ABS has shown steady growth since the onset of the recent credit crisis, and total outstanding amounts have grown over 40% since the end of 2011.

The Impact of Financial Regulation

In his 1998 article, Miller was especially critical of the risk-based capital requirements imposed on banks through the Basel Accord of 1988 (including its several revisions and national-level implementation). One of Miller's criticisms of such capital requirements is the failure of regulators to anticipate the pro-cyclical effects of such requirements during periods of large losses that are likely to result in the undercapitalization of many major banking entities at the same time. As Miller wrote, "[T]he regulatory apparatus designed to protect the banking system actually becomes counter-productive and leads to a credit freeze-up wherever any substantial number of banks go bad at the same time."

In other words, as a result of regulatory mandates to maintain minimum regulatory capital requirements, banks in the midst of a crisis involving correlated losses across different lenders will effectively be forced to deleverage and restrict access to credit at the same time to avoid breaching regulatory capital minimums. Commenting on the Asian crisis of 1997, Miller explained: "This system of elaborate national and international rules and inspections to keep banking safe failed utterly last year in most of East Asia. Paradoxically, the rule structure governing banking actually made matters *worse* by producing the credit crunch that made recovery so difficult once the collapse had occurred."

Miller's criticisms of bank capital regulations seem, if anything, even more applicable to the recent crisis than to the 1997 crisis about which he was writing. Banks experienced significant mark-to-market losses on subprime and leveraged loan assets in 2007 that created huge pressure to deleverage in order to satisfy minimum capital requirements. And as non-bank investors in the shadow banking system disappeared, banks were further required to emphasize deleveraging and recapitalizations rather than credit creation. The proposed tightening of bank capital requirements in recent years has further exacerbated the problem and led to even more sharp contractions in bank lending.⁶⁹

In addition, the Basel-based Financial Stability Board ("FSB"), the international authority tasked with promoting the implementation of regulatory policies across all its G-20 member countries, has been focused since its inception in 2009 on the shadow banking system. In November 2012, the FSB released a consultative paper on strengthening the oversight and regulation of the global shadow banking system and its participants.⁷⁰ Specifically, the FSB recommends that national regulators evaluate market participants based on the role they play in the global financial system and not on their classification as bank or non-bank entities. In particular, the FSB recommends tighter regulations on all entities involved in the provision of credit and liquidity.

For the most part, the FSB's proposed regulatory framework is ambiguous. Nevertheless, the FSB does explicitly recommend certain changes, such as enhanced monitoring of and disclosures by non-bank providers of liquidity and credit to national banking regulators. The FSB further recommends that national banking regulators promulgate regulations that limit the risks of shadow banking system participants in terms of their maturities of portfolios assets, leverage, liquidity risk and asset concentration, and the like. The FSB further recommends the imposition of bank-like regulatory requirements on shadow banking system participants, including minimum capital, liquidity, and leverage requirements.

The FSB proposals are sufficiently vague that any detailed analysis of those proposals is impractical at this juncture. Nevertheless, the contemplated regulations would evidently extend significantly the existing panoply of bank regulations to a large number of non-bank lenders—that is, all of the institutional participants on the right side of Figure 3. Those regulations are almost certain to raise the costs of non-bank participants' provisions of credit and, all else equal, deter those institutions from providing such credit through their participation in the shadow banking

68. For more details, see Culp and Forrester (2013), *op. cit.*

69. The impact of bank capital regulations on extensions of credit has been thoughtfully explored by Professor Steve Hanke of The Johns Hopkins University. See, for example, S. Hanke, "It's the Money Supply, Stupid," *GlobeAsia* (July 2012), S. Hanke, "Money, Where's the Money?" *GlobeAsia* (August 2012), and S. Hanke, "Basel's Capital

Curse," *GlobeAsia* (January 2013). See also P. Lee, "Shackled Banks Face Up to Disintermediation Threat," *Euromoney* (September 2012).

70. Financial Stability Board, "Strengthening Oversight and Regulation of Shadow Banking," *Consultative Document* (November 18, 2012).

system. The benefits of the proposed regulations have not been clearly articulated, and, given their potential negative impact on credit creation, should be evaluated very carefully before being accepted.

Also of concern to shadow banking participants is the unfinished work required to implement the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. Although two years have elapsed since the passage of Dodd-Frank, the required rulemakings are less than 50% complete,⁷¹ and many of the required rules that have yet to be promulgated or finalized may significantly impact the shadow banking system. Implementation of proposed regulations like the Volcker Rule, the U.S. and European banking regulators' minimum risk retention requirements, potential rating agency reforms (such as the so-called "Franken Amendment"), regulations pursuant to Title VII of Dodd-Frank in the over-the-counter derivatives market (that could negatively impact synthetic securitizations), various disclosure requirements for securitizations (such as the SEC's proposed Regulation AB II), and several more proposed regulations could significantly restrict the ability of the shadow banking system to facilitate fund-raising and risk transfer for the commercial banking system.⁷²

Conclusion

In his 1998 article, Professor Miller argued that one of the strongest weapons available to national economies in their defense against the macroeconomic impacts of liquidity and banking crises was the availability of non-bank financial products and structures. He argued that diversification away from the commercial banking system was a way to reduce the impact of purely financial crises on the important macroeconomic function of credit creation.

Although Professor Miller may have exaggerated the independence of bank- and market-based sources of financing, his conclusions are nevertheless more correct than not regarding the importance of non-bank investors in the provision of credit. The proliferation of structured credit products like ABS and CLOs and the interest of non-bank investors like MMMFs and loan mutual funds in holding bank-like debt have clearly and fundamentally changed the commercial banking paradigm from a predominantly O&H business model into a primarily O&D banking model. The availability of non-bank sources of investment capital have greatly enhanced the ability of banks to create credit and facilitate economic growth.

The subprime mortgage loan market and structured products backed by those assets (for example, mortgage-based ABS and ABS CDOs) illustrate a potential risk of relying on the shadow banking system. Thanks to our recent experience,

we now understand how a loss of confidence in structured products and concerns about asymmetric information can precipitate a sudden run on the shadow banking system that rapidly translates into significant liquidity and solvency concerns in the commercial banking system.

Nevertheless, the extraordinary recovery of the U.S. syndicated leveraged loan market demonstrates that the relation between commercial and shadow banking is very much a two-way street. When leveraged loans and CLOs experienced problems from 2007 through 2009 due primarily to the widespread liquidity and credit market disruptions that impacted essentially all structured credit products, institutional investors in leveraged loans disappeared and the leveraged loan primary market imploded. But when institutional participants regained confidence in shadow-banking products, leveraged lending by banks recovered quickly and dramatically. In other words, the U.S. leveraged loan market demonstrates that shadow banking system participants are a critical component of the total demand for such loans, and that the ebbs and flows from institutional leveraged loan markets are strongly connected with the health and integrity of the underlying leveraged bank loan market.

In sum, critics of securitization and the shadow banking system tend to focus on the subprime mortgage story in which the sudden re-pricing of credit risk and the resulting disappearance of investment demand for ABCP, private-label mortgage-related ABS, and ABS CDOs created unexpected and significant downward price pressure on those asset classes. But, again, the leveraged loan market tells a different story—one in which bank syndicates rely heavily on non-bank investors, and the presence or absence of those investors significantly affect the ability of banks to extend new leveraged C&I credits. This is essentially Professor Miller's contention—namely, that non-bank investors diversify the risk of credit creation while at the same time improving the price discovery process in different markets. When times are good, securitization results in larger loan production; but when times are bad, the loss of institutional interest causes prices to fall and loan production to contract. As Professor Miller explained, that is precisely how markets *should* work, lest the creation of credit lie solely with commercial banks, their shareholders, and their regulators.

CHRISTOPHER CULP is a Senior Advisor at Compass Lexecon, as well as an Adjunct Professor of Finance at The University of Chicago Booth School of Business and a Professor of Insurance in the Institut für Finanzmanagement at Universität Bern. He can be reached at christopher.culp@chicagobooth.edu.

71. See, for example, Davis Polk, "Dodd-Frank Progress Report," *Presentation* (November 2012).

72. For a more detailed discussion of the impacts of recently proposed regulations on the shadow banking system, see Culp and Forrester (2013), *op. cit.*