Structuring for Leverage: CPDOs, SIVs, and ARSs

by

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It is fairly straightforward to create less risky portfolios. In teaching investments, textbooks routinely demonstrate how combinations of a risk-free asset and a risky portfolio can adjust portfolio risk-return characteristics to match investor utilities.

While textbooks suggest that leverage can be sued to *increase* risk, too, the application is all too cursorily dismissed as being hindered by the practical inability to borrow at the risk-free rate. While it is hard to disagree that borrowing costs only affect the proposition at the margin, despite the equity premium puzzle we rarely see returns cheap enough to cover the cost of the additional leverage. Furthermore, there are typically relatively few risk averse investors that prefer leveraged risk-return combinations, naturally constraining the exercise. But in a well-established benign market with low borrowing costs and reduced risk aversion markets for leveraged investments proliferate.

In the recent seemingly benign credit environment of the last several years, markets saw low borrowing rates as an opportunity to increase leverage and reduce funding costs – in effect, striving to make investments more risky in search of greater marginal yield. Sometimes the pursuit was masked in terms of lowering issuance costs. Other times, funds actively pursued leverage on the basis of low market interest rates. The effect of both is the same: increased risk and return. In a benign market, the return is immediately realized while the risk remains latent – until the market turns. That is, until now.

After the fact, we see that risk was masked in two principal ways. First, many highly-leveraged instruments were sold on the basis of correlations with respect to underlying collateral rather than final structure. ARS were represented as "simple Student Loan ABS," SIVs as "simple RMBS," and

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CPDOs as "simple CDOs." Of course, the increased risk heightened the credit correlations of each underlying collateral, which, themselves are only cursorily understood.

Second, market arrangements for the new products were artificially supported by seller institutions. ARS sellers supported auctions, SIV sellers repatriated debt, and RMBS CPDOs are still riding on the back of representations and warranties of the mortgage originators. Of course, when risk is managed through non-fundamental and non-reported means, the correlative properties of such investments will render them explosive so that they may unexpectedly fail. Indeed that is what we have seen.

The rest of this paper briefly introduces the theory of leveraged returns and risk aversion, which created both a supply and demand for leveraged structured products. The sections following describe three applications of such practices: Constant Proportional Debt Obligations (CPDOs) used financial leverage to increase returns on consumer mortgage and other loan receivables; Auction Rate Securities (ARS) took the application to the extreme, using monthly note auctions to determine rates for even safer underlying student loan collateral; and Structured Investment Vehicles (SIVs) implemented a term-structure arbitrage to lower funding costs for typical consumer mortgage and other assets at the expense of liquidity risk. Of those three asset types, CPDOs are facing steep losses after ratings agencies admitted some of their statistical models for evaluating those structures were mathematically flawed and the market for those structures no longer exists, SIVs have all been dissolved, and ARMs are being supported by sellers in myriad legal settlements.

Throughout the descriptions there are three common themes. First, investments books' dismissal of leverage on the grounds of practical borrowing costs is correct in all but a financial bubble. There is no reason that a lender would lend at a risk-free rate if the risk premium on the use of funds was high enough to enable an arbitrage. Second, therefore, the initial application to increasing leverage has to take place in a benign market environment with a safe underlying collateral or investment type. Third, once the arbitrage is in place and risk has been dismissed, there inevitably comes a push to increase the risk of the underlying collateral to heighten profits. Of course, when risk manifests – as it inevitably does – dramatic losses follow.

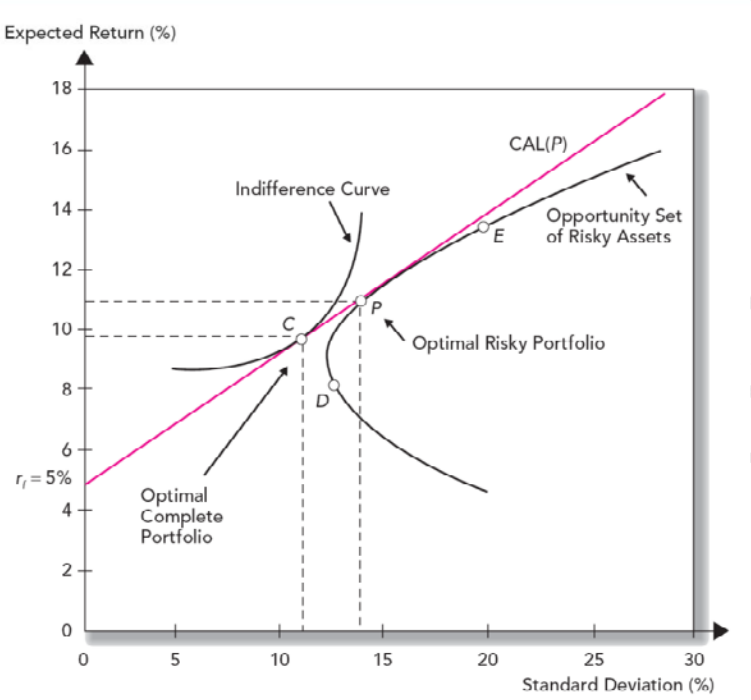
I. Review of financial literature on equilibrium risk targets

From capital budgeting to portfolio theory, there is a great deal of literature on equilibrium risk targets.

In capital budgeting, we assume the firm has to meet some rate of return hurdle for an investment project to be considered worthwhile. Of course, that rate of return hurdle is made up primarily of the cost of funds, which investors determine in markets that price the risk of the business enterprise. Hence, the rate of return hurdle is merely a return threshold that is thought to compensate for a specific level of risk presented in the firm's portfolio of investment projects.

Portfolio theory, therefore, presents the greater challenge. The challenge arises because it is in portfolio theory that investors choose their own individual risk-return preferences. Risk aversion plays a part in this determination, but is not sufficient to explain risk preferences in total. The idea is that risk aversion merely shapes the indifference curve of the investor, that is, makes that indifference curve convex.

FIGURE 1: DETERMINING THE INVESTOR'S OPTIMAL PORTFOLIO



Source: Bodie Kane and Marcus, Investments, Irwin/McGraw-Hill, 2007.

The basic portfolio theory framework is represented in Figure 1.In Figure 1, the shape of the indifference curve reflects the basic idea that an investor will only reach for greater return if that presents progressively less marginal risk. More or less risk aversion in this framework results in a tighter or more linear representation, respectively, with the extreme of the risk neutral investor being represented by a linear indifference curve, such that increased risk is not punished by demanding the characteristic progressively higher marginal returns (even at a de minimus rate).

Figure 1, like most standard representations of portfolio choice, suggests the chosen optimal portfolio lies to the left of the optimal risky portfolio. That is, most investors choose some combination of the optimal risky portfolio and the risk-free asset. But extensions of the theory suggest that leverage can be used to push to the right of the optimal risky portfolio, achieving higher risk-return combinations for investors who have overall higher appetites for risk. Such an investor would still be risk averse – the general shape of their indifference curve would remain convex – but the indifference curve would achieve tangency to the right of the optimal risky portfolio.

Standard theory, however, has a hard time justifying the ability to use leverage in the purest sense because the risk-free rate is rarely available to individual borrowers. The standard approach, nonetheless, theoretically accommodates the availability of risk-free borrowing by suggesting that a risky borrowing rate would only rotate the capital allocation line (CAL) clockwise at the point of tangency with the optimal risky portfolio, decreasing – but not removing – the benefits of financial leverage. Still, the smaller spreads from leverage may be widely unavailable in the real world and, indeed, have been difficult to unearth – until witnessed in recent market conditions of very low credit spreads that effectively reduced the theoretical rotation of the CAL away from its optimum.

The key to achieving the desired rotation is structural, rather than purely financial, leverage. While financial leverage still requires a willing lender, structural leverage can be engineered by funding existing investments with financially engineered portfolios of securities take advantage of term structure, credit, or liquidity mismatches. Such structural leverage can be thought of as either new investment opportunities that push out the frontier so that the tangency with the CAL is moved to the right or as non-standard leverage applied to existing financial products.

The choice of characterization depends on whether one considers the resulting structured finance securities new financial products in their own right or merely a repackaging of existing financial instruments. Since all financial instruments are already in the optimal risky portfolio, a mere repackaging would be represented as a variant on financial leverage, moving the investor out along the existing CAL from the original and consistent optimal risky portfolio. A new financial instrument, on the other hand, would be represented as a new investment possibility frontier, from which a new optimal risky portfolio emerges.

The choice is more than academic. If we are witnessing a mere shift in financial leverage applied to a consistent optimal risky portfolio, increased risky borrowing rates will effectively delever the system and remove opportunities to the right of the optimal risky portfolio. If, however, we are witnessing the dawn of a new category of financial products, there is no reason to expect that mere increases in risky borrowing rates alone will mitigate today's problems: a new valuation problem will be set before us, and we will need sufficient transparency and modeling techniques in order to put markets right. In truth, the problem is probably a little bit of both of those influences. In the case of CPDOs, fairly typical financial leverage was applied to portfolios of new hard-to-value financial products such that the resulting position was both difficult to value and risk sensitive. In the case of SIVs and ARM securities, leverage was attained primarily through term structure, credit, and liquidity mismatches.

It would be disingenuous to end this section without a discussion of new types of risks that have entered into the valuation process. Many of the new financial instruments contain not only elements of opacity, such that the underlying cash flows are themselves difficult to gather and estimate (as with pure cash-flow estimation of residential mortgage-backed security (RMBS) and follow-on mezzanine RMBS collateralized debt obligation (CDO) valuation), but also fundamentally difficult to value operational risk, liquidity risk, interacted risks with the seller-servicer, legal contractual risks, and financial structure risk (the risk of just plain bad engineering).

In summary, we have witnessed a shift in investment behavior that can be represented by investor choices on the standard CAL. Whether because of a shift in the underlying investments frontier or merely a reduced cost of leverage on the existing CAL, investors became more comfortable reaching for additional leverage in recent years, whether financial or structural. Hence, while the efficiency gains from many structured finance arrangements are real, they may simply have been too much for today's financial infrastructure to bear.

II. Constant Proportional Debt Obligations *[section still under construction]*

Constant Proportional Debt Obligations (CPDOs) are merely leveraged Collateralized Debt Obligations. The term CDO, however, comprises a set of very different types of structured finance arrangements, from cash flow CDOs to synthetics. Favored collateral types for all those

arrangements can and sometimes do change rapidly over time, shifting from aircraft leases and mutual fund fee securitizations prior to 2003 to subprime mortgages thereafter.

A. Background

CDOs are different from MBS in at least five different ways. First, whereas MBS and ABS are supported by static or brain-dead pools of underlying assets, CDO pools are managed. Hence, the composition of the asset portfolio can change dramatically through the duration of the CDO transaction.

Second, CDO transactions close before the pool of underlying assets is fully formed. This aspect may be a benefit or a drawback. Beneficially, the manager may be able to include in the pool greater diversity of collateral across industry, credit, and vintage. As a drawback, however, investors cannot be sure the manager will act as intended upon investment.

Third, CDOs are quite heterogeneous with respect to granularity. Some CDOs may contain as little as twenty underlying assets, while others may contain several hundred. Note, however, that even several hundred underlying assets is still a relatively small number compared to the hundreds of thousands of accounts underlying MBS and ABS pools. Furthermore, several hundred underlying assets from the same sector, that is, RMBS, does not add true diversification to the pool, leading many in the industry to question the relevance of the traditional calculations of "diversity scores" in contemporary CDOs.[2] Because of the lack of diversification, traditional actuarial loss methods applied to ABS and MBS pools are not properly applicable to CDO pools.

Fourth, CDOs may illustrate more ratings volatility than ABS or MBS due to ratings migration on the underlying collateral or manager trading. Fifth, while the heterogeneity of CDO asset pools adds some degree of diversification to pool performance that is not possible in ABS or MBS, it may also increase opacity to investors.

Last, since the CDO market is still growing, secondary market trading is still limited. The development of secondary market trading has been further hampered by the immense heterogeneity across CDO underwriters, collateral managers, and asset types.[3]

As a result of those differences, CDOs fund portfolios of collateral using a set of tranched securities, like ABS and MBS, but using even *more* complex and esoteric securities than ABS and MBS. CDOs, like MBS, use securities like interest-only and principal-only strips to address the different risks that those two sets of cash flows pose to investors. Interest-only securities promise payment only while the loans are outstanding. Once the loan exits the pool, whether through prepayment or default, interest payment ends. Hence, there is great risk of non-payment in interest-only strips. Principal-only strips return investors' funds, but timing is the issue. Whether the loan prepays or defaults (after which the collateral is sold), the investor usually *eventually* recovers principal in full. Hence there is little risk of non-payment in principal-only securities (although timing is still an issue).

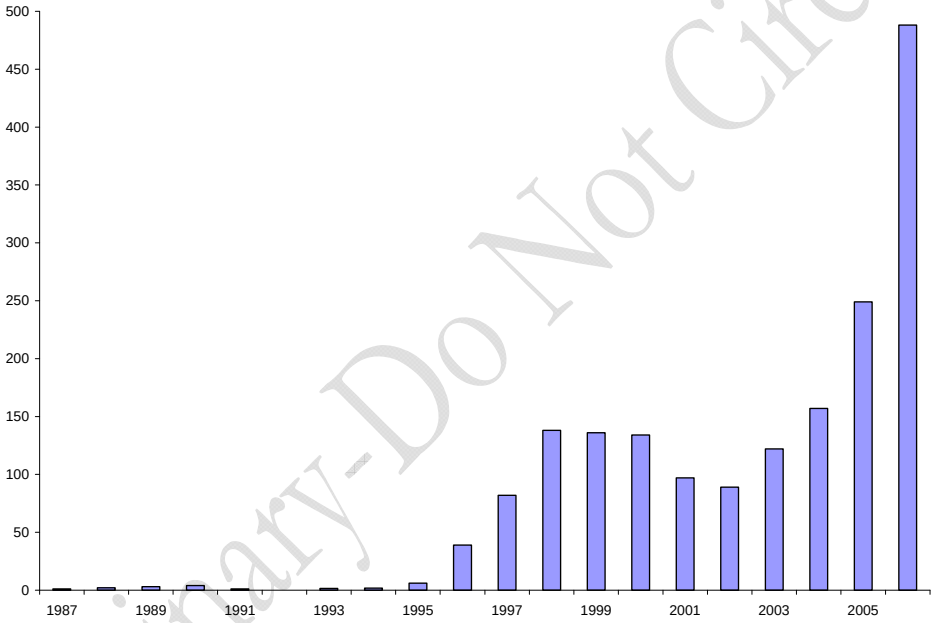
The growing investor acceptance of CDO structures has been supported by rating agencies willingness to rate these assets. Unlike other assets that rating agencies rate, these assets are subject

2 *See, e.g.*, Frank Partnoy, *How and Why Credit Rating Agencies Are Not Like Other Gatekeepers*, in FINANCIAL GATEKEEPERS: CAN THEY PROTECT INVESTORS?, (Yasuyuki Fuchita & Robert E. Litan, eds. Brookings 2006).
3 *See, e.g.*, S&P Global Cash Flow and Synthetic CDO Criteria, Mar. 21, 2002, at 13-14.

to considerable market risk, a risk which rating agencies do not claim to be able to effectively rate. Recognizing these issues, in May of 2005 former Fed Chairman Greenspan warned that "the credit risk profile of CDO tranches poses challenges to even the most sophisticated market participants" and warned investors "not to rely solely on rating-agency assessments of credit risk."

Figure 2 shows that CDO issuance dropped off dramatically from 1998 to 2002, exceeding 1997 levels again only in 2003. That drop-off arose from a combination of economic conditions along with unforeseen difficulties in the corporate loan and bond markets and manufactured housing, aircraft lease, franchise business loan, and 12-b1 mutual fund fee structured finance sectors that accounted for a significant component of CDO investments at the time. CDOs have since moved out of those sectors, and into RMBS and commercial mortgage-backed securities (CMBS).

FIGURE 2: ANNUAL CASH CDO ISSUANCE



Source: Lucas, Goodman, and Fabozzi (2006).

B. Structure

CPDO structures take the CDO paradigm one step further. Constant proportion portfolio insurance ("CPPI"), first established by Fisher Black and Robert Jones in 1986, is a technique for leveraging up

investments while providing full or partial protection. This method has been used extensively in equities and hedge funds and is now applied to the credit market. Constant proportion debt obligations ("CPDOs") are essentially a variant of CPPI, the main differences being a fixed coupon with no upside and different leverage rules. Like credit CPPIs, CPDOs give leveraged exposure to credit portfolios, although they do not offer principal protection to investors.

C. Leverage

D. The Demise of CPDOs

The CDO market added liquidity to the RMBS market *in a highly leveraged fashion* by funding *lower*-tranche MBS securities. CPDOs added further leverage to the resulting investments, creating a highly risky set of investments. Given the complexity of the underlying RMBS and CDOs, it is not surprising the CPDOs were beyond the ability of ratings agencies to properly model and assign ratings. Hence, by the second half of 2008 the CPDO market was essentially closed.

III. Structured Investment Vehicles

SIVs are merely one step beyond Asset-backed Commercial Paper (ABCP), which itself lies one step beyond Commercial Paper (CP). ABCP extended the CP paradigm to structured finance collateral, and SIVs built in a more complex funding structure and more complex contractual arrangements. SIVs moved ABCP beyond a short-term transactional funding mechanism for subprime loans in the process of being securitized, into a funding mechanism in its own right. Of course, the leverage inherent in the arrangement led to similar spectacular collapse when the underlying collateral faltered.

A. Background

SIVs have a short but illustrious history. Citibank launched Alpha Finance Corporation in 1988, and followed with Beta Finance Corporation in 1989. In 1995 Gordian Knot set up Sigma Finance Corporation. In May 1996 Singer & Friedlander Capital Markets established Asset Backed Capital Limited. ABC is now managed by Quadrant Capital following a management buy-out in 1998. Centauri Corporation, another Citibank vehicle, was established in September 1996. In 1998, the Industrial Bank of Japan, Limited set up Ascot Capital Ltd. and Citibank set up Dorada Corporation and wound down Alpha.

In 1999, four new vehicles were formed. Dresdner Bank set up K2 Corporation, Bank of Montreal established Links Finance Corporation, Citibank opened its fifth vehicle, Five Finance Corporation, and Quadrant Capital established Abacas Investments. In 2000, Ascot Capital was wound down by IBJ in anticipation of the merger of IBJ, Fuji Bank and the Dai-Ichi Kangyo Bank. Parkland Finance Corporation, Bank of Montreal's second vehicle, was set up in 2001. In 2002, West End Capital Management and Gen Re Securities Limited set up Rathgar Capital Corporation.

By 2007, SIVs were among the highest growth areas of Structured Finance with US$ 370 billion of assets managed across 28 vehicles, 10 of which had been launched in 2006 alone. At the height of the market, Moody's rated 36 SIVs or SIV hybrids that managed $395 billion of assets.[4]

SIVs became increasingly more sophisticated with the passage of time. While Alpha was set up to operate with fixed leverage, subsequent SIVs developed capital structures that were dynamic to certain factors including rating of assets held, asset maturity and asset concentration. Today a variety of factors, described further below, determine the capital requirement for these vehicles. Managers have also focused on a number of other areas, including alternative forms of liquidity, synthetic exposure to risk and the issuance of capital in a variety of currencies in developing the SIV model.

B. Typical SIV Structure

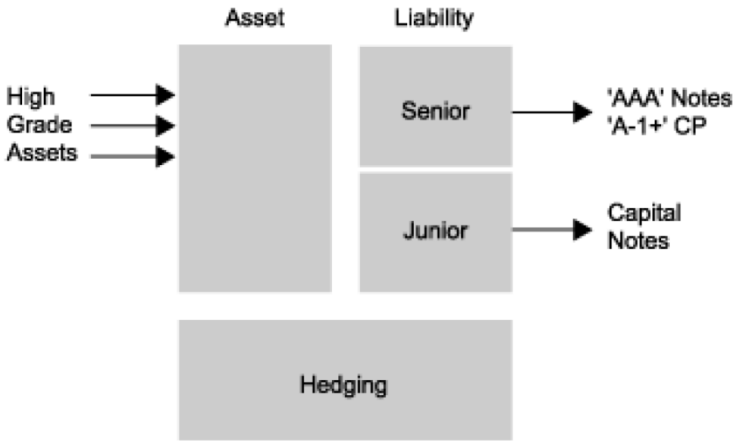
SIVs are best understood in relationship to their close cousins, Asset-backed Commercial Paper (ABCP). Both issue short-term (usually three- to six-month) Commercial Paper as funding and use the proceeds to invest longer-term in various highly-rated assets. The longer-term assets pay a coupon rate that is higher than the interest rate on the Commercial Paper liabilities, providing the necessary return on the arrangement. Both hold similar underlying collateral, typically a mix of highly-rated structured finance securities and bank and financial institution securities.

That's where the similarities end. ABCP, like regular commercial paper, has 100% liquidity support backing that ensures investors are only exposed to credit risk, not market value risk. SIV's, on the other hand, only carry about 5%-10% committed liquidity support. The remaining liquidity support relies on the market value of the collateral assets. Hence, investors are exposed to both market value risk and credit risk.

While SIV's typically hold greater credit enhancement (usually 7%) than ABCP, that enhancement adjusts for credit risk, not liquidity risk. Liquidity risk is mitigated by a more diversified funding mix, consisting of junior equity, mid-seniority medium-term notes, and finally senior A1 Commercial Paper. The basic structure is presented in Figure 3. The idea is that the equity and medium-term notes absorb the liquidity risk, which, since liquidity shocks are usually short-lived, should cover typical temporary market disruptions.

[4] Moody's Investors Service, *An Introduction to Structured Investment Vehicles*, January 25, 2002.

FIGURE 3: BASIC SIV STRUCTURE



While traditional ABCP was a bridge financing mechanism, funding loans during seasoning until they were moved in roughly quarterly securitizations, SIVs provided permanent financing for the underlying assets. Hence, SIVs issue a mix of short-term and long-term liabilities and purchases assets with the proceeds. SIVs therefore engage in maturity transformation through the purchase of long-term assets to support senior short-term liabilities, engendering asset-liability maturity gaps in the range of 2.4 to 4.8 years. Fixed-rate assets are swapped to floating rate liability payments using swap derivatives.

Because of the inherent risk in the maturity mismatch, the vehicles mark portfolios to market on a frequent basis to gauge value should it become necessary to de-lever following an inability to roll liabilities or unexpected downgrades or defaults in the portfolio. Hence, even further unlike ABCP, SIVs are built around "brain-dead" operating constraints that provide a strictly contractually-determined unwind in the event that liquidity shocks or solvency shocks create too much stress for the liability structure to withstand.

Typical triggers can be broken down into three main categories: (1) Cash flow tests; (2) Portfolio restrictions, and; (3) Liability constraints. Among the cash flow tests, capital requirements ensure sufficient credit enhancement is present in the structure at all times, interest rate and foreign exchange tests ensure that the interest rate and foreign exchange swaps continue to hedge asset-liability duration and denomination mismatches, liquidity tests ensure that collateral remains sufficiently liquid to meet investor redemptions on a timely basis, and cash outflow tests ensure that no liability "run" debilitates the liability structure.

Portfolio restrictions ensure the managed portfolio remains within certain risk tolerance boundaries. Portfolios are restricted in terms of rating quality and counterparty risk (especially for swap transactions). The weighted average life (WAL) of the portfolio is monitored to restrain portfolio maturity mismatch, and hence interest rate risk (duration) exposure.

Liability restrictions ensure that the weighted average life of the debt structure also remains within the limits of risk tolerance and that junior note ratings remain sufficiently high to keep total liability

costs low enough to maintain profitability.[5] Daily marks to market ensure that the cash flow, portfolio restrictions, and liability constraints remain in place and effective through the life of the structure.

FIGURE 4: SIV OPERATING STATES

	Portfolio management	Investments	CP/MTN issuance
Normal	SIV manager	Yes	Yes
Restricted investment	SIV manager	No	Yes, for refinancing
Restricted funding/ defeasance	SIV manager	No	No
Enforcement	Security trustee/ receiver	No	No

Source: Fitch

All those moving parts constitute a brain-dead operating context, such that any deviation can be resolved quickly through either a readjustment of the structure or – if that cannot be achieved – an orderly unwind on behalf of investors. Hence, continued trigger breaches will invoke increasingly drastic operating constraints upon the structure, as outlined in Figure 4.

Figure 4 shows that in normal times, SIV managers can increase debt issuance and expand the portfolio to grow the fund (within the brain-dead restrictions set forth earlier). As pressures mount, new liabilities are only permitted for rolling the refinancing and new investments are halted. Forcing the fund to stop growing. As pressures deepen, no more refinancing is permitted, forcing the portfolio to run off. Since the shortest maturity liabilities are the senior notes, the provisions form a sort of credit enhancement where senior investors are paid today in full and junior noteholders and equity holders are paid later and only partially.

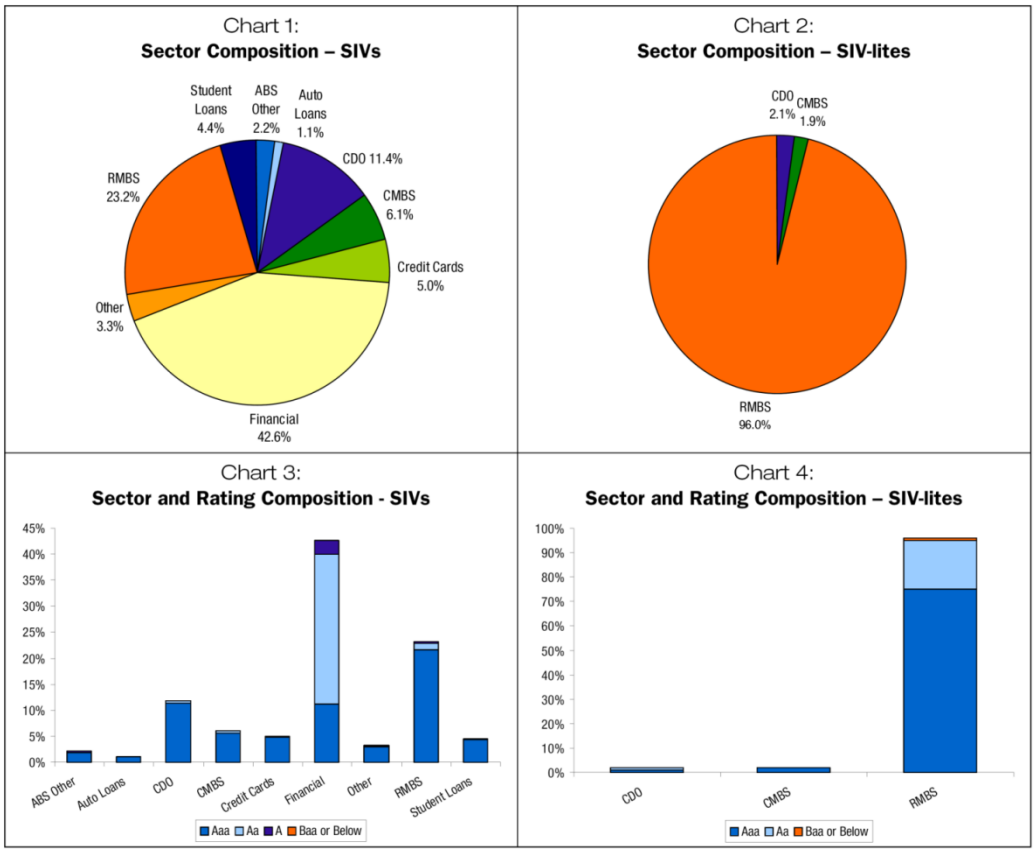
C. Leverage

Once the SIV became popular, the SIV-lite evolved to heighten the risk. SIV CDOs (or "SIV-lites") and SLVs (Structured Loan Vehicles) are hybrid SIVs that typically invested in US RMBS and leveraged loans, respectively. Figure 5 illustrates how different SIV-lites were from their (already complex and risky) SIV cousins.

SIVs invested in a broad array of underlying assets, including general financial institution debt, as well as credit card, commercial mortgage, auto loan, student loan and residential mortgage securitizations, as well various other asset-backed securities and CDOs. The largest concentration of investments is in financial institution debt (42.6%), and the second largest is residential mortgage-backed securities (23.2%). Given that the financial institution debt is associated with a diversified portfolio already and the SIV holds a fairly diversified portfolio of other investments, the structure would not be expected to have a great deal of remaining diversifiable risk.

[5] Moody's Investors Service, *An Introduction to Structured Investment Vehicles*, January 25, 2002.

FIGURE 5: COMPARISON OF SIVS AND SIV-LITES



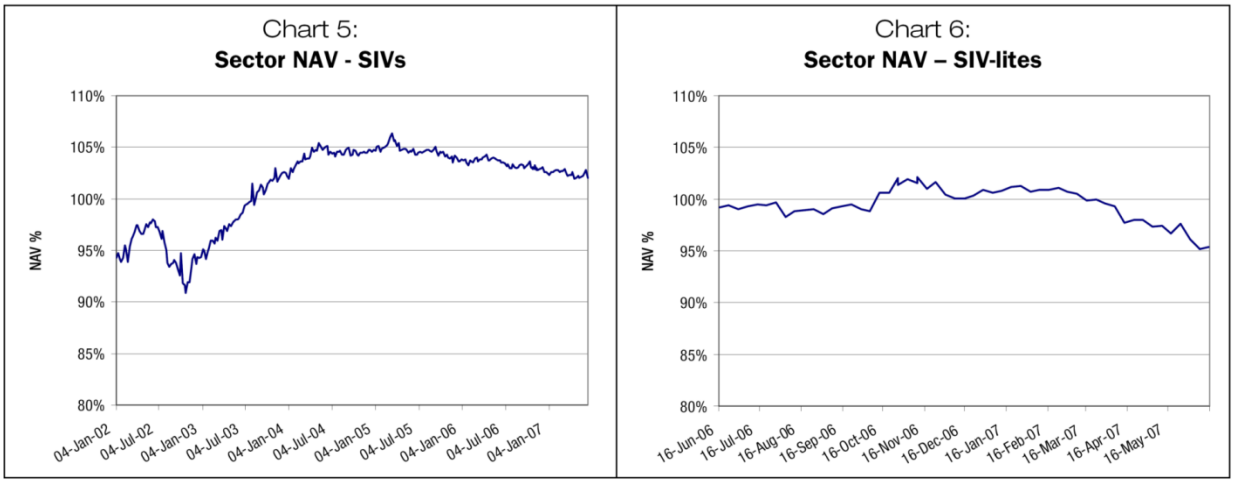
SIV-lites, on the other hand, held 96% of their investments in a single sector: residential mortgage-backed securities, with only a smattering of commercial mortgage-backed securities and CDOs (around 2% apiece). The resulting portfolio is hardly diversified and therefore subject to a substantial amount of idiosyncratic risk.

Furthermore, SIV portfolios held mostly Aaa rated bonds, with a secondary exposure to Aa- and A-rated financial institution debt. While SIVs held a minute exposure to Aa-rated RMBS, that sector made up almost 20% of SIV-lite exposure. As is now widely acknowledged, SIV's Aa-rated financial institution debt was a much higher credit quality than the SIV-lite's Aa-rated RMBS, a factor which was to prove crucial as the sector imploded in mid 2007.

D. The Demise of SIVs

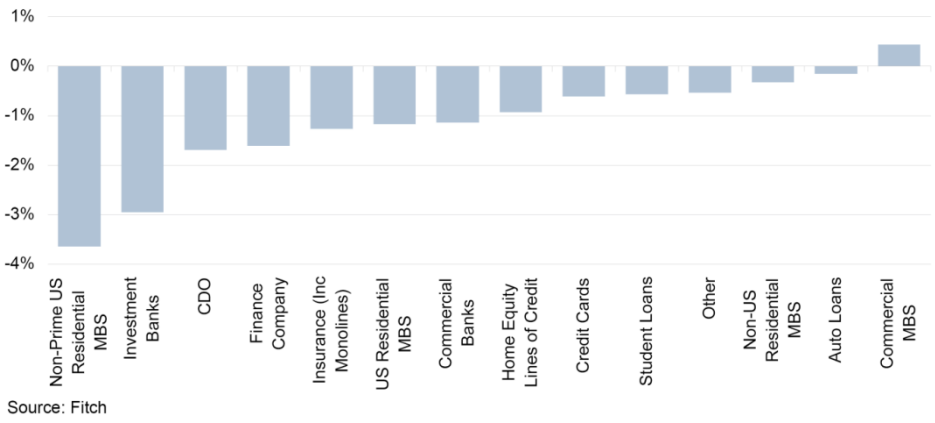
The point of the structure is to profit from several types of spreads. The Senior/Subordinate structure profits from credit spread. The maturity mismatch profits from yield curve spread. The problem with the arrangement is that we typically think of yield curve as made up of risk-free asset spread, but the underlying assets were anything but risk free in August 2007. As the value of SIV-lite RMBS holdings deteriorated and credit spreads increased, it became impossible to roll over the short-term senior financing, while the long-term financing remained in place. Hence, the sector toppled from the top down, as senior financing could not be replaced and losses mounted in the junior claims.

FIGURE 6: SIV AND SIV-LITE NET ASSET VALUES, 1Q2002-1Q2007



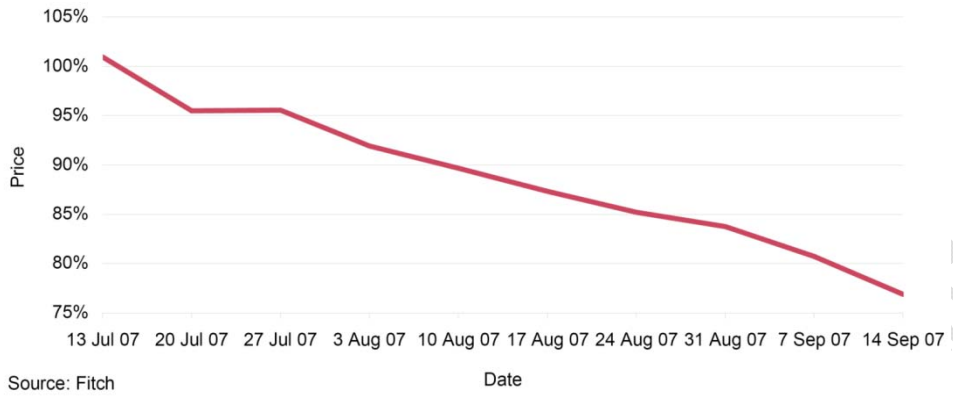
Up through the first quarter of 2007, both SIVs and SIV-lites performed well. Figure 6 shows that although both sectors were obviously stressed from deteriorations in RMBS valuations, the difficulties they were experiencing were broadly in line with historical experience.

FIGURE 7: REPRESENTATIVE SECTOR VALUATIONS IN MID-2007



But Figure 7 shows that in 2007, the value of all major collateral sectors underlying SIVs fell precipitously. In particular, losses were concentrated in non-prime RMBS, principally affecting SIV-lites. Secondarily, however, losses also accumulated in financial institution debt, in general, which also affected regular SIVs. Regular SIVs, however, also holding investments in credit card, commercial mortgage, auto loan, student loan and residential mortgage securitizations, as well as various other asset-backed securities, faced lower losses than SIV-lites as a result. Returns in both SIVs and SIV-lites, therefore, fell precipitously in the second quarter of 2007, as reflected in Figure 8.

FIGURE 8: SIV AND SIV-LITE NET ASSET VALUES, 3Q2007



Source: Fitch

While ABCP and financial CP issuance declined substantially during the period illustrated in Figure 8, nonfinancial CP markets were almost completely unmoved. The reduction set in motion a leveraged unwind in the SIV sector as a whole, however, as the collateral impairment triggered contractual terms of SIVs and left them unable to roll senior funding even if markets accepted the paper. The increase in CP rates between July and September, 2007, therefore reflected only in part the sale of SIV funding for riskier collateral pools, as many of those pools were already substantially constrained by contractual triggers restricting their operation.

FIGURE 9: COMPOSITION OF FUNDING IN FITCH-RATED SIVS

	End Aug 07 (%)	Mid Sept 07 (%)	End Sept 07 (%)
CP market	29	27	23
MTN market	62	62	64
Capital	7	7	7
Repo facilities	2	3	6

Source: Fitch

As those triggers, similar to the ones illustrated in Figure 4, entered restricted funding and defeasance rules, CP funding of SIV liabilities necessarily fell. The decline created the imbalance in liability structures illustrated in Figure 9. Fitch reports that commercial paper fell from August 2007 to September 2007 by six percent, from twenty-nine percent of SIV liabilities to only twenty-three percent. At the same time, medium-term notes, the next most junior liability, rose from sixty-two percent of SIV liabilities to sixty-four percent and repurchase facilities rose from two percent to six percent.

Certainly, when SIVs could not roll the short-term funding, the funding composition changed, The important thing to realize, however, is that CP is an "in or out" market, meaning that if an issuer is not prime credit quality they are excluded from the market. When the issuer is a brain-dead SIV that has been precluded from restructuring its investments by contractual triggers, there is no hope of recovery.

In summary, it is important to ask what kind of risk is this? In a way, this is liquidity risk. But funding liquidity, as well as asset liquidity, was a primary risk as the structure funded long-term assets with short-term liabilities. Such liquidity risk on the liability side is often referred to as roll risk.

Market risk manifested itself in the decline in market value of the collateral, threatening solvency of the construct. Some characterize this as cliff risk, since it was largely unanticipated. But seeing the construct in its entirety, the liquidity, roll, market, and solvency risks all manifested themselves interactively to create a rapid and spectacular demise of a financial sector.

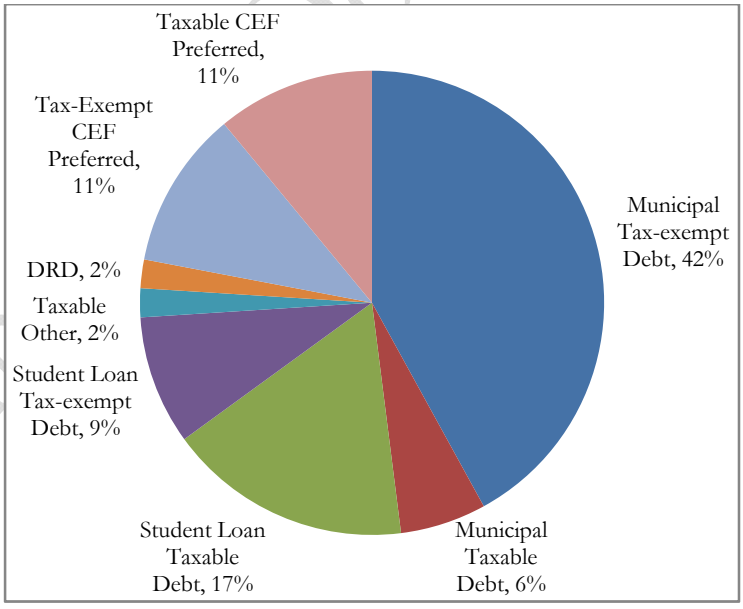
IV. Auction Rate Securities

Auction rate securities (ARS) take the SIV paradigm one step further: issue short-term (weekly or monthly maturity) debt in auction format to gain the cheapest funding. The scheme completes the term structure arbitrage that SIVs address, but has a duration mismatch similar to commercial bank deposits. Like commercial bank deposit funding, the failure is followed by a liability freeze. Without quick recovery in underlying collateral values the structure is not viable and investors experience both illiquidity and credit losses.

A. Background

Nearly twenty years ago the ARS market was developed as a simple way of cheaply funding pools of safe municipal bonds. By 2007, the ARS market was approaching $300 million in outstanding securities. Investors included an array of individuals and firms that sought the safety of sound underlying collateral and reasonable yield, such as corporate cash managers, trust departments, municipalities, non-profits, and individuals. (Merrill Lynch, *An Introduction to Auction Market Securities*, 4th Quarter 2006)

FIGURE 10: TYPICAL ARS COLLATERAL



Source: Merrill Lynch, *An Introduction to Auction Market Securities*, 4th Quarter 2006

The securities included an array of taxable and tax-exempt bonds backed by various safe collateral. Among those, the most prominent was Municipal debt, making up nearly fifty percent of the market at year-end 2006. Student loans made up another twenty-four percent of the market, and closed-end fund (CEF) preferred, another twenty-two percent.

B. Structure

The term "auction rate security" describes a widely disparate array of funding possibilities. Auction rate securities can be equity or debt, taxable or tax-exempt. Rates may reset at 1-, 7-, 28-, or 35-, 49, or 90-day intervals. Structures may be over-collateralized internally, standalone, or insured. But while a vast array of choices exists, similar paradigms were typically applied to particular asset classes.

For instance, in the closed-end fund auction market preferred world the auction rate security is a preferred equity stake. The funds underlying investment portfolio have to maintain a minimum net asset coverage ratio of two to one under the Investment Company Act of 1940, so preferred shares may have to be redeemed if the coverage ratio falls below that threshold. While CEF preferred may be taxable or tax-exempt, auction cycles are typically 7- or 28-days, although 49-day auction cycles occur for certain special types of funds, i.e., dividends received deduction (DRD) preferred deals.

Municipal auction rate securities are sold by states and municipalities for the same funding purposes as typical municipal debt. The collateral is usually standalone, although it may be secured by a municipal bond guarantee. Interest may be taxable or tax-exempt, although – like the typical munipal bond market – most is tax-exempt. Auction rate cycles in municipal debt may run 1-, 7-, 28, 35, or 90-days. Bond ratings on municipal auction rate debt are typically very high, sometimes boosted

Student loan-backed auction rate debt, one of the most popular securities of the credit crisis, is more like a typical student loan securitization. The debt is issued by a bankruptcy-remote special purpose entity, established by not-for-profit, for-profit, and state-sponsored originators of student loans. Auction cycles here are typically 28 days.

Like most securitizations, student loan structures are built upon over-collateralized pools that build reserve funds by accumulating excess spread. There may be different classes of debt issued by the structure forming senior and subordinate claims. But because many of the student loans are guaranteed by state or Federal authorities, the collateral itself, and therefore the securities are viewed as very safe.

In summary, the auction mechanism is thought to give investors liquidity, in that they can exit by deciding to sell at the next auction. In reality, however, the auctions created illiquidity as investors learned that in the event of a failed auction they may not be able to sell the securities until the next successful auction or final legal maturity.

C. Leverage

When auction rate securities function normally, the auctions provide liquidity. When stressed, the auction mechanism reveales the extreme leverage in the short-funded structure.

If there ar emore sellers than buyers in a given auction, that auction will be said to "fail." A failed auction will set a maximum rate as described in the issue's offering document. The idea is to remunerate investors for their own loss of term strcuture yield. Hence, the "maximum rate" is often not that high, representing the expected yield to the next auction. If none of the existing holders of a security offers shares for sale in an auction, an "all hold" rate is imposed until the next auction. The all hold rate can be thought of as a minimum rate, which encourages holders to take part and accurately price the securities from period to period.

While few auctions failed prior to 2008, securities dealers often provided liquidity where auctions might otherwise be mildly stressed. In 2007 Merrill Lynch stated it was "…aware of only 13 issuers which have experienced failed auctions since 1984 with only 1 of those experiencing a failed auction since 1993 (July 2002)." (Merrill Lynch, *An Introduction to Auction Market Securities*, 4th Quarter 2006) By 2007, almost 500 "successful" auctions were taking place each day in the sector.

But "successful" was often not defined in a particularly rigid fashion. An auction could still be successful of the dealer intervened. Indeed, auction rate securities documents disclosed that "an issue's lead dealer, while not obligated to do so and completely t its sole discretion, generally submits a "support bid" into an auction to ensure the auction is successful." In fact, the "lead dealer may submit a support bid at any rate and that bid may affect the rate set in the auction." (Merrill Lynch, *An Introduction to Auction Market Securities*, 4th Quarter 2006)

The problem, however, was not that the dealer submitted those bids, per se. But rather, that the dealer, and the dealer alone, knew the true success of the auction, having submitted backup bids without the reporting those bids or auction results to investors. In fact, auction rate dealers were sanctioned by the SEC in 2006 for failing to reveal relavant information to investors. Upon concluding an investigation of fifteen firms representing the Auction Rate Securities industry, the SEC reported that, "…between January 2003 and June 2004, each firm engaged in one or more practices that were not adequately disclosed to investors, which constituted violations of the securities laws."The SEC issued a cease-and-desist order to stop these violations (see http://www.sec.gov/news/press/2006/2006-83.htm).

The SEC order lists several illegal practices in the conduct of auctions, and notes: "In addition, since the firms were under no obligation to guarantee against a failed auction, investors may not have been aware of the liquidity and credit risks associated with certain securities. By engaging in these practices, the firms violated Section 17(a)(2) of the Securities Act of 1933, which prohibits material misstatements and omissions in any offer or sale of securities."

D. Demise of Auction Rate Securities

In late 2007 and continuing into early 2008, auctions began to fail, slightly at first and building to complete failure by February 13, 2008. Dealers appeared to increasingly intervene to prevent failed auctions in this period in order to avoid losing underwriting and auction dealer fees and allow dealers to sell inventory of auction rate securities. The Wall Street Journal reported on July 28, 2008, that:

> *Wall Street firms started raising commissions paid to some brokers at outside dealers who sold securities to clients, an action that might serve as an enticement to them to sell more. On November 2, 2007, for example, Credit Suisse's short-term trading desk sent out an email informing its salespeople that Citigroup was increasing its commissions to outside dealers from 0.15 of a percent of the security sold to 0.20 of a percent on certain of its auction rate securities, according to a person familiar with the email. By the start of January, their commissions on all types of Citigroup's auction rate securities rose to 0.15 of a percent, instead of 0.1, says the person.*

It appears that similar emails circulated among many Wall Street firms at the time.

It was also at this time that the true nature of the auctions became much more widely known, even inside the industry, itself. About this time, the New York Times reported, "experts say that calling these securities auction-oriented is something of a misnomer because real auctions – during which buyers and sellers meet and an interest rate is set based upon their interest – weren't taking place in recent years. Instead, the Wall Street firms in charge of the auctions smoothed the process by bidding with their own capital rather than rustling up thousands of buyers to meet up with sellers every week or so." The Times quoted Joseph S. Fichera, chief executive of Saber Partners, a financial advisory firm, as maintaining, "The investor never knew how many investors there were, how often the brokerage firms were stepping in to make the system work, not that the broker's support could stop all of a sudden." ("A Long, Cold Cashless Siege," *New York Times*, April 14, 2008)

On June 5, 2008, the Bond Buyer reported that, "Martha Mahan Haines, [SEC Chief of Office of Municipal Securities] said that one of the biggest problems in the ARS market was its opacity, which may have kept investors from knowing that a small group of broker-dealer firms that bid on the auctions were critical to preventing widespread failures. Even though broker-dealers disclosed that they were bidding on auctions, the extent of their participation was unknown."

On August 15, 2008, the Regional Bond Dealers Association explained the situation to the SEC as one in which, "…lead managers in an ARS transaction exercise an almost complete degree of control over information associated with auctions. Lead managers are the only dealers associated with an ARS that know, for example, the number of bidders at an auction, the individual an aggregate dollar amount of bids, the range of bid prices, whether there are sufficient bids by investors for the auction to succeed, and the clearing rates in successful auctions (before those rates are disclosed to the issuer and investors). The lead manager is also the only party (other than perhaps the auction agent, who is not a principal in the transaction) who knows whether the lead manager itself bid for its own account and whether that bid was necessary for the auction's success."

But while lead dealers once knew and had records of such details, in response to a subpoena issued by the New York Attorney General key market participants claimed that auction desk records, transcripts, and recordings were destroyed. Hence, we will never know the true extent of auction manipulation in the market.

But the situation in auction rate markets is even worse. Two brokers, Eric Butler and Julian Tzolov, who worked in the Private Client Services Division of Credit Suisse became famous in early 2008 for aggressively marketing auction rate securities to investors. One practice in the industry – which has been ascribed to Butler and Tzolov but about which the true extent is yet to be known – was to use what the industry has alleged to be "informal shorthand" for the names of many deals that were sold to unwitting investors.

Using such shorthand, deals were represented to be standard student loan ARS when, in fact, they were auction rate-based mezzanine CDOs, instead. The industry referred to "Athilon Funding," when they really meant "Athilon Cap Corp Sr Sub Deferrable Int" securities, or "Lakeside Funding" when they really meant "Lakeside CDO II, Ltd., or "Camber Funding Student Ln. Ser. 5" when they really meant "Camber Master Tr Ser 06-5." A brief list of such alleged references is included in Figure 11.

In summary, like other financing structures, the initial leverage applied to safe collateral grew in magnitude and was eventually applied to riskier underlying collateral, with predictable results.

FIGURE 11: "INFORMAL SHORTHAND" USED TO SELL NOW-DEFAULTED ARS DEALS

DESCRIPTION IN EMAIL	DESCRIPTION IN ACCOUNT STATEMENT
Athilon Funding	ATHILON CAP CORP SR SUB DEFERRABLE INT
Athilon Funding	ATHILON CAP CORP SR SUB DEFERRABLE INT
Athilon Funding	ATHILON CAP CORP SR SUB DEFERRABLE INT
Pivot Funding	PIVOT MASTER TR AR
Mantoloking Funding	MANTOLOKING CDO 2006 LTD
Pivot Funding Ser. 6	PIVOT MASTER TR AR
Pivot Funding Ser. 6	PIVOT MASTER TR AR
Capstan Funding Ser. 2	CAPSTAN MASTER TR SER 2
Lakeside Funding	LAKESIDE CDO LTD
Lakeside Funding	LAKESIDE CDO LTD
Lakeside Funding	LAKESIDE CDO LTD
South Coast Funding St. Loan	SOUTH COAST FDG V LTD
South Coast Funding St. Loan	SOUTH COAST FDG V LTD
South Coast Funding St. Loan	SOUTH COAST FDG V LTD
Camber Funding St. Loan Ser. 2006-1	CAMBER 2006-1 SER 2
Camber Funding Student Ln Ser. 5	CAMBER 2006-5 SER 06-5
Camber Funding Student Loan Ser. 6	CAMBER MASTER TR SER 6

V. Summary and Conclusion

If market doesn't deliver the target equilibrium risk, change the risk. Fairly straightforward to make investments LESS risky, but in a seemingly benign credit environment, markets may strive to make investments MORE risky, instead. Of course, when risk increases, the correlative properties of such investments will render them explosive, so that they may be the first to fail. Hence, from a policy

perspective, innovative structures created in periods of relative calm need to be closely monitored, so that the effects can be contained on the other side of the business cycle.