

Credit

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Global Structured Credit Strategy

Options for CLO summer hedging, finding CLO call candidates

- **Cash has been more resilient but may weaken** — Fund inflows have contained the widening of spreads for cash, including CLO assets, but we think there is scope for widening especially in mezz bonds. Derivatives such as credit indices have done much worse.
- **Flows are muted and might remain so this summer** — BWIC and TRACE data show that CLO trading flows are down, driven perhaps by early summer doldrums, Europe headlines, as well as widely-telegraphed bank loss and possible trade unwind news.
- **At-the-money options provide cheap downside hedge** — The market is currently defensively positioned and cheap shorts are getting scarcer. We recommend at-the-money (ATM) options on credit indices as a cheap hedge against downside tail risk.
- **CLO refinancings and new issue will continue, but a little slower** — Healthy new issue supply has been helped by refinancing of older deals. If loan prices and CLO spreads remain stable, we believe that the trend will continue.
- **We identify 34 pre-2008 CLO refinancing candidates** — Pre-2008 deals exiting their reinvestment period with tight extension language and high CLO equity asset-value are the most likely to get called, as are most 2008-2010 deals out of their non-call period.
- **Life without call: extension and adverse selection** — The average life of deals with no incentive to refinance will depend on their incentive to stay invested; moreover, all deals are prone to the back-ended risk of weaker borrowers remaining in the pool.

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See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

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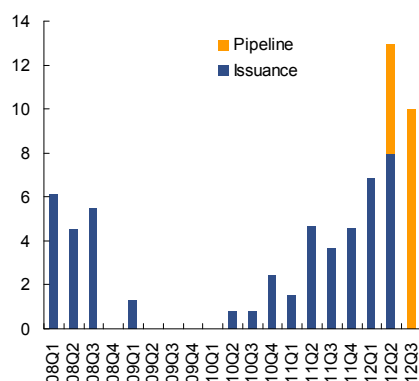
CLO Update – Time to hedge spread?

Figure 1. Prices of cash loans and credit (IG and HY) indices (base=100)



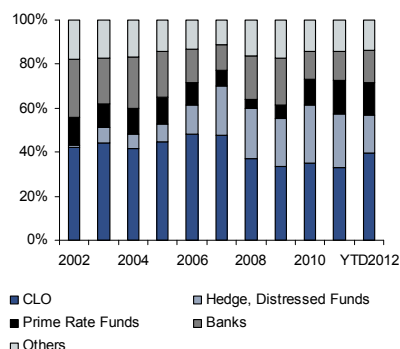
Source: Citi Investment Research and Analysis

Figure 2. CLO new issuance



Source: Citi Investment Research and Analysis

Figure 3. CLO share of loan market



Source: S&P LCD

Cash more resilient – but how much longer?

The credit markets have been fairly volatile over the past few weeks, but most of the widening has really been confined to the derivative markets. Indices have widened across the board, in high yield and in investment grade, in the US and in Europe. Prices of cash assets, such as corporate bonds, loans and CLOs, have been much more resilient (Figure 1).

However even the cash markets could not escape the poor macro-headlines, the most recent being the lack of visible progress in the latest Eurosummit, and the Merkel-Hollande disagreement on the amount of coordinated support for peripheral countries. A few loan issuers have delayed bringing their deals to the market, or were reported to be looking at bond markets as an alternative source of funding. Moreover, as the figure shows, secondary prices have fallen. LCD's flow-name composite posted its steepest week-over-week loss since early Oct 2011.

The widening in synthetics compared to the resilience of cash is an indication of the current state of the markets. Cash markets have been dominated by fund inflows while the index markets have seen much more involvement from relative value players and hedging by dealers and real money accounts. If anything, as pointed out by our colleagues in [European Credit Outlook](#), the market is at a watershed and much more defensively positioned than last year. Real money accounts will buy index (or single-name) protection as a short-term overlay or lighten up on exposure on more "opportunistic" inventory, but they remain very reluctant to part with what they consider to be core cash holdings. Almost certainly that is in part due to the difficulty of buying the bonds back when the sentiment turns in the secondary market, but it is also an indication of the amount of excess cash many still have.

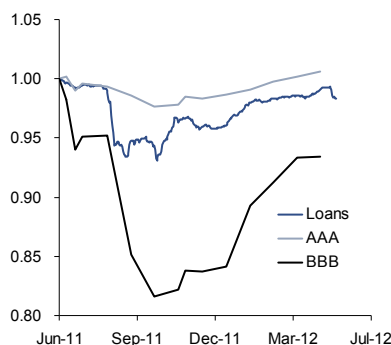
So while we expect spreads to leak wider in cash and synthetics on the back of news, there is also a good possibility of a sharp squeeze tighter on the sign of any good news, given investor positioning.

CLO Supply – Important for Loan Spreads

The loan market has certainly been helped by the relative uptick in CLO issuance (Figure 2) and any significant weakness will likely affect loan prices. Issuance to-date, at \$14.8bn, has already surpassed 2011 volumes and there is a healthy pipeline. As Figure 3 shows, the share of loans that were bought by CLOs last quarter is not far behind 2007, and significantly up from last year. There is a symbiotic relationship here – more CLOs mean more loans are needed and that boosts loan prices (or increases loan issuance). CLO demand wanes (or liability spreads widen too much relative to loans) and there is not enough excess cashflow to attract CLO equity buyers, which leads to a drop in issuance.

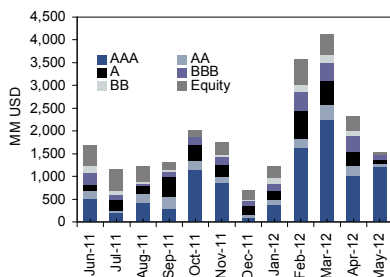
It is too early to predict whether the very recent drop-off in CLO issuance and slight reversal in loan and CLO spreads (ECP 2012-4 from Silvermine priced slightly wider across the capital structure than recent prints) will persist, but investors should be prepared for such a scenario. Despite the evidence that CLOs have come through the crisis with their credentials intact, and, moreover, US, unlike European, corporate defaults are expected to be low ([Default Rates to Climb Rapidly in Q3 and Q4](#)), a risk-off environment will affect all credit products. Higher beta-tranches such as junior mezz bonds will likely feel the volatility significantly more.

Figure 4. Loan and CLO triple-A and triple-B prices (base = 100)



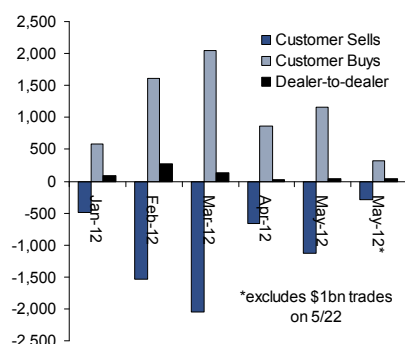
Source: Citi Investment Research and Analysis

Figure 5. Recent BWIC activity (\$mm)



Source: Citi Investment Research and Analysis

Figure 6. TRACE investment-grade CDO flows



Source: FINRA, Citi Investment Research and Analysis

Mezz is hit harder, but price drops are more muted than in the past

As the previous sell-offs have shown (a substantial one in 2008, and smaller ones in Q2/Q3 2010 and 2011), it takes a while for CLO spreads to react. Among cash assets, bonds and loans react sooner followed by structured assets. As secondary liquidity in CLOs has improved and more cross-asset investors have become involved with CLOs, the lag has decreased. Moreover, price falls have become contained with greater liquidity in the market, when compared to 2008. Last year provided ample evidence of this (Figure 4). Loan prices fell and so did CLO bonds, after the US downgrade and a reigniting of Euro sovereign headlines. Triple-B prices fell substantially more than senior bonds or loans, but in all cases the price falls were nowhere as draconian as 2008. Prices of triple-Bs, for example, had reached as low as single-digits in 2009, had risen and then dropped to high 40s in the summer of 2011. After prices rose again in 2011, elevated market volatility later in the year saw them drop to low 60s, thus evidencing better support at the bottom from a bigger investor pool. Triple-As also dropped in price but the drop was much less compared to the junior bonds. We also feel that a growing body of new investors in the senior part of the CLO capital structure will better protect senior prices than in the past.

Recent fall-off in investor activity may mean choppy summer

One indication of difficulties ahead is a fall-off in investor activity. Till recently, mezz CLO bonds had been the mainstay of secondary BWIC activity. That trend has almost died this month (Figure 5) in a sign that dealers may not be providing much liquidity and investors are not willing to sell into an uncertain market.

A similar picture emerges when one analyzes monthly TRACE flows. Unfortunately, the data from FINRA does not distinguish between CLO and other CDOs (such as real estate, sub-prime or with bank TruPS portfolios). Since most non-CLO cash CDOs are non-investment grade, we focus on the investment-grade section of the portfolio. Further, May volumes would have been influenced by a few large-notional trades as the Fed sold its legacy Maiden Lane vehicle CDO positions. In particular, the data for May 22 shows a few large trades that we suspect to be related to these sales. The volume data after adjusting for these trades (Figure 6) is consistent with the fall in customer sales that the BWIC data shows.

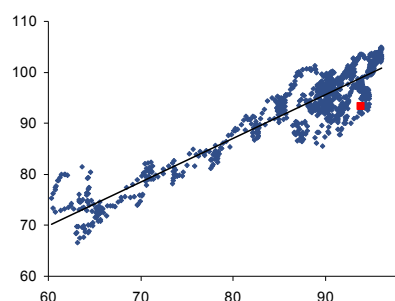
In a market with negative technicals, low dealer inventory and sparse client flows, there is a high possibility that spreads could gap out. Such a scenario increases the motivation of investors to look at possible systemic hedges.

Figure 7. Cross Asset Correlations (2008—present, prices)

	Loans	CLO AAA	CLO BBB
CDX IG	68%	64%	63%
CDX HY	93%	88%	87%
Loans		97%	94%

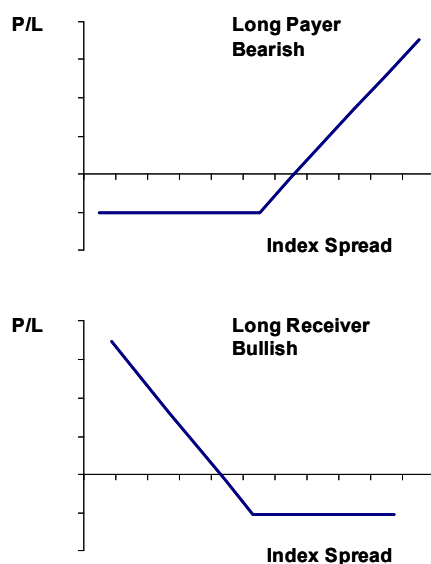
Source: Citi Investment Research and Analysis

Figure 8. CDX HY (Y-axis) vs Loans (X-axis), prices



Source: Citi Investment Research and Analysis

Figure 9. Payout Profiles for Long Option Positions at Option Expiry



Source: Citi Investment Research and Analysis

Strategies to Hedge Market Downside

Investing in options is not suitable for all investors. Please see the disclosures concerning the risks of investing in options below and discuss with your Financial Advisor whether this particular options strategy is suitable for you. Note that all option prices are indications, based on intraday prices as of 30 May 2012. Interested investors should contact our trading desk for updated price and liquidity information. Also, complex option strategies may entail higher commissions costs.

As discussed earlier, CLO cash spreads have tended to lag derivative markets recently (see Figure 1 and Figure 4), because of illiquidity and positive technicals due to larger allocations from credit focused funds and insurance companies reaching out for yield. However, the risk of CLO prices catching up remains significant in light of expectations of elevated credit market volatility. In particular, given the neutral to bearish investor positioning in credit markets (see [Credit Strategy Cheat Sheet](#)), we believe that the markets will be able to absorb negative headlines up to a point beyond which spreads will suddenly gap wider. Overall, based on the analysis below, we believe that an options-based hedging strategy may be appropriate.

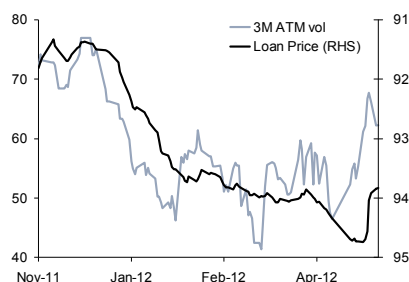
We consider different ways for hedging a long CLO cash position. The correlations between loans, CLO tranches and the 5Y OTR (on-the-run) CDX IG and HY indices are shown in Figure 7. It is clear that both AAA and BBB CLO tranches are highly correlated with loans, as well as the IG and HY indices. Therefore, for the purposes of this analysis, we use cash loan prices as a proxy for CLO prices to judge the effectiveness of a hedge, given the sparse nature of CLO cash pricing data.

The first possibility that we consider is to buy protection on a credit index. As discussed earlier, credit indices have significantly underperformed loans (and CLOs) – this makes using credit indices as a hedge against a downside gap risk unattractive from a cost perspective. For example, the 5Y CDX HY OTR (currently HY18) index could potentially be a good hedge since it shows a correlation of 93% to loan prices, and a regression against loan prices shows an R^2 of 86%. However, a simple regression of the 5Y CDX HY prices against loan prices (see Figure 8) shows that the current CDX HY level (red marker) is significantly undervalued relative to loans (below the linear regression line), which obviously limits the upside of the hedge in a downward market move.

A second possibility is to use credit index options to hedge against a downward market move. The credit index option markets (especially options on the OTR CDX IG index) have exhibited improving liquidity as more credit market participants engage in volatility trading. Credit index options come in two flavors – payers and receivers. A payer is similar to a put option on an equity index and expresses a bearish view on credit spreads, while a receiver is similar to a call option and expresses a bullish view on credit spreads. The payout profiles for long payers and receivers at option expiry are shown in Figure 9.

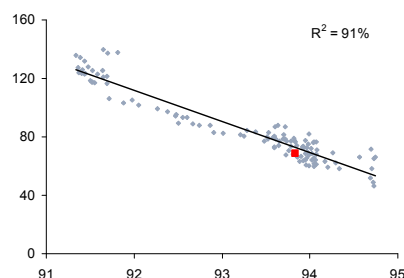
Similar to an equity option, the value of a credit option is affected by movements in the underlying index (delta), the passage of time (theta), changes in implied volatility (vega) and changes in delta (convexity or gamma). An option is said to be at-the-money (ATM) when the spread (price) at which the option is struck equals the spread (price) of the underlying index. A long payer option position has positive delta (option value goes up as underlying index spreads widen), positive gamma (long option has positive convexity with respect to the underlying index spread), positive vega (option value goes up with increasing implied volatility) and negative

Figure 10. Loan prices (reverse scale) and Credit Implied Volatility



Source: Citi Investment Research and Analysis

Figure 11. 3M ATM Payers (Y-axis) vs Loans (X-axis), prices



Source: Citi Investment Research and Analysis

Figure 12. Hedging Costs as of 5/30/2012

	Upfront	Runnin g
Short 5Y CDX HY18	7.75pt	500bp annuall y
Long 3M ATM IG CDX Payer	92.25bp (369bp annually, roll every 3 mos on option expiry)	

Source: Citi Investment Research and Analysis

theta (option value falls as it gets closer to maturity). Thus, in order to hedge a long cash CLO position, payers would be the logical instruments of choice, as they allow the investor to express a leveraged (and positively convex) bearish view. Further details about credit options can be found in the [Credit Default Swaption Primer](#).

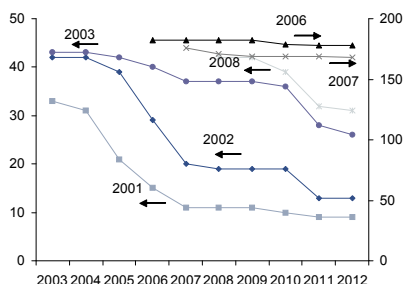
In Figure 10 we see that the 3M (month) ATM (at the money) CDX IG option implied volatility and loan prices are inversely correlated, i.e., buying volatility by going long options can be a profitable hedging strategy in down markets for loans (and CLO tranches due to the positive correlation between loans and CLO tranches). The next figure (Figure 11) shows that on a price basis, 3M ATM IG CDX payer options have slightly underperformed loans, as indicated by the current price levels (red marker) which are very close to the linear regression line. Thus, we believe a long payer option hedge is advantageous on multiple counts:

1. Upside in the case of a market downturn is preserved since payer options (which move up in price as markets go down) have underperformed loans (in price terms).
2. Positive convexity (or gamma) with respect to the underlying CDX IG index (which is positively correlated to loans and CLO tranches) implies that as markets gap wider, the performance of the payer option hedge will get a boost from increased sensitivity to the underlying index spread widening. In particular, given the expectations of large market moves to the downside, it makes sense to take advantage of the positive convexity of a long payer option position.
3. Low cost compared to a short 5Y CDX HY18 (OTR) position. The costs for hedging using a long payer option versus a short 5Y CDX HY18 position are shown in Figure 12. The leveraged nature of the long option position makes it considerably cheaper than hedging with an index.

All of the above factors put together make a long 3M ATM IG CDX option payer a very attractive hedging alternative, in our view.

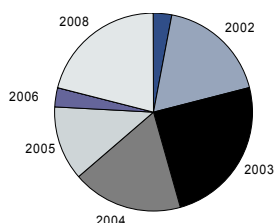
CLO Call (or Extension) Candidates

Figure 13. Number of deals (by vintage) outstanding versus year



Source: Citi Investment Research and Analysis

Figure 14. Redemptions of deals in 2011 by vintage



Source: Citi Investment Research and Analysis

Figure 15. Questions to consider in deciding whether it is optimal to call a CLO or not

Deal feature	Condition or Incentive
Non-call period	Ended
Equity vote	Controlling majority in favor
Rated notes	Needs to be paid off in full
Portfolio value	Typically high (pay-off debt and leave some value for equity, latter less important if debt bought at discount)
Extension ability	Difficult to continue reinvesting post end of reinvestment period
Liability cost	High relative to current market (either deal is delevering or, if not, was issued at wider spreads)
Value of future equity cashflows relative to liquidation value	Low either because CLO is deleveraging or cash is trapped to pay off senior debt

Source: Citi Investment Research and Analysis

CLO Calls continue

With five deals already called so far this year, the contribution of refinancings to the new issue pipeline remains stable, if at a somewhat slower pace than last year. The latest (and also the most recent vintage) deal to be called and refinanced was a 2010 middle-market deal, Garrison Funding 2010-1. More should be on the way.

As Figure 13 shows, most redemptions during 2011 were those of 2002-2004 and 2008 vintages. The reasons are different for the older and more recent vintages. For older vintages (such as the 2001-2004 deals) the reason is that the average liability costs increase as triple-As pay down at the end of the reinvestment period (and will equal the liability costs of a new deal at some point), and, simultaneously, the leverage for equity declines. As a result, the equity holder is incentivized to call the deal as residual cashflows decline because of the combination of these two factors. Moreover, with higher loan prices, the NAV of the portfolio may result in a higher immediate payout than the present value of these future cashflows.

The reason for the refinancing of the newer (2008) deals is opportunistic. With the tightening of triple-A spreads, these deals were able to reduce their liability costs by rolling into a new transaction with lower spreads (notice in the figure that many 2002 deals did the same during 2006-2007). The same reason also explains why deals from 2006 and 2007, with their low liability spreads, are not likely to get called in the near future. If spreads stay stable, we expect more refinancings from 2010 vintages which are coming out of their non-call period.

The timing for opportunistic refinancings can vary depending on the level at which new liabilities can be reissued. Refinancings dropped off in Q4 2011, for instance, following the sovereign-led jitters in the previous quarter. Moreover, Moody's reports¹ that a handful of CLOs revoked their optional redemptions late in third-quarter 2011, although one deal subsequently re-issued the notice. These revocations were likely due to the fact that the deals were no longer able to fully repay their debt amid the decline in loan prices in the second half of 2011.

To Call or Extend

The decision to refinance a deal depends on a few factors, listed in Figure 15. For deals that are still within their reinvestment period such as 2008 (and later) and deals out of their non-call period, the question is whether the deals can be refinanced at tighter liability spreads. For deals that are out of their reinvestment period, there are a few other considerations for equity holders.

If deals are delevering and are finding it difficult to stay reinvested (typically because of tight reinvestment language), the combination of rising liability costs and lower leverage argue for early redemption. On the other hand, a 2006 or 2007 CLO with low spreads for its rated debt will try to stay reinvested (and thus extend the life of its rated debt) provided that the reinvestment language provides enough flexibility to do so (Figure 16). The decision that such an equity holder will make is whether the present value of its future equity cashflows (which gets the benefit of low debt servicing costs) exceeds the market value of the collateral less the liquidation costs (which includes paying off the rated debt in full). Ordinarily, high future cashflows and low market value would argue for late redemption while high market value would argue for the opposite. This logic may break, however, if the equity holder

¹ CLO Redemptions will Continue, CLO Interest, Moody's Investors Service, 10 May 2012

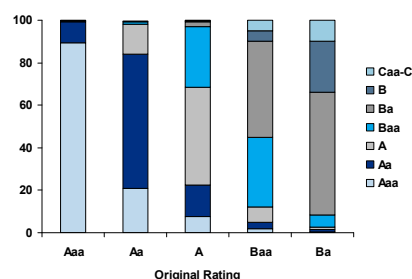
Figure 16. Tests that make it difficult to reinvest after reinvestment period ends

Test	Description
Allow reinvestment	None
Bucket (if allowed)	Unscheduled proceeds only (versus credit-improved and/or credit-risk as well)
WAL* Test (1)	Declining with time, in contrast to fixed
WAL Test (2)	Satisfy, in contrast to maintain or improve
Asset maturity	Same or shorter maturity
Tranche Downgrade	Test exists (i.e. trading restricted if tranches are below threshold)
Coverage Tests	Exist (and number of tests)

*Weighted Average Life

Source: Citi Investment Research and Analysis

Figure 17. Current vs original CLO tranche ratings



Source: Moody's

also owns bonds purchased at discount – the appreciation on the bonds may be enough to give up any further upside on the equity after the collateral is liquidated.

Initial Shortlist of Call Candidates

Based on the call criterion of the attraction of deal liquidation versus ongoing reinvestment that we just described, we have identified an initial shortlist of 34 call candidates from a starting pool of 159 CLOs. This pool of CLOs was used by Moody's² in their assessment of the collateral extension risk in US CLOs. To assess the ease of a deal's ongoing reinvestment, we considered the following criteria:

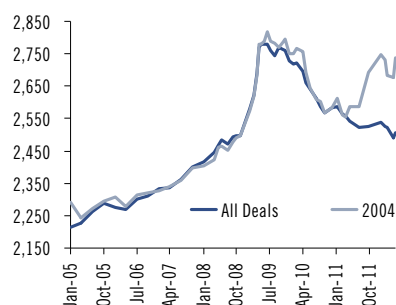
1. The ability of a CLO to continue investing even after the reinvestment period has ended;
2. The available cushion in the collateral weighted average life (WAL) test;
3. Any requirement to preserve the same asset maturity if a manager chooses to reinvest in new collateral during the deal amortizing period;
4. Whether there were any tranche rating conditions that had been triggered which would stop the deal from reinvesting.

We assessed the relative economics of liquidation by looking at the proceeds available to equity if a deal was liquidated (that is, the collateral market value less par of CLO liabilities which need to be repaid as well as any unpaid fees) in comparison to the present value of the projected equity cashflows if the deal remained outstanding.

The shortlist of 34 deals along with a brief description of the criteria that were used is shown in Figure 19. Our two main criteria were first, that the deal has a high ratio of equity NAV to present value of CLO equity (PV) projected cashflows, or, second, that the deal would find it difficult to stay reinvested and would delever early. The equity NAV to PV ratio is shown in the second-from-right column in the figure and we have considered a ratio of 90% as sufficiently high for an equity investor to reasonably consider the liquidation option. (The right-most column, not directly used in our shortlist, is used as a proxy for the deal's appeal in continuing to generate future cashflows since a high cushion means it is less likely that a cash diversion trigger will be breached). We have included deals with a lower equity NAV ratio (65-90%) if we felt the deal would delever soon and thus hurt its equity returns. We assumed this was the case if the deal was not allowed to reinvest unscheduled principal payments (4th col.), or, even if it was so, the deal had become static because there was either a rating condition breach (9th col.) or the deal's collateral average life test required it to satisfy, not just maintain at its current level, a test value (6th col.) and the deal was already out (or nearly out) of compliance (5th col.). Typically, the pinch-point for a downgrade trigger being breached now is the single-A and triple-B tranche (see Figure 17) as many are more than 2 notches below the original rating. We do accept that bonds can get upgraded but we feel that is likely to happen after more deleveraging which once again tilts the economics in favor of an early call.

² Significant Number of US CLOs Have Potential for Life Extension and Credit Deterioration After Reinvestment Period, CLO Interest, Moody's Investors Service, 10 May 2012

Figure 18. Adverse Migration - Rating factor (WARF) deterioration of 2004 US CLOs



Source: Citi Investment Research and Analysis

Life without call: extension and adverse selection

The average life of deals that do not get called in the near-term will depend on how tight is the language for investing in new loans at the end of the reinvestment period. Many deals have seen rapid amortization of senior bonds (see Structure and manager differences in CLO amortization, [Global Structured Credit Strategy](#)). However there are other deals with slower amortization rates.

Deals with low equity NAV (we ignore any upside from an equity holder having purchased debt at a discount and looking to the appreciation from an early unwind) have less incentive to refinance. Moreover, if these deals have an incentive to be invested in longer-dated collateral and preserve their low liability costs (for 2006-2007 deals) by just needing to maintain their average life test values (even if their tests are out-of-compliance), calling the CLOs is less likely. In contrast, equity holders of deals that cannot reinvest after the revolving period ends, will be more inclined to refinance. We have highlighted the bonds with the greatest extension risk in Figure 20. We have not included deals which are currently static because their tranche ratings are below the required thresholds – in reality, though, such bonds may be upgraded as deals de-lever and the CLOs can start reinvesting again. Therefore the list is likely going to be longer than what is shown. With all deals, moreover, there is the risk that the weakest borrowers, who are unable to refinance, remain in the pool, a feature we notice in 2004 CLOs (Figure 18). Deal structures that are more lenient in their reinvestment language may be more prone to this risk as managers look for shorter-dated collateral to reinvest cash.

Figure 19. Pre-2008 CLOs Most Likely To Get Called (Based on Ratio of Equity NAV to PV of Future Cashflow > 90% for any deal; or 65-90% for deals where Can Reinvest Unscheduled Principal = N unless WAL Test Type = S* with little WAL Cushion, or Rating Condition Triggered = 1)**

Deal Name	Close	Reinv end	Can reinvest unsched. prin?	WAL cushion	WAL test type*	Same or shorter maturity	Rating condition	Triggered ?	Ratio of Equity NAV to PV of Future Cashflow**	Junior- most OC cushion
Denali Capital CLO V, Ltd.	09/2005	10/2011	N	2.00	N/a	N/a	N/a	N/a	65%	3.77%
ColumbusNova CLO Ltd. 2006-I	08/2006	10/2012	Y	(0.21)	S	Y	A & B 1 notch; C, D & E 2 notches	1	66%	4.43%
Madison Park Funding I, Ltd.	04/2005	05/2011	N	(0.37)	N/a	N/a	N/a	N/a	66%	10.25%
Ares VR CLO	03/2006	02/2011	Y	(0.20)	S	Silent	A & B 1 notch; C & D 2 notches	0	67%	5.40%
Symphony CLO I, Ltd.	11/2005	11/2012	Y	0.00	M/I	Y	Senior Notes 1 notch, Mezz 2 notches	1	67%	6.80%
Octagon Investment Partners V, Ltd.	01/2003	02/2012	N	0.14	N/a	N/a	N/a	N/a	68%	3.30%
LCM III Ltd.	04/2005	06/2012	Y	(0.37)	S	Y	Senior Notes 1 notch	0	68%	5.05%
BlackRock Senior Income Series II	06/2005	05/2011	Y	(0.59)	M/I	Y	A 1 notch; B, C & D 2 notches	1	69%	3.84%
Atrium IV	06/2005	06/2011	N	0.46	N/a	N/a	N/a	N/a	69%	7.26%
Ares XII CLO Ltd.	10/2007	11/2012	Y	4.46	Silent	Y	A & B 1 notch; C, D & E 2 notches	1	69%	3.53%
Market Square CLO Ltd.	05/2005	04/2011	Y	(1.32)	S	Y	A 1 notch; B & C 2 notches	0	69%	3.63%
Castle Garden Funding	10/2005	12/2011	N	0.11	N/a	N/a	N/a	N/a	71%	8.07%
Cent CDO XI Limited	03/2006	04/2012	Y	(0.04)	M/I	Y	A 1 notch; B & C 2 notches	1	73%	6.04%
NACM CLO I	06/2006	07/2012	N	(0.02)	N/a	N/a	N/a	N/a	73%	4.89%
Lafayette Square CDO Ltd.	11/2005	11/2011	Y	5.91	S	Silent	A & B 1 notch; C 2 notch	0	73%	8.70%
Halcyon Strd Asset Mgt Long / Short 2006-1 Ltd.	10/2006	10/2011	Y	0.00	M/I	Y	A & B 1 notch; C, D & E 2 notches	1	73%	5.04%
Clydesdale Strategic CLO I Ltd.	01/2005	02/2011	N	0.09	N/a	N/a	N/a	N/a	74%	6.74%
Centurion CDO 8 Limited	01/2005	03/2011	Y	(1.08)	M/I	Y		0	75%	4.96%
LCM IV Ltd.	08/2005	10/2011	Y	(1.08)	S	Y	All Classes of Notes 1 notch	1	75%	5.21%
BlueMountain CLO Ltd.	11/2005	11/2011	Y	(0.84)	S	Y	All Classes of Notes 1 notch	1	81%	5.13%
Ares NF CLO XIII Ltd.	05/2006	05/2011	Y	(0.51)	S	Silent	A & B 1 notch; C & D 2 notches	0	82%	4.55%
Navigator CDO 2005, Ltd	07/2005	10/2011	Y	(1.08)	S	Y	A 1 notch; B & C 2 notches	0	84%	8.73%
Marathon CLO I LTD	04/2005	04/2011	Y	(0.98)	S	Silent	All Classes of Notes 1 notch	0	90%	15.24%
Dryden VIII-Leveraged Loan CDO 2005	06/2005	08/2011	Y	0.82	S	Silent	A & B 1 notch; C & D 2 notches	0	94%	5.31%
1776 CLO I, Ltd.	04/2006	05/2012	Y	-	M/I	Y	A & B 1 notch; C, D & E 2 notches	0	96%	6.4%
Whitney CLO I, Ltd.	12/2004	03/2011	Y	0.71	M/I	Y	All Classes of Notes 1 notch	0	98%	4.2%
Cumberland II CLO Ltd.	09/2005	11/2011	Y	(0.11)	M/I	Y	A 1 Notch; B & C 2 notches	0	99%	4.1%
Four Corners CLO 2005-I, Ltd.	02/2005	03/2011	Y	(1.12)	S	Y	A1, A2, A3 & B 1 notch; C & D 2 notches	0	103%	29.12%
Ares VIR CLO	03/2006	03/2011	Y	(3.90)	Silent	Y	A & B 1 notch; C & D 2 notches	0	103%	20.38%
Oak Hill Credit Partners IV, Limited	07/2005	08/2011	Y	-	M/I	Y	A 1 notch; B & C 2 notches	0	107%	16.6%
Chatham Light II CLO, Ltd.	08/2005	08/2011	Y	(0.89)	M/I	Y		0	108%	8.7%
Cavalry CLO I, Ltd.	03/2006	03/2012	Y	-	M/I	Y		0	113%	6.7%
LCM II	11/2004	01/2011	Y	0.18	S	Silent	All classes of Notes 1 notch	0	118%	10.09%
Carlyle Arnage CLO, Ltd.	12/2007	02/2012	Y	2.67	M/I	Y	All Classes of Notes 1 notch	0	155%	2.5%

*WAL Test M/I = Maintain or Improve; S = Satisfy

**Equity NAV based on current collateral market value less liquidation costs. PV of Future Cashflow calculated by discounting equity cashflow under market assumptions of collateral default, recovery and prepayment at 15% yield. .

Source: Moody's, Intex; Citi Investment Research and Analysis

Figure 20. Likely Pre-2008 CLO Extension Candidates (Based on Can Reinvest Unscheduled Principal = Y; WAL Test Type = M/I*; Rating Condition Triggered = 0; Ratio of Equity NAV to PV of Future Cashflow** < 90%)

Deal Name	Close	Reinv End	Can Reinvest?	WAL Cushion	WAL Test Type*	Same or shorter maturity	Rating Condition	Triggered ?	Ratio of Equity NAV to PV of Future Cashflow**	Junior-most OC Cushion
Carlyle High Yield Partners VI, Ltd.	07/2004	08/2010	Y	(2.75)	M/I	Y	A & B 1 notch; C & D 2 notches	0	0%	47.8%
Halcyon Strd Asset Mgt Long / Short 2007-1 Ltd.	05/2007	07/2013	Y	-	M/I	Y	A & B 1 notch; C & D 2 notches	0	0%	-2.2%
Lightpoint CLO III, Ltd.	07/2005	09/2011	Y	(1.07)	M/I	Y	A & B 1 notch; C 2 notches	0	0%	12.1%
Lightpoint CLO IV, Ltd.	04/2006	04/2012	Y	(0.65)	M/I	Y	A & B 1 notch; C 2 notches	0	0%	7.9%
Fraser Sullivan CLO II Ltd.	12/2006	12/2012	Y	0.53	M/I	Y	A & B 1 notch; C & D 2 notches	0	0%	4.6%
Pacifica CDO V, Ltd.	01/2006	07/2012	Y	-	M/I	Y	A 1 notch; B & C 2 notches	0	11%	4.2%
Fraser Sullivan CLO I Ltd.	03/2006	03/2012	Y	(0.22)	M/I	Y	A & B 1 notch; C, D & E 2 notches	0	19%	4.4%
Avenue CLO II, Ltd.	08/2005	10/2011	Y	0.27	M/I	Y	All Classes of Notes 1 notch	0	19%	2.9%
Four Corners CLO III, Ltd.	09/2006	10/2012	Y	(0.64)	M/I	Y	A & B 1 notch; C & D 2 notches	0	21%	2.6%
Diamond Lake CLO, Ltd.	09/2006	12/2012	Y	(0.27)	M/I	Y	All Classes of Notes 1 notch	0	25%	4.0%
Mountain View Funding CLO 2006-1, Ltd.	05/2006	04/2012	Y	(4.06)	M/I	Y	A & B 1 notch; C, D & E 2 notches	0	25%	2.8%
KKR Financial CLO 2006-1, Ltd.	09/2006	08/2012	Y	(1.52)	M/I	Y	A-1, A-2, & B 1 notch; C 2 notches; D 3 notches	0	26%	22.9%
Greyrock CDO Ltd.	09/2005	11/2011	Y	0.31	M/I	Y	All Classes of Notes 1 notch	0	27%	2.0%
Mountain Capital CLO IV Ltd.	12/2005	03/2012	Y	0.18	M/I	Y	All Classes of Notes 1 notch	0	28%	3.0%
Carlyle Bristol CLO, Ltd.	10/2005	11/2011	Y	-	M/I	Y	All Classes of Notes 1 notch	0	35%	3.5%
Baker Street CLO II Ltd.	09/2006	10/2012	Y	0.05	M/I	Y	A & B 1 notch; C & D 2 notches	0	35%	3.6%
Baker Street Funding 2005-1 CLO	12/2005	12/2011	Y	-	M/I	Y	A & B 1 notch; C, D & E 2 notches	0	35%	3.2%
Summit Lake CLO, Ltd.	12/2005	02/2012	Y	-	M/I	Y	All Classes of Notes 1 notch	0	37%	2.4%
Southfork CLO	03/2005	05/2012	Y	(1.22)	M/I	Silent	All Classes of Notes 1 notch	0	38%	8.4%
Gulf Stream-Compass CLO 2005-II, Ltd.	01/2006	01/2012	Y	-	M/I	Y	A & B 1 notch; C & D 2 notches	0	40%	3.1%
Babson CLO Ltd. 2005-II	07/2005	07/2012	Y	(0.62)	M/I	Y	A1 & A2 1 notch; B, C & D 2 notches	0	50%	4.5%
Black Diamond CLO 2005-1 Ltd.	04/2005	06/2011	Y	(0.04)	M/I	Y	A & B 1 notch; C & D 2 notches	0	53%	4.2%
Marquette Park CLO Ltd.	12/2005	01/2012	Y	(0.58)	M/I	Y	A 1 notch; B, C & D 2 notches	0	59%	2.7%
Octagon Investment Partners VIII, Ltd.	08/2005	09/2011	Y	(0.12)	M/I	Y	A & B 1 notch; C, D & E 2 notches	0	60%	3.5%
Gallatin CLO II 2005-1, Limited	09/2005	11/2011	Y	0.37	M/I	Y	All Classes of Notes 1 notch	0	60%	4.1%
AIMCO CLO, Series 2005-A	09/2005	10/2012	Y	0.59	M/I	Y	A 1 notch; B, C & D 2 notches	0	61%	5.3%
Kingsland I, Ltd.	07/2005	06/2011	Y	-	M/I	Y	All Classes of Notes 1 notch	0	66%	3.9%
Trimaran CLO IV	09/2005	12/2011	Y	0.02	M/I	Y	All Classes of Notes 1 notch	0	69%	4.5%
Babson CLO Ltd. 2005-I	03/2005	10/2012	Y	(0.25)	M/I	Y	A 1 notch; B & C 2 notches	0	70%	4.4%
Kennecott Funding Ltd.	01/2006	01/2012	Y	(1.51)	M/I	Y	A & B 1 notch; C & D 2 notches	0	70%	8.8%
ACA CLO 2005-1, Limited	08/2005	10/2011	Y	0.46	M/I	Y	All Classes of Notes 1 notch	0	71%	5.7%
Galaxy IV CLO	03/2005	04/2011	Y	(0.43)	M/I	Y	A & B 1 notch; C 2 notches; D 3 notches	0	72%	18.0%
Galaxy V CLO, Ltd.	09/2005	10/2011	Y	(0.21)	M/I	Y	A & B 1 notch; C 2 notches; D 3 notches	0	73%	10.7%
KKR Financial CLO 2005-1, Ltd.	03/2005	04/2011	Y	(1.50)	M/I	Y	A1, A2 & B 1 notch; C 2 notches; D 3 notches; E & F 4 notches	0	81%	7.1%
KKR Financial CLO 2005-2, Ltd.	11/2005	11/2011	Y	(1.08)	M/I	Y	A & B 1 notch; C 2 notches; D 3 notches	0	85%	12.0%

*WAL Test Condition is M/I (Maintain or Improve) versus S (Satisfy)

**Equity NAV based on current collateral market value less liquidation costs. PV of Future Cashflow calculated by discounting equity cashflow under market assumptions of collateral default, recovery and prepayment at 15% yield.

Source: Moody's, Intex; Citi Investment Research and Analysis

Appendix

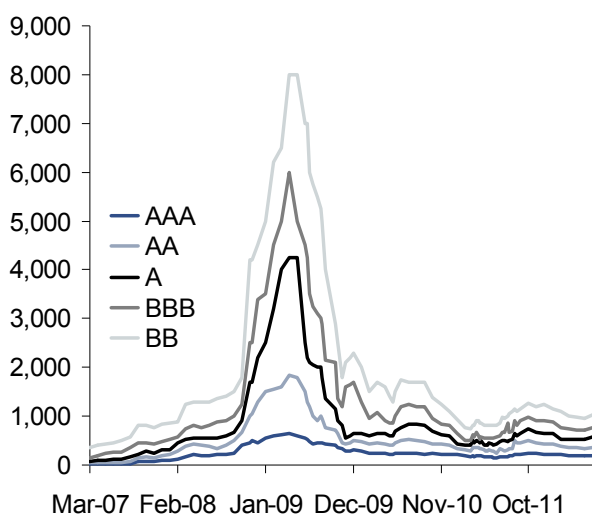
Cash Flow CDO Market

Figure 21. Secondary Cash Flow CDO Spreads/Prices

Collateral Type	AAA	AA	A	BBB	BB
US HY CLO (Spreads) – 1-May-12	180	350	575	775	1025
US HY CLO (Prices) – 1-May-12	Low 90s – Mid 90s	Mid 80s – High 80s	Mid 70s – Low 80s	High 60s – Low 70s	High 60s – Mid 70s
Euro HY CLO (Spreads) – 1-May-12	340	750	1025	1625	2270
Euro HY CLO (Prices) – 1-May-12	Low 90s – Mid 90s	Mid 70s – Low 80s	Mid 60s – Mid 70s	High 40s – High 50s	High 40s – High 50s

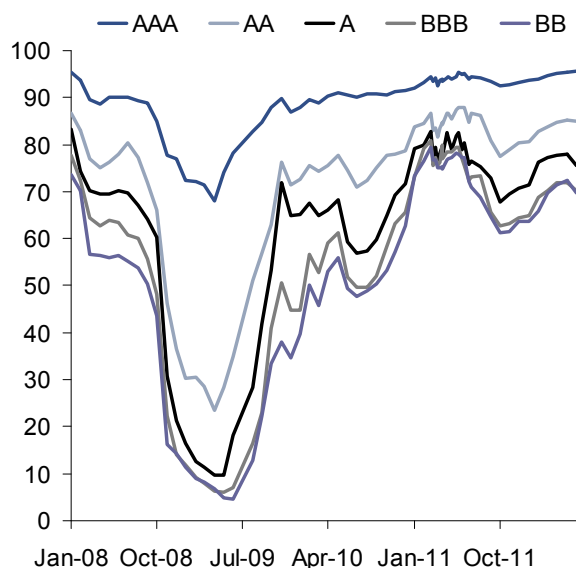
Source: Citi Investment Research and Analysis

Figure 22. US CLO Tranche Spreads



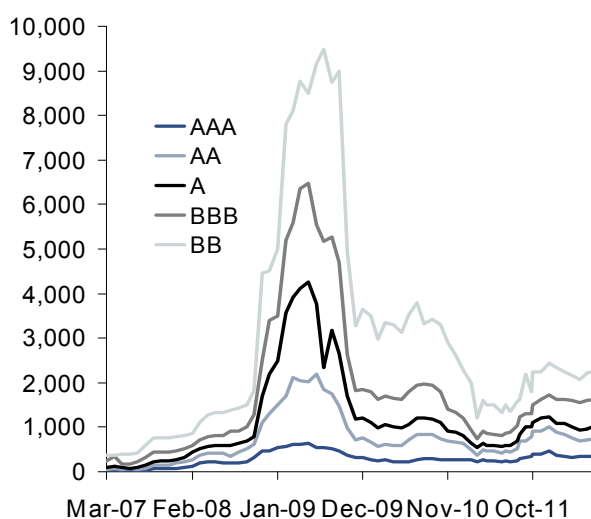
Source: Citi Investment Research and Analysis

Figure 24. US CLO Tranche Prices



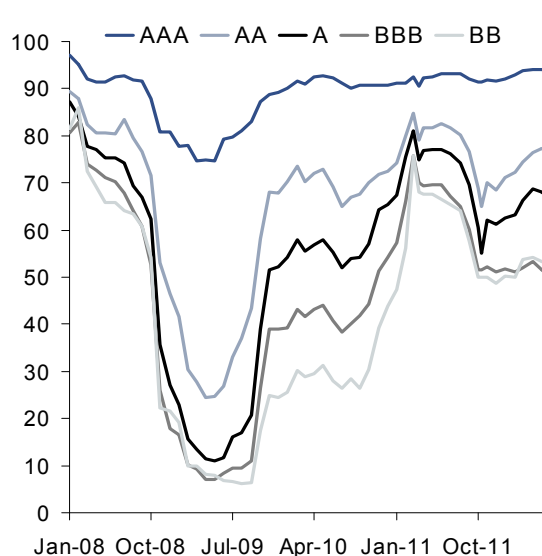
Source: Citi Investment Research and Analysis

Figure 23. European CLO Tranche Spreads



Source: Citi Investment Research and Analysis

Figure 25. European CLO Tranche Prices



Source: Citi Investment Research and Analysis

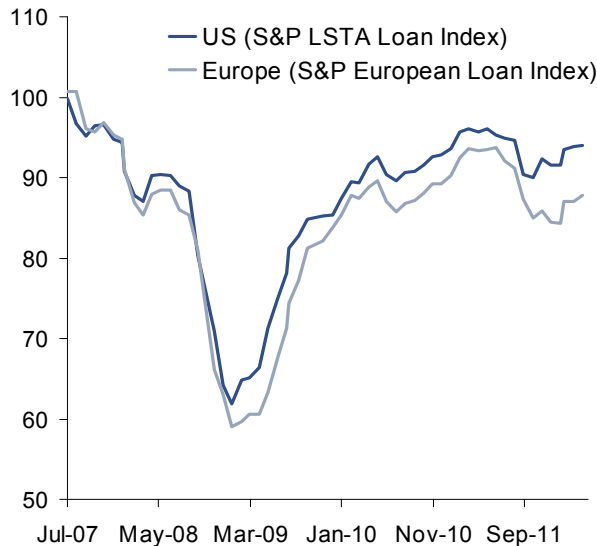
CLO Collateral

Figure 26. Avg First and Second-Lien Secondary Spreads to Maturity (bp)



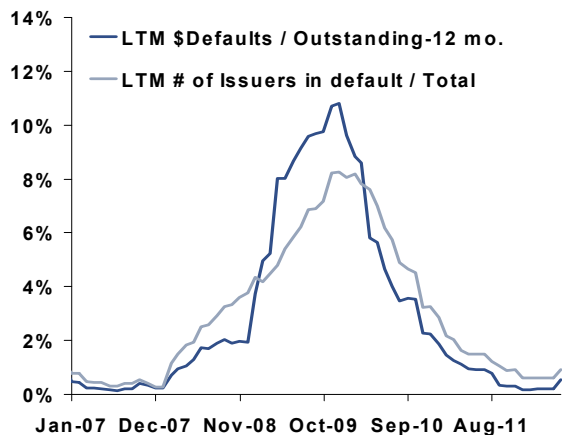
Source: Citi Investment Research and Analysis

Figure 27. Weighted Average Bid (price)



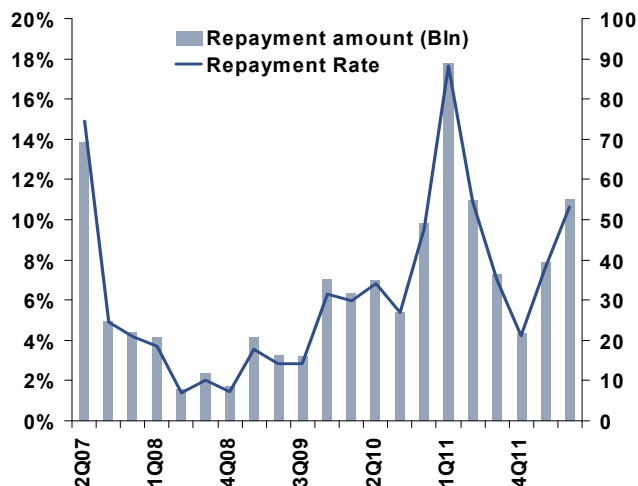
Source: Citi Investment Research and Analysis

Figure 28. Lagging 12mo. Default Rate by Principal Amount and # of Issuers



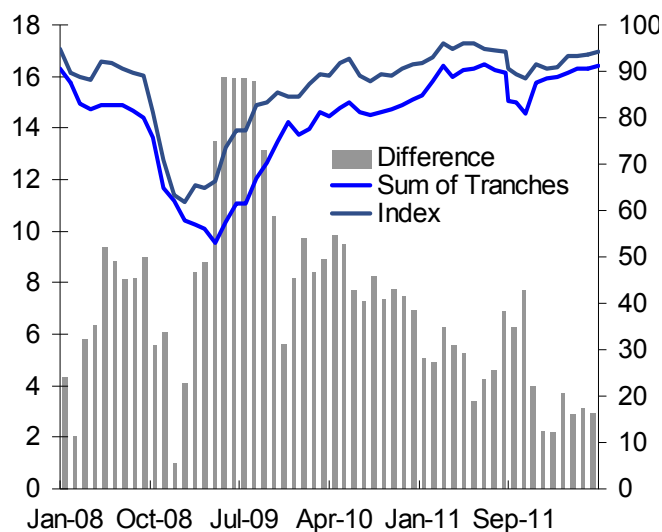
Source: Citi Investment Research and Analysis

Figure 29. Quarterly Repayment Rate and Repayment Amount



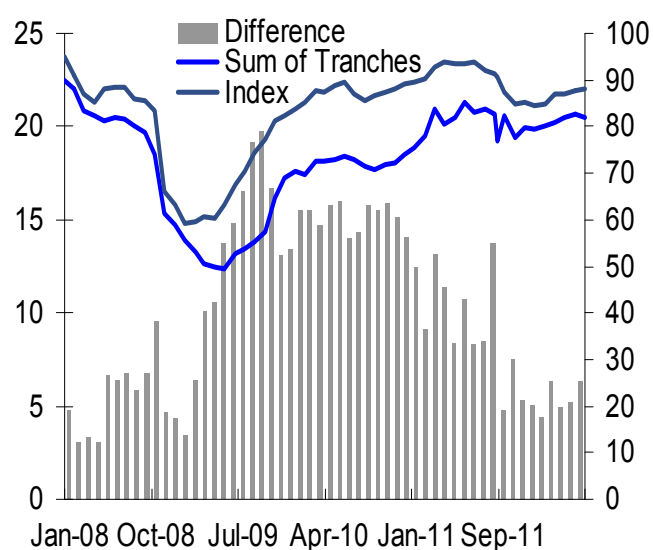
Source: Citi Investment Research and Analysis

Figure 30. Collateral/Tranche Arbitrage (US Deals), prices



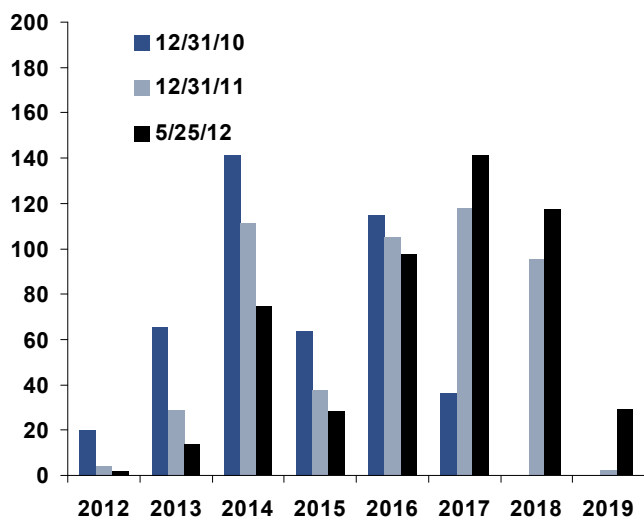
Source: Citi Investment Research and Analysis

Figure 31. Collateral/Tranche Arbitrage (EUR Deals), prices



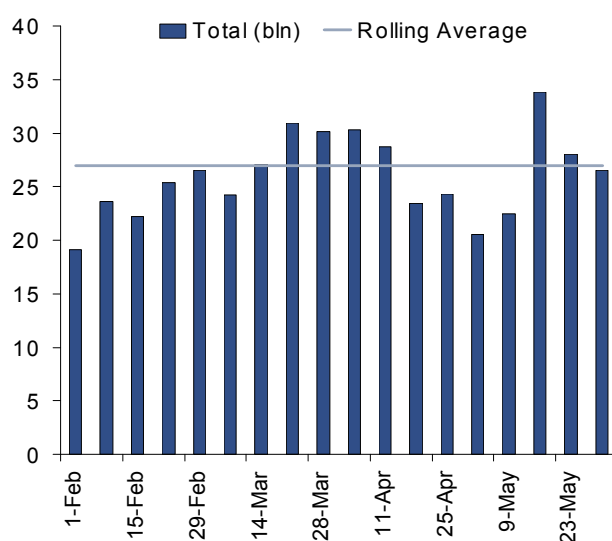
Source: Citi Investment Research and Analysis

Figure 32. Loan Distribution by Year of Maturity



Source: S&P

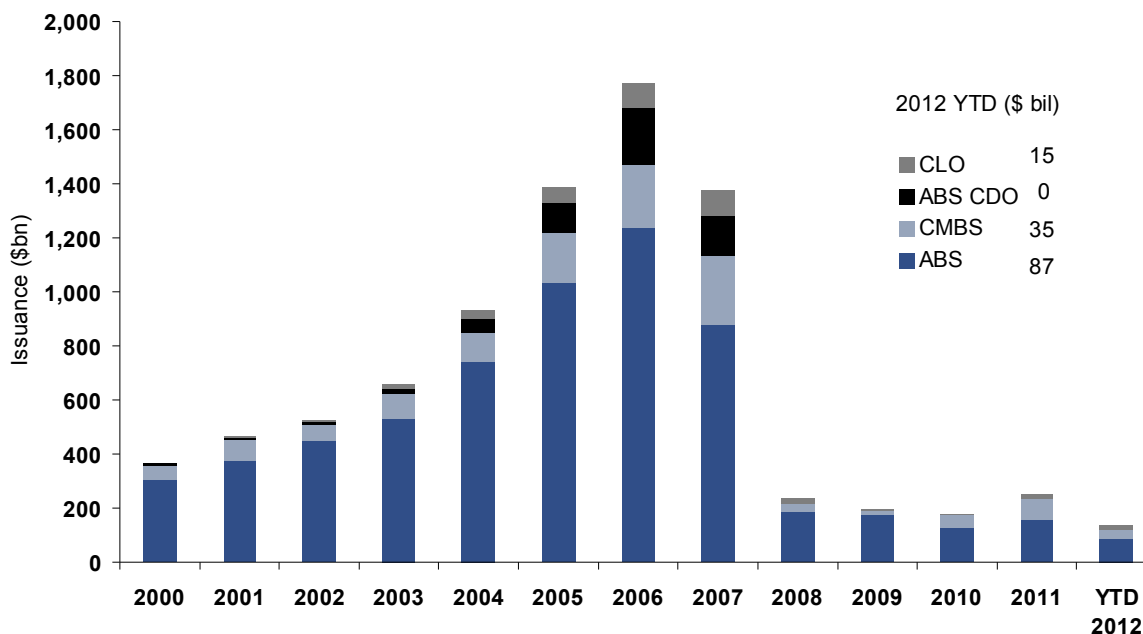
Figure 33. Institutional Loans Launched to Market (Rolling 30-Days)



Source: S&P

Securitized Products Issuance

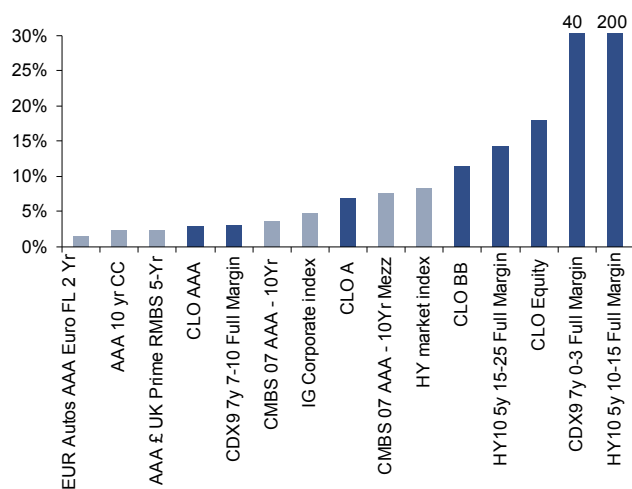
Figure 34. Year-to-Date CDO Issuance and Securitization Market Historical Issuance (\$bn)



Source: Citi Investment Research and Analysis

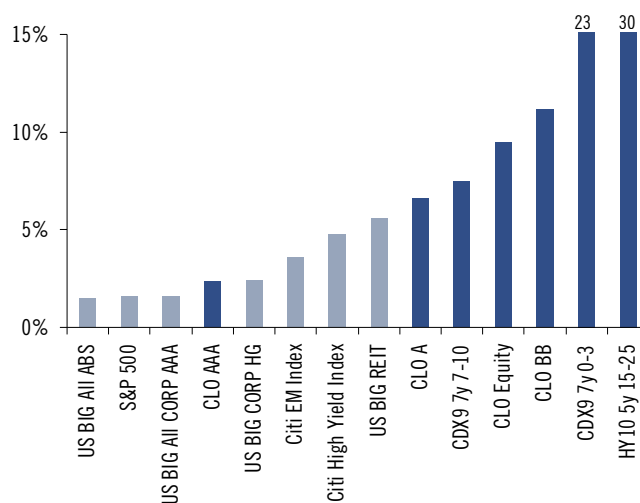
Securitized and Non-securitized Products Returns

Figure 35. Simple Yield



Source: Citi Investment Research and Analysis

Figure 36. Total Returns, 2011 (through 1-October-2011)



Source: Citi Investment Research and Analysis

Appendix II. Recent Publications

Figure 37. Recent Features

Date	Title	Description	Location on FI Direct
8-May-12	CLO 2.0 Mind the gap	Variation in amortization of senior bonds is priced in CLO 1.0 and should also influence 2.0	Credit >> Global CDO
17-Apr-12	Life after reinvestment	CLO 1.0 resurrected.	Credit >> Global CDO
29-Mar 12	CLO Debt Management	Good for equity does not mean bad for debt; reverse can be true	Credit >> Global CDO
06 Mar 12	CLO Equity – Strong Cashflows Continue	Our annual piece that provides an extensive study on CLO equity performance.	Credit >> Global CDO
26 Jan 12	CLO Debt 2012 Update: Relative value remains amidst diminishing supply.	We look at relative value opportunities between CLO debt and other similarly rated corporate and structured assets.	Credit >> Global CDO
19 Jan 12	CLO Equity as an Alternative Asset Class	We look at relative value opportunities between CLO equity and other alternative asset classes such as private equity.	Credit >> Global CDO
05 Dec 11	Strong Finish to an Impressive Year	We look at the impressive results from primary as well as the pick up in secondary trading.	Credit >> Global CDO
10 Nov 11	Inflows may dominate Europe to help CLO Mezz	Despite European turmoil, fund inflows, low dealer inventory, and current investor positioning may lead to a year-end rally.	Credit >> Global CDO
20 Oct 11	Juicy Yields but Hedge Vol	Euro CLO Seniors look cheap but tactically hedge market risk. CLO Equity to benefit from slowing prepayments.	Credit >> Global CDO
4 Oct 11	Opportunities in CLO Senior Mezz	Following the recent selloff, CLO Senior Mezz have the best value among CLO tranches.	Credit >> Global CDO
9 Sep 11	Ideas for Hedging CLO Tranches	We look at a menu of hedging options for a volatile market.	Credit >> Global CDO
18-Aug 11	Loan Jitters, But Not for 2008 CLOs	Weaker technicals and outlook for CLOs but it's much better than 2008	Credit >> Global CDO
26 July 11	CLO AAAs	With a downgrade of US debt likely, investors who need AAA ratings should consider CLOs.	Credit >> Global CDO
14 July 11	CLO Seniors Should Remain Resilient	Despite choppy markets, CLO AAAs should remain at their current levels	Credit >> Global CDO
14 July 11	Manager Consolidation Continues	In 2011 close to 40 CLOs have changed hands in 5 separate transactions.	Credit >> Global CDO
24 June 11	Should CLO Equity be Nervous of Call	CLO equity holders with a non-controlling stake may take significant losses if the deal is called.	Credit >> Global CDO
24 June 11	Impact of Lehman Portfolio Unwind	We look at the Lehman portfolio unwind and its effect on MCDS spreads.	Credit >> Global CDO
26 May 11	US vs Euro CLO Equity	We look at 5 key components explaining why Euro equity has underperformed US equity	Credit >> Global CDO
26 May 11	New Issue close to 2010 volumes	Primary volume for the year is currently at 3.7bil with several deals in the pipeline.	Credit >> Global CDO
5 May 11	Mav Note Update	We recommend buying class B (mezz) or A1,A2 (senior).	Credit >> Global CDO
5 May 11	CLO New Issue Restarts	Two new deals price with tighter AAA spreads and more deals to come.	Credit >> Global CDO
12 Apr 11	CLO Retention Rule	We analyze the effects of a rule requiring managers to retain pieces of their CLOs	Credit >> Global CDO
6 Apr 11	US Struc Credit Conference Survey 2011	We ask 100 firms to fill out a survey on the future of the CLO market.	Credit >> Global CDO
18 Mar 11	Selloff May Provide an Entry Point	CLOs have given up most of their 2011 gains, will they recover?	Credit >> Global CDO
18 Mar 11	Will the Earthquake Have an Impact on Structured Credit	To what extent will the earthquake cause Japanese banks to sell CLO holdings.	Credit >> Global CDO
18 Mar 11	CLO Monitor	More euro equity has restored cashflows and WARF and CCC baskets remain in check	Credit >> Global CDO
18 Mar 11	Using Loans for CLO Hedging	We highlight how to hedge AAA CLOs with TRS	Credit >> Global CDO
28 Feb 11	CLOs Bracing for Calls	Many 2008 transactions might be called for financing, also old CLOs where NAV exceeds valuations are at risk	Credit >> Global CDO
26 Jan 11	CLO Equity – Performing as Marketed	A review of CLO equity performance as well as future predictions on returns	Credit >> Global CDO
12 Jan 11	Structured Credit Outlook 2011	2010 saw CLOs rally and expect the trend to continue into 2011 at a slower pace.	Credit >> Global CDO
10 Nov 10	TruPS Deferrals to Defaults: Is S&P Looking Backward	Many TruPS have resumed interest payments despite obligations that are deferring.	Credit >> Global CDO
27 Oct 10	Floating Rate Advantage of CLO Seniors	Interest rate risk makes CLO's attractive compared to corporates due to a floating rate.	Credit >> Global CDO
27 Oct 10	Defaults to Fall in 2011	Our econometric models anticipate a fall in default rates to 2% in January 2011.	Credit >> Global CDO
27 Oct 10	CRE CDOs Revisited	CRE CDOs, while not suitable for all, offer a CMBS like investment with higher risk-adjusted yield.	Credit >> Global CDO
12 Oct 10	CLO and Loan Market Update	September brought \$2.5 billion of BWICs, and there was increased demand for mezz.	Credit >> Global CDO
12 Oct 10	Synthetic Markets Update	We are now seeing a burst of demand for IG15 mezz.	Credit >> Global CDO
12 Oct 10	CLO Collateral Extensions	We analyze the likelihood of managers reinvesting and using "amend and extends" to lengthen the life of the deal.	Credit >> Global CDO
20 Sep 10	Hedging Tail Risk	Market turbulence has increased investors' fears about the pace of economic recovery and increased interest in hedging tail- or extreme risk.	Credit >> Global CDO
1 Jul 10	Structured Credit Market Update	While there is fresh supply for CLO secondary, investors are still mostly in the sidelines. Meanwhile, we expect higher prepayments speeds to translate to upgrades.	Credit >> Global CDO
1 Jul 10	Bank TruPS CDOs – A Recovery Play?	Given the signs of stabilization in the banking sector, second priority tranches (usually A2 tranche) of bank TruPS CDO seem to us to be an interesting way to benefit from an upcoming recovery.	Credit >> Global CDO
8 Jun 10	CLO Market and Trading Color	The widening spreads in CLO's provide an opportunity to buy, and Moody's follows S&P's lead in beginning to upgrade CLO tranches.	Credit >> Global CDO
8 Jun 10	CLO Monitor	An updated snapshot of the most relevant statistics for the CLO universe such as WARF, WAS, and triple-C Basket Size.	Credit >> Global CDO
8 Jun 10	Sovereign Quanto Mechanics	We think that the quanto levels are too high and recommend selling protection, more so for the high-beta corporates and sovereigns.	Credit >> Global CDO
13 May 10	Structured Credit Market Update	We analyze the trend in CLO spreads and liquidity and loan prepayment rates, the first upgrades of CLO tranches, and opportunities in synthetic IG Mezz tranches.	Credit >> Global CDO
21 Apr 10	Credit Derivatives – Sovereign Basket Focus	Investors should use high implied correlations in the sovereign FTD market to create a cheap short (or senior long) by playing baskets against single names.	Credit >> Global CDO
21 Apr 10	LCDX – Loan Prepayment Probability	The new bullet LCDS and LCDX14 contracts allow investors to ignore loan cancellation. Comparing LCDX13 to 14, we think the implied cancellation probability is too high.	Credit >> Global CDO

Source: Citi Investment Research and Analysis

Figure 18. Recent Primers

Date	Title	Description	Location on FI Direct
28 Mar 11	Bank Loan Total Return Swaps	A primer on Total Return Swaps.	Credit >> Global CDO
13 May 10	MAV Senior Notes – Valuable Though Complex	A primer on CAD-Denominated MAV notes created from the restructuring of Canadian CP liabilities backed by leveraged corporate super-senior risk.	Credit >> Global CDO
13 Apr 07	A Simple Guide to Subprime Mortgages, CDO, and Securitization	A primer on how securitization transforms home loans into bonds and bonds into CDOs.	Credit >> Global CDO
8 Feb 07	Credit Default Swaps	A simple primer for credit default swaps.	Credit >> Global Derivatives
6 Sep 06	The CDO of CDOs Handbook	A primer on the increasingly popular CDO squared products.	Credit >> Global CDO
20 Jun 06	Credit Default Swaps on CDOs	ISDA recently published a template for CDS on CDO debt tranches with ongoing pay-as-you-go settlement and with physical settlement following a credit event. The article explores key features of the confirmation.	Credit >> Global CDO
23 May 06	Mezzanine ABS CDOs	An in-depth look at mezz ABS CDO equity and junior debt.	Credit >> Global CDO
20 Apr 06	Risky PV01 of a CDS Contract	Discussion of the calculation and the importance of Risky PV01.	Credit >> Global Derivatives
7 Feb 05	Hedging Credit Portfolios and Tranches with Payers	Crossover payer options can offer a cheap and liquid hedge against spread widening, especially in a low volatility environment.	Credit >> Global Derivatives
19 Jan 06	Credit Derivatives Indexes	A primer on the credit derivatives index market.	Credit >> Global Derivatives
31 Oct 05	Understanding Tranches Today	A guide to our daily tranche report and P&L attribution methodology.	Credit >> Global Derivatives
31 Oct 05	An Introduction to Commercial Real Estate CDOs	An introduction to commercial real estate (CRE) CDOs.	Credit >> Global CDO
30 Sep 05	High-Grade ABS CDOs	Analyzing the performance of the HG CDOs through a bottom-up analysis.	Credit >> Global CDO
27 Jun 05	Leveraged Loan Handbook	A guide to the corporate loan market.	Credit >> Global CDO
27 May 05	Credit CPPI	A primer on constant proportion portfolio insurance (CPPI).	Credit >> Global Derivatives
7 Apr 05	Trading Tranches On CDX.EM Diversified: Hedging and Leverage	An intro to trading tranches on CDX.EM Diversified.	Credit >> Global Derivatives
23 Mar 05	Understanding CDO-Squareds	A primer on how CDO-squareds work, and helpful hints on how to find value.	Credit >> Global CDO
22 Nov 04	The CMCDS Handbook	Introduction to and trading strategies for constant maturity credit default swaps.	Credit >> Global Derivatives
3 Nov 04	Middle-Market CLO Handbook	Primer on middle-market CLOs.	Credit >> Global CDO
22 Sep 04	Traxxing the Dragons — Investment Strategies With iTraxx Asia Indexes and Tranches	A guide to investment strategies with iTraxx Asia indexes and tranches.	Credit >> Global Derivatives
16 Sep 04	Trading Credit Tranches — Taking Default Correlation out of the Black Box	A guide to investing and trading in credit tranches.	Credit >> Global Derivatives
28 Apr 04	The Structured Credit Handbook	Compilation of all Citi structured credit handbooks and primers.	Credit >> Global CDO
27 Apr 04	A Primer on Single-Tranche CDOs	A primer on single-tranche CDOs.	Credit >> Global Derivatives
14 Apr 04	Citigroup's Primer on Credit Default Swaptions	All you needed to know about credit default swaptions.	Credit >> Global Derivatives
22 Mar 04	Trading the CDX.EM iBoxx	The new CDS benchmark for emerging markets.	Credit >> Global Derivatives
19 Mar 04	Excerpt from the BMRS: New Roll of the iBoxx CDX Indexes	Overview of iBoxx roll on March 20, 2004, and its implication for investors.	Credit >> Global Derivatives
1 Mar 04	High-Yield iBoxx Indexes — New Benchmarks for the High-Yield Market	Using iBoxx as a key instrument for positioning in the high-yield market.	Credit >> Global Derivatives
4 Feb 04	The CDO of ABS Handbook	A primer on CDOs backed by structured finance securities.	Credit >> Global CDO
3 Feb 04	The CLO Handbook	A primer on collateralized loan obligations.	Credit >> Global CDO
23 Jun 03	Synthetic Arbitrage CDOs	Discussion of recent improvements in synthetic arbitrage CDOs.	Credit >> Global Derivatives
31 Dec 02	Single Name Credit Default Swaps — A Users Guide	A guide to single-name CDS.	Credit >> Global Derivatives
20 Aug 01	First-to-Default (FTD) Baskets	A primer on FTD basket swaps.	Credit >> Global Derivatives

Source: Citi Investment Research and Analysis

RISKS

When buying calls and puts (or receivers and payers) the maximum loss is the premium paid. When selling calls (or receivers), the maximum potential loss would occur as the index spread decreases but is limited by the index spread being floored at zero. For puts (or payers), the maximum potential loss (amount below the strike) would eventuate should the index price fall to zero. Sector index options are cash settled. The above calculations do not include any additional fees or transaction costs.

OPTIONS RISK DISCLOSURE — PLEASE READ CAREFULLY

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Appendix A-1

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