Global Structured Credit Strategy

- **New issue already close to 2010 volumes, will grow –** 2011 YTD volume is $3.7 bn across nine deals, compared to $4.1 bn in 2010. New deals and refinancings in the pipeline mean we are likely to exceed 2010 volumes before quarter-end.
- **CLO spreads, and new-issue funding costs, at tights –** With CLO costs of funding falling 40bps over the past couple of months, CLO secondary spreads have also come in. Triple-As, Double-As and Single-As are at their tightest for the year.
- **Managing spread versus collateral quality in CLOs –** Our CLO comparison shows that higher spreads does not necessarily mean lower loan ratings, a source of manager-alpha that equity investors should be considering.
- **Banks buy more securities, positive for CLOs –** FDIC data and conversations with bank treasury clients reveal that shrinking loan volumes and lower margins have driven clients towards securities, initially agency MBS, but also corporates.
- **US versus Euro CLO equity return attribution –** Our detailed feature this week identifies five key components to try to explain why European CLO equity is paying 15 points less than US equity. We find that differences in leverage and collateral spread and the presence of Libor floors in US loans dwarfs other components such as management fees and the basis in floating-rates.
- **Quanto CDS as a way of participating in peripheral story –** We think the market is underestimating the possible Euro depreciation if a few countries, even if considered peripheral, default. We would buy Quanto CDS on these names.
- **Could CRE CDOs follow CLO recovery –** Given US insurance sector involvement with commercial real estate (CRE) as well as pivotal to the new issue CLO market, we think whole-loan CRE CDOs could make a slow comeback.

Ratul Roy
+1-212-723-6043
ratul.roy@citi.com

Mikhail Foux
+1-212-723-9353
mikhail.foux@citi.com

Michael Hampden-Turner
+44-20-7986-3445
michael.hampdenturner@citi.com

Eduard Trampolsky
+1-212-816-2748
eduard.trampolsky@citi.com

Thomas Rose
+1-212-723-9422
thomas.rose@citi.com

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

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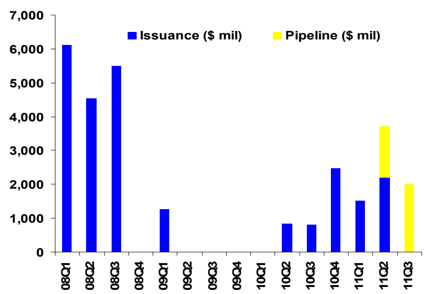
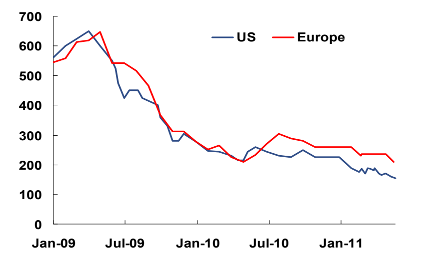
Structured Credit Market Color

Figure 1. US CLO Issuance



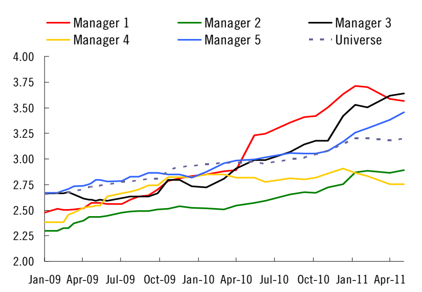
Source: Citi Investment Research and Analysis

Figure 2. Generic Triple-A CLO Spreads



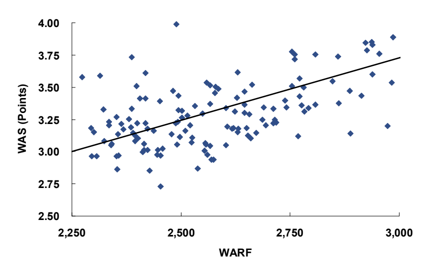
Source: Citi Investment Research and Analysis

Figure 3. Portfolio WAS (percent) for Select US CLO Managers



Source: Citi Investment Research and Analysis

Figure 4. WAS (weighted average spread) and WARF of 2007 US Vintage CLOs



Source: Citi Investment Research and Analysis

CLO Primary – Firing on All Cylinders

The CLO market seems to have found its rhythm, with three deals, BMI CLO I, Symphony VII CLO and ING 2011-1 CLO priced within the past two weeks. Accounting for these three deals, 2011 YTD volume has reached $3.7 billion across nine deals, just slightly under the $4.1 billion of CLOs priced through the entire 2010. More importantly though, there are several new deals (e.g. LCM, Apollo, CIFC) as well as refinancings of existing CLOs in the pipeline (Figure 1), suggesting we're likely to see a handful of new prints even before the quarter ends. For now, we expect primary CLO issuance in 2011 to be around $10 billion (in line with our year-end forecasts) though the figure can be higher if the recent return of banks and foreign investors pushes down funding costs even further and boosts equity returns. Finally, although it is a bit early to speak about primary issuance in 2012, one thing is quite certain to us – there will be quite a bit of it. With CLO costs of funding falling at least 40bps over the past couple of months (and likely to fall further), we expect the entire class of 2010 CLOs to get refinanced, contributing to ongoing CLO primary issuance.

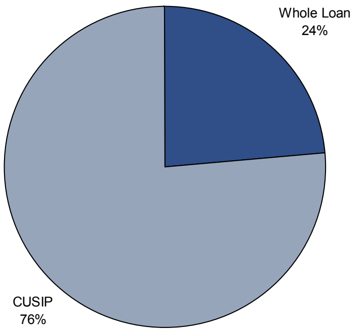
Secondary Spreads Tighter

Fueled by continuing spread tightening in the primary market, CLO secondary spreads have also come in. Triple-As that started the year around 200bps are now in 140-160 range. At the same time, Double-As and Single-As too are at their tightest for the year while junior mezz is within reach of their tightest levels too. The question, though, is how much further spreads, particularly senior spreads, can tighten. We think quite a bit. First, from a relative value perspective, CLOs are still cheap to alternatives, such as corporates and other securitized products, suggesting that relative value will eventually resurface. Furthermore, the ongoing return of investors to CLO primary is likely to push primary spreads down, affecting the secondary. A lot, however, will depend on the overall macro environment. As we have learned over the past year, spreads tightening and market jitters don't go well together, regardless of fundamentals.

Managing Spread versus Rating

Some managers do a much better job of managing the attractions of high portfolio spread with the risks of lower rated collateral. Indeed, let's have a look at Figure 3 which plots median collateral spread of the US CLO universe and five large CLO managers. It can be seen that several managers have significantly higher spread in their portfolios that others. For similar capital structures, wider spreads mean significantly higher excess cash flows for the equity. As an example, 50bps of difference in collateral spread between two CLOs with similar capital structures means roughly 6 points of equity distribution on an annual basis. There are however inherent risks in higher spreads portfolios. First, such portfolios are more likely to get refinanced, particularly in a benign credit environment, resulting in lower excess spread. Moreover, such higher spread portfolios (at least in theory) carry a higher risk of default, which also should be taken into consideration. Yet, opportunities for relative value plays are abundant. As Figure 4 shows, investors can find CLO portfolios with range of spreads as wide as 50-60bps for the similar level of credit risk (WARF). For those investors who are willing to look around and wait for the right transaction, the difference in equity cashflows is substantial.

Figure 5. Breakdown of US CRE CDO Universe by Collateral Type



Source: Citi Investment Research and Analysis

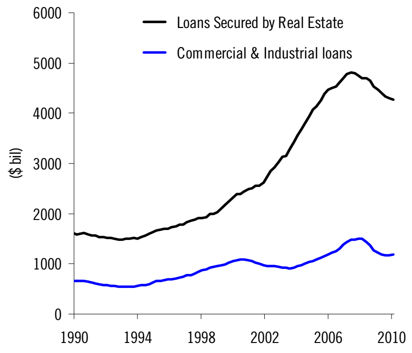
Can the CRE CDO Engine be Restarted

As the CLO, ABS and CMBS primary markets gain momentum, market participants are looking at other areas of structured finance to see what other products have proved themselves through the crisis, and hopefully can be brought back to life. CRE (Commercial Real Estate) CDOs may be one such product, although a lot of trust building will have to take place first. As a background, at its height in 2007, the total outstanding CRE CDO market in the US grew to about $90 billion. The amount was split into two uneven segments – CUSIP CRE CDOs (about 76 percent) and whole loan CRE CDOs (Figure 5). Some CDOs were a combination of the two, i.e. their collateral consisted of CMBS tranches and whole loans. CUSIP CRE CDOs represented a double-layer securitization, similar to that of ABS CDOs with the collateral being junior tranches of CMBS and sometimes even tranches of other CRE CDOs. With commercial real estate prices taking a nose dive in 2008 and defaults followed should not be surprising that the fate of CUSIP CRE CDOs is similar to that of ABS CDOs. However CRE CDOs backed by whole loans is a completely different story. Though many loan-backed CRE CDOs have experienced their share of defaults and downgrades, performance of these deals is different from that of CUSIP CRE CDOs and overcollateralization levels in many loan-backed CRE CDOs are back to their pre-crisis level.

Though loan-backed CRE CDOs can be brought back to life, we see two major obstacles. The first is the rating hurdle. Any post-crisis criteria for CRE CDOs, if and when they apply, will likely lead to higher subordination levels below tranches despite better quality of current loans. This was what happened for CLOs. The second obstacle is the initial reluctance of investors to come back to the market – also something that the CLO market has been dealing with for the past two years. Yet, the CLO market can also be a source of inspiration. Although the recovery has been through a lot of pain, the new issue market is now on a firm footing. Encouragingly, the CLO market rebound was led by US insurance companies, for whom funding commercial real estate is the bread-and-butter of their business.

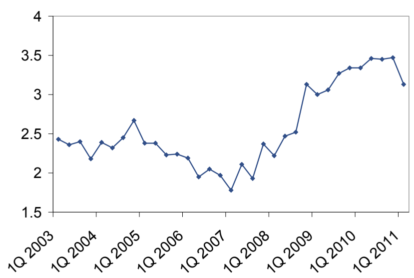
Banks Buy Securities – Positive for CLOs

Figure 6. Loans on US Bank Balance Sheets



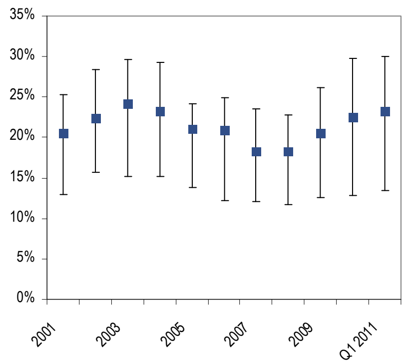
Source: FDIC

Figure 7. Spread-over-Fed Funds for Commercial & Industrial (C&I) loans, %



Source: FDIC, Citi Investment Research and Analysis

Figure 8. Securities-to-Total Assets for 100 largest US banks



Source: Highline FI and Citi

Credit Demand Down

US banks are having a bit of a problem in making margins. The problem is particularly acute for smaller banks. Large banks are seeing improving trends in lending, but the industry as a whole (Figure 6), especially smaller institutions, remain starved for loans. Meanwhile Fed data shows that banks, large and small, are sitting on more cash than they have in the past twelve months as deposits continue to roll in. It isn't just volumes that have gone down; competition for loans has also pulled in loan spreads.

Loan Margins Down

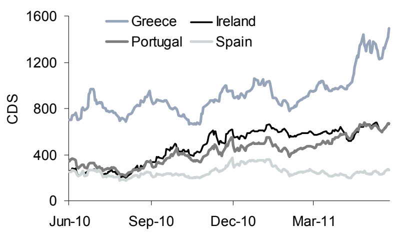
Anecdotal evidence from Citi sales covering US bank treasurers indicates that commercial and industrial (C&I) lending has been an improving spot for the largest US banks. Banks, very recently, have reported an increase in loan demand from their large, middle-market and small business customers. However, banks have eased terms for loans (Figure 7) as there is competition for good quality assets. More worryingly, cash and short-term investments remain at high levels on the balance sheets of large US companies, indicating limited funding needs. Faced with reduced spreads and lending volumes, it comes as no surprise, therefore, that bank treasurers are looking at other ways of supplementing income from bank balance sheets.

For Now Mostly Agency MBS, but Will Change

Conversations with our bank treasury clients also reveal that they have beefed up their holdings of securities, to counteract disappointing loan production. Figure 8 shows the data on total bank securities holdings for the top 100 banks, through the first quarter of 2011. The average ratio of total securities-to-total assets was at a two-decade high of 23 percent at March 2011, only once previously attained at December 2003. Though most of the security portfolio comprised increasingly of agency MBS (at the expense of Treasuries), a growing number of regional banks are looking to invest in corporate bonds. Moreover, data from Citi's structured credit business shows that banks are taking an increasing share of CLO purchases (from a near-zero two years ago) in the primary and secondary markets. We have long-argued that the low risk-weighting and floating-rate coupon of senior structured credit assets should make them appealing for well-capitalized banks – we are starting to see this happen. It won't be smooth sailing, of course – many banks have to reduce their leverage and improve liquidity – but we are on the right track at last.

Quanto CDS and Euro Depreciation

Figure 9. Periphery 5-YR CDS Spreads



Source: Citi Investment Research and Analysis

The Quanto CDS market appears to be underestimating the possible depreciation of the currency if a few countries, even if they are considered peripheral, default. We discussed sovereign Quanto CDS last year ("Sovereign Quanto Mechanics") but due to renewed volatility in the sovereign space, and with periphery spreads pushing record wides (Figure 9), we feel that this topic is worth revisiting. Just to remind readers, Quanto CDS can be constructed by using offsetting positions for the same reference entity in different currencies. For example, one could sell €10 million in Euro-denominated Spanish 5-YR CDS at 206bp, while buying $14.1 million in dollar-denominated Spanish 5-YR CDS at 275bp (assuming the EUR-USD exchange rate is 1.41). Why aren't the spreads of the two legs the same? For the simple reason that a credit event for Spain should cause Euro depreciation, resulting in a positive P&L for a seller of Quanto protection. Let's go through the cash flows, assuming 40% recovery and 25% Euro-USD depreciation:

One would pay: €10*(1-0.4) = $1.41*0.75*10*(1-0.4) = $6.35 million.

One would receive: $14.1*(1-0.4) = 8.45 million. Net P&L: $2.10 million.

Taking it one step further, the ratio of Quanto CDS to the 5-YR CDS spread, roughly represents the degree of Euro devaluation as a result of a sovereign credit event. The latest Quanto CDS spreads, ratios and yearly changes are shown in Figure 10.

Figure 10. European 5-YR Quanto CDS (Mid-Market Spreads)

	8-Jun-10			11-May-11			23-May-11		
Countries	5-YR CDS	Quanto CDS	Ratio	5-YR CDS	Quanto CDS	Ratio	5-YR CDS	Quanto CDS	Ratio
AUSTRIA	74	-21	28%	66	-27	41%	66	-25	38%
BELGIUM	108	-28	26%	143	-39	27%	160	-39	24%
FRANCE	77	-23	30%	75	-29	39%	77	-29	38%
GERMANY	43	-11	26%	39	-16	41%	40	-15	38%
GREECE	700	-70	10%	1300	-20	2%	1425	-20	1%
IRELAND	260	-47	18%	668	-40	6%	662	-40	6%
ITALY	228	-39	17%	155	-43	28%	172	-46	27%
PORTUGAL	345	-57	17%	645	-45	7%	668	-45	7%
SPAIN	250	-53	21%	246	-66	27%	275	-69	25%

Source: Citi Investment Research and Analysis

Compared to last year, there is a greater divergence of the market's views on the impact that a particular sovereign default can have on the currency. Whereas the default of some of the peripherals (notably Greece, Ireland and Portugal) is expected to have a negligible impact on the Euro (right-most column of Figure 10), the impact one of the core nations (for example, Germany) defaulting is, rightfully, much more severe. We do not disagree with this broad premise (default of Germany would likely send off a global tsunami), but think that there are some mispricings, presenting interesting opportunities.

In particular, we think the numbers relating to the impact of the three peripherals on the list is too low, and recommend taking the other side of the trade – buying Quanto CDS. Most of the other numbers make more sense to us. Italy and Spain are now viewed as much more systemic to the European Union, compared to the rest of periphery names. On the opposite side of the peripherals, the ratios for Austria and Belgium are at 38% and 24%, respectively. These numbers seem high to us, given the size of these sovereigns, unless one believes that the rest of the EU members will have problems ahead of them. As such, we like selling Quanto CDS on these names.

US vs. Euro CLO Equity – Return Attribution

Lower CLO Equity Returns in Europe

It is well documented that the performance of European CLO equity has been significantly worse than that of its US counterparts. In our study, *"CLO Equity – Performing as Marketed"* we have shown that, for fully-paying equity, recent annualized distributions to European CLO equity have been on average 15 points lower than in the US. Furthermore even now, almost two years after the credit markets started recovering, 30 percent of European CLO equity is still starved of cash flows. For comparison, more than 90 percent of US CLOs are receiving distributions with annualized distributions of roughly 26 percent the in first quarter of 2011.

Some underperformance has to do with credit. Based on the number of issuers, Europe has experienced higher number of loan defaults than the US. Recoveries in Europe tend to be lower, partly due to the high incurrence of mezzanine loans in CLO portfolios. Furthermore, once a company defaults, workout proceeding tend to last longer, denting into overcollateralization levels and potentially trimming cash flows to equity for a longer period.

Five Key Components

However, as we argue below, the European CLO structure plays an equally, if not more important role, in outperformance of US CLO Equity versus Europe. Below we will try to perform an in-depth attribution of this outperformance.

First, let's do the math. The formula below shows the annual amount of interest received by CLO Equity, as a percent of equity notional.

$$Equity = \left((Libor_{Assets} + Spread_{Assets}) - \frac{N-1}{N}(Libor_{Liab} + Spread_{Liab}) - (Fee_{Mgmt} + Fee_{Other}) \right) * N$$

In the above formula *N* denotes leverage. The first term in equation relates to asset income, the middle term relates to the weighted average liability spread, and the last relates to the management (we exclude incentive fees) and other fees. Adding the component of loan Libor floor, which is present in significant number in US CLO portfolios and rearranging some of the members, the formula can be written in the following way:

$$\begin{aligned} Equity = &(Libor_{Assets} + Spread_{Assets}) + ((N-1)*(Libor_{Assets} - Libor_{Liab})) + ((N-1)*(Spread_{Assets} - Spread_{Liab})) \\ &- N*(Fee_{Mgmt} + Fee_{Other}) + \alpha * N * \max(LiborFloor - Libor_{Assets}, 0) \end{aligned}$$

In the formula above, α denotes the percentage of assets in the collateral that have Libor floor.

Before we continue, there are two key facts that are very important. First the leverage in US CLO structures is significantly higher than that in Europe, with median of 12.5 compared to 10 times leverage in Europe. The difference, we believe, is direct result of lower diversity of Euro CLO structures. At the same time, the weighted average spread of CLO liabilities in Europe and the US is roughly the same for the majority of 06-70 vintage CLOs transactions, at around 50bps.

Equipped with these two key facts, we are now ready to perform attribution of difference between European and US CLO equity returns. The formula above has five components and we will analyze these components one by one.

1. Leveraged Asset Spread Effect: $((N-1)*(Spread_{Assets} - Spread_{Liab}))$

2. Base Floating Rate Mismatch: $((N-1)*(Libor_{Assets} - Libor_{Liab}))$

3. Libor Floor: $\alpha * N * \max(LiborFloor - Libor_{Assets}, 0)$

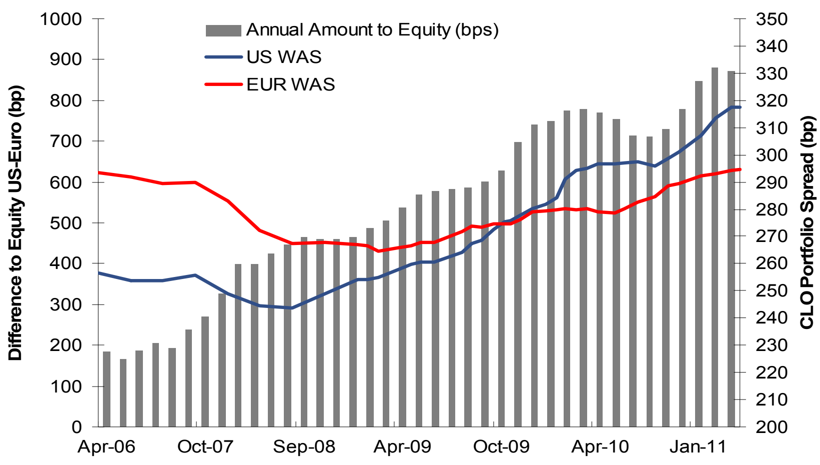
4. Management Fee: $N*(Fee_{Mgmt} + Fee_{Other})$

5. Collateral Interest Rate $(Libor_{Assets} + Spread_{Assets})$

Leveraged Asset Spread Effect

First, let's start with the first component of the equation which deals with the leveraged effect of spread differential between CLO assets and liabilities (or simply CLO arb). Substituting numbers for leverage, assets spreads, and CLO liability spreads we can see that leverage and spread differences play a major role in the difference in performance of US and CLO Equity. At current levels the excess of US CLO equity over Europe, attributable to difference between spreads and leverage, stands at an impressive 870bp.

Figure 11. Effect of Leverage and Assets Spreads to CLO Equity (US vs. Europe)



Source: Citi Investment Research and Analysis

The situation though has not always been like this. Back in 2006 and 2007, when the absolute levels of spreads were lower, both in US and Europe, and spreads on European loans were about 40bps wider than in the US the positive effect of higher leverage in US structures relatively to Euro CLOs was not so pronounced. Indeed in 2006 and 2007 the difference in equity payments attributable to leverage and CLO arb was only 200bps higher, making US and European CLO Equity comparable in models and marketing materials.

Figure 12 below shows the matrix of outperformance of US Equity over Europe due to effect of leverage, with yellow square highlighting the approximate current situation. As can be seen form the figure, unless Euro loan spreads are wider than US loans by more than 50bps, the higher leverage in US CLOs holds the upper hand.

Figure 12. Matrix of Outperformance of US over Europe at Different Spread and Spread Differential Levels.

US Loan Spread Level	Spread Differential (US vs Europe) -40	-30	-10	0	10	20	30	40
240	115	205	385	475	565	655	745	835
260	165	255	435	525	615	705	795	885
280	215	305	485	575	665	755	845	935
300	265	355	535	625	715	805	895	985
320	315	405	585	675	765	855	945	1035
340	365	455	635	725	815	905	995	1085
360	415	505	685	775	865	955	1045	1135
380	465	555	735	825	915	1005	1095	1185
400	515	605	785	875	965	1055	1145	1235
420	565	655	835	925	1015	1105	1195	1285
440	615	705	885	975	1065	1155	1245	1335
460	665	755	935	1025	1115	1205	1295	1385
480	715	805	985	1075	1165	1255	1345	1435

Source: Citi Investment Research and Analysis

For those looking to dwell into some mathematical details behind the matrix, the formula below allows to see the difference in CLO equity payments that is only attributable to leveraged spread.

$$\Delta = \left(N_{US} - 1\right) * \left(AssetSpread_{US} - LiabSpread_{US}\right) - \left(N_{Eur} - 1\right) * \left(AssetSpread_{Eur} - LiabSpread_{Eur}\right) =$$
$$= \left(N_{US} - 1\right) * AssetSpread_{US} - \left(N_{Eur} - 1\right) * AssetSpread_{Eur} - 50 * \left(N_{US} - N_{Eur}\right)$$

Note in the formula above we put 50bp as spread on CLO liabilities in US and Europe. After we substitute the values for leverage (12.5 and 10 for US and Europe respectively), the formula can be simplified to the following:

$$\Delta = 9 * \left(AssetSpread_{US} - AssetSpread_{Eur}\right) + 2.5 * AssetSpread_{US} - 125$$

Base Floating Rate Gap

With the analysis of the most important component behind us, we continue our analysis with the second component, which represents the leveraged difference in the floating component of interest on CLO assets and liabilities. As a reminder, loans have the option at each payment date to reset their base floating rate (e.g. 1M Libor, 3M Libor, 6M Libor) whereas for CLO liabilities the base rate is fixed through the life of the transaction. In the US it is typically 3-Month Libor while in Europe it is typically 6-Month Libor.

Figure 13. Estimating Interest Rate Gap between CLO Assets and Liabilities for US and Europe

	US	Europe
Collat Based on 1-Month Rate	42%	55%
Collat Based on 3-Month Rate	58%	26%
Collat Based on 6-Month Rate	0%	19%
Median 1Month – 3 Month Libor Basis (bps)	6.0	24.1
Median 1Month – 6 Month Libor Basis (bps)	20.6	43.6
Median 3 Month – 6 Month Libor Basis (bps)	15.0	17.4
Basis Between CLO Assets and Liabilities	**2.52**=(.42*6+ .58*0)	**20.91** = (.55*43.6 + .26*17.4)

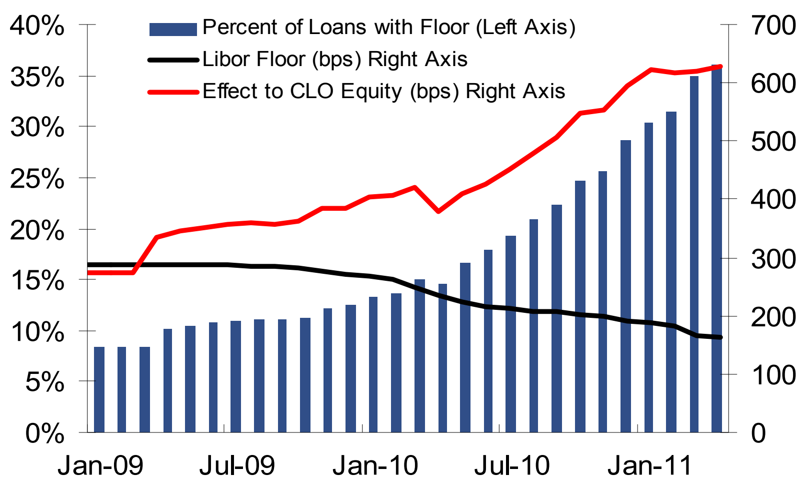
Source: Citi Investment Research and Analysis

From Figure 13 above we can see that for the US the negative effect of floating rate basis between CLO assets and liabilities (including effect of leverage) is equal to (12.5-1)*2.52 = 29bp. On the other hand, for Europe the effect is 188bps, hence, roughly 150bps of higher CLO equity payment in the US can be attributed to better floating rate match between CLO assets and liabilities.

Libor Floor Impact

Now, let's evaluate the third component of the equation, which deals with the effect of the Libor floor. Generally speaking, very few loans, if any, have Libor floor in Europe. On the contrary, in the US, in order to compete with high-yield bond markets, the proportion of loans that have Libor floor has been steadily increasing. As of now, roughly 40 percent of loans in US CLO portfolios have Libor floor with weighted average value of 150bps. Substituting those two numbers in the formula, we can see that currently roughly 625 = 0.4*12.5*max(150-25,0) bps of higher returns in US CLO equity can be attributed to presence of Libor floors. The number has been changing over time (Figure 14). If we take the average since Jan 2009 we can say that over past two years roughly 450 bps in US equity returns can be attributed to the presence of Libor floors in underlying loans.

Figure 14. Attribution of Higher Returns of US CLO Equity Due to Presence of Libor Floor

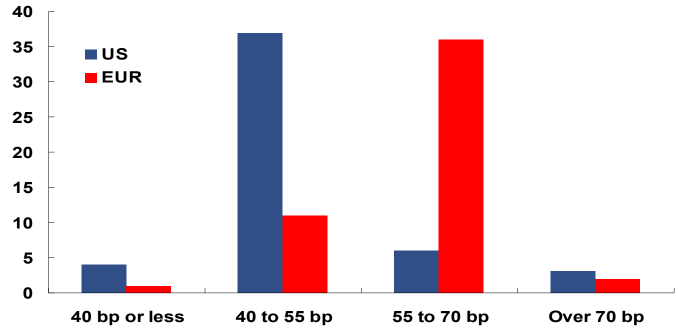


Source: Citi Investment Research and Analysis, S&P Leveraged Commentary and Data

Fee Difference Effect (or Lack of It)

The fourth component doesn't present too much interest. The fees, such as trustee fees and other agency fees, and other are comparable in both US and Europe. Management fees are somewhat higher in Europe vs. US (65bp vs. 50bp, Figure 15). However after applying the effect of leverage 10*65 vs. 12.5*50 it seems that little, if any, of equity returns discrepancy can be attributed to higher management fees in Europe.

Figure 15. Distribution of Management Fees in US and Europe

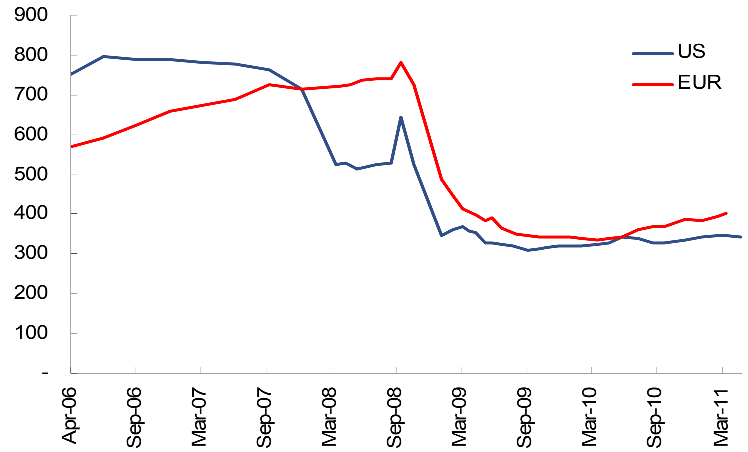


Source: Citi Investment Research and Analysis

Difference in Asset Interest

The last component of the equation that we evaluate in fact denotes interest on loans in CLO portfolio. Currently, the difference between interest on loans in US and European CLO portfolios is roughly 50bps with Europe being higher. Over the time though the difference between interest on loans in US and Europe has been changing but has always been within 150bps. Thus the maximum of overall higher interest on European loans is 150bps favoring Euro CLO Equity.

Figure 16. Difference on Total Interest in US and European Loans



Source: Citi Investment Research and Analysis

Pulling it all Together

Of the 15 points in observed differences in the payouts of US and European CLO Equity, the impact of the differences in leverage, collateral spread and the presence of Libor floors in US loans (the first and third factors in our list) is overwhelming. We found other components such as differences in management fees and the basis in floating-rate not to be very significant. We also did not did not take into account that European portfolios delevered more than their US counterparts, sustained more losses, and were (in most cases) able to build less par.

However, as time passes the situation may become less unfavorable for European CLOs. As interest rates rise, the effect of Libor floors will likely diminish. Furthermore, as US loans continue repricing at tighter spreads the difference between US and Euro loan spreads will decrease (and possibly become negative), decreasing the effects of leveraged spread differences. However, even if defaults remain low and interest rates increase, we expect annual CLO equity payments attributable to structural differences to be at least 500-600 bps higher in US than in Europe, suggesting that the average difference of 25-30 points between US and European Equity price makes complete sense.

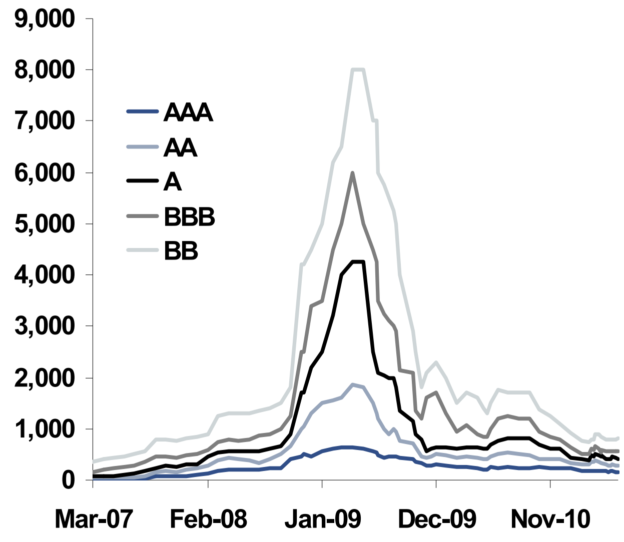
Cash Flow CDO Market

Figure 17. Secondary Cash Flow CDO Spreads/Prices

Collateral Type	AAA	AA	A	BBB	BB
US HY CLO (Spreads) – 25-*May-11*	150	250	400	550	810
US HY CLO (Prices) – 25-*May-11*	Low 90s – Mid 90s	Mid 80s – High 80s	High 70s – Mid 80s	Mid 70s – High 70s	Low 70s – High 70s
Euro HY CLO (Spreads) – *1-May-11*	210	390	520	780	1400
Euro HY CLO (Prices) – *1-May-11*	Low 90s – Mid 90s	Low 80s – Mid 80s	Low 70s – High 70s	High 60s – Mid 70s	Mid 60s – Low 70s

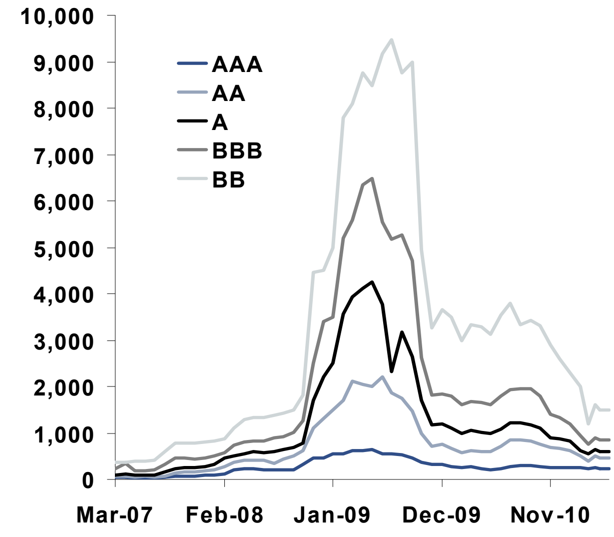
Source: Citi Investment Research and Analysis

Figure 18. US CLO Tranche Spreads



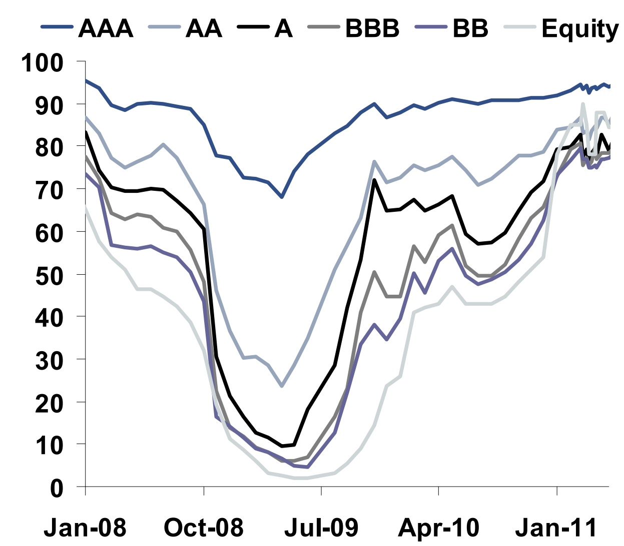
Source: Citi Investment Research and Analysis

Figure 19. European CLO Tranche Spreads



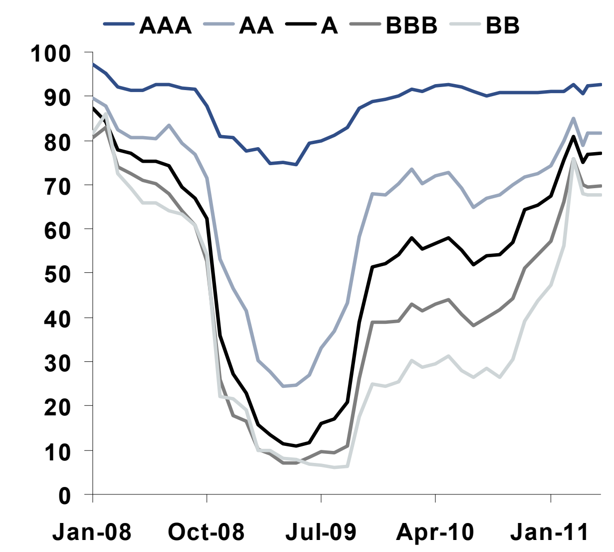
Source: Citi Investment Research and Analysis

Figure 20. US CLO Tranche Prices



Source: Citi Investment Research and Analysis

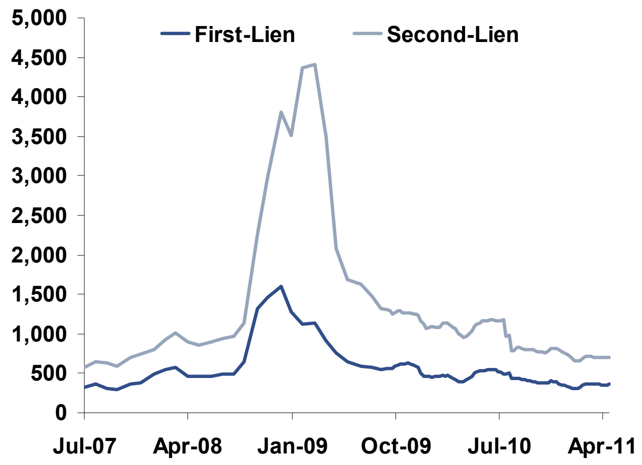
Figure 21. European CLO Tranche Prices



Source: Citi Investment Research and Analysis

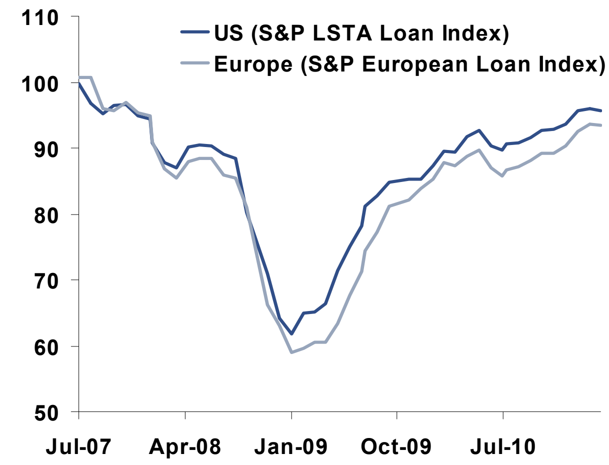
CLO Collateral

Figure 22. Avg First and Second-Lien Secondary Spreads to Maturity



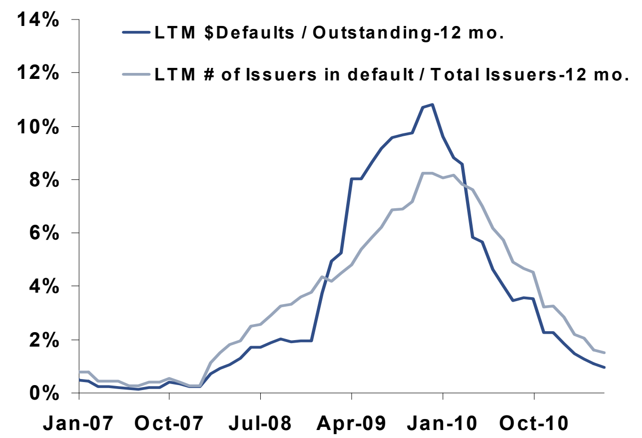
Source: Citi Investment Research and Analysis

Figure 23. Weighted Average Bid



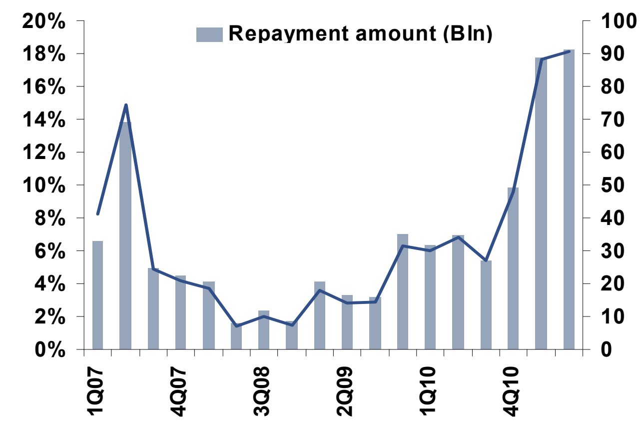
Source: Citi Investment Research and Analysis

Figure 24. Lagging 12mo. Default Rate by Principal Amount and # of Issuers



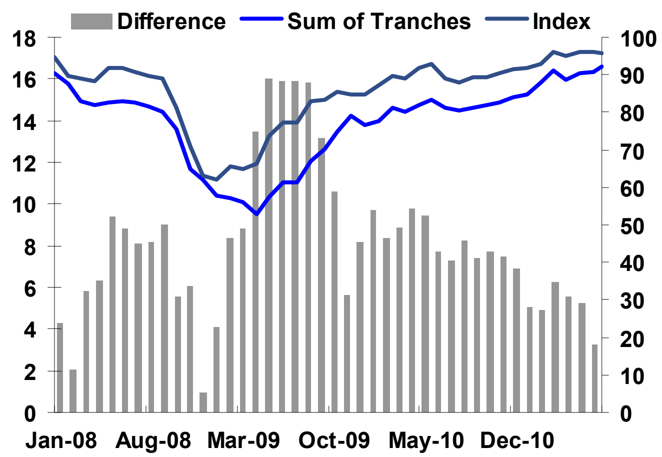
Source: Citi Investment Research and Analysis

Figure 25. Quarterly Repayment Rate and Repayment Amount



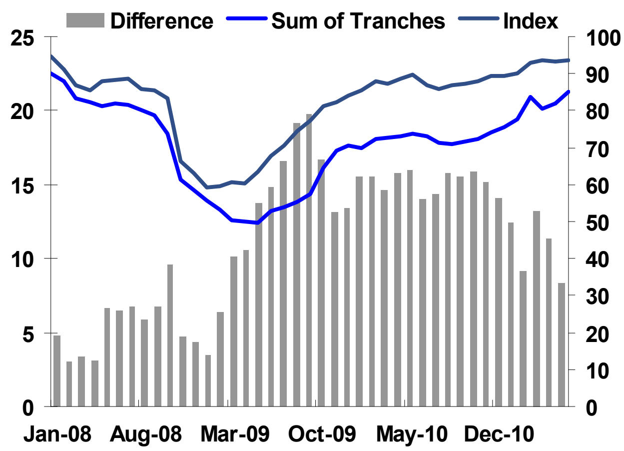
Source: Citi Investment Research and Analysis

Figure 26. Collateral/Tranche Arbitrage (US Deals)



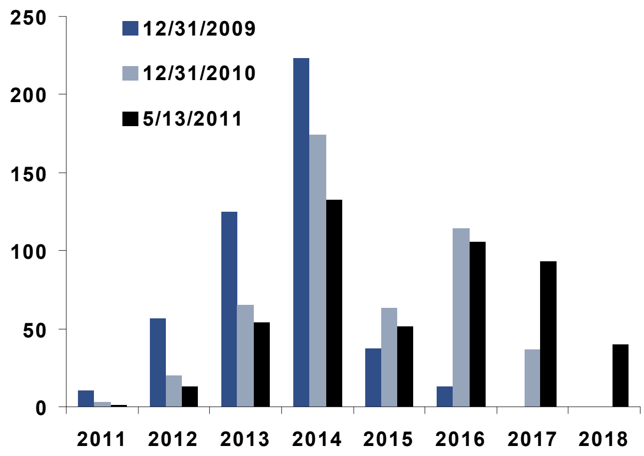
Source: Citi Investment Research and Analysis

Figure 27. Collateral/Tranche Arbitrage (EUR Deals)



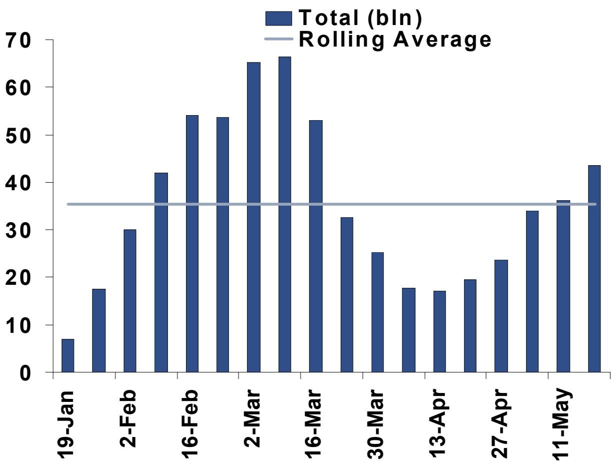
Source: Citi Investment Research and Analysis

Figure 28. Loan Distribution by Year of Maturity



Source: S&P

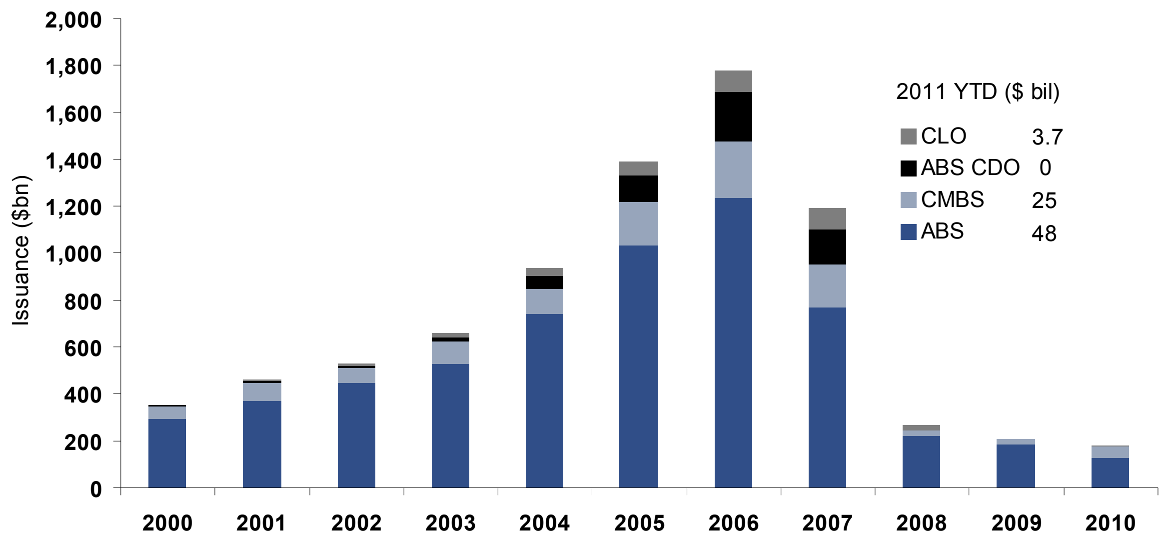
Figure 29. Institutional Loans Launched to Market (Rolling 30-Days)



Source: S&P

Securitized Products Issuance

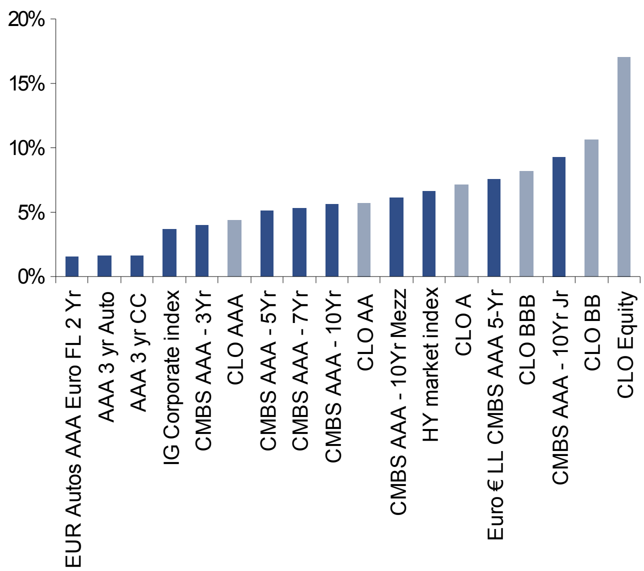
Figure 30. Year-to-Date CDO Issuance and Securitization Market Historical Issuance ($bln)



Source: Citi Investment Research and Analysis

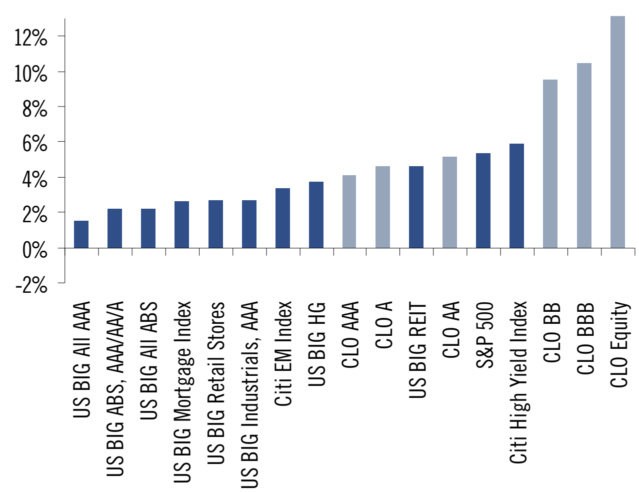
Securitized and Non-securitized Products Returns

Figure 31. Simple Yield



Source: Citi Investment Research and Analysis

Figure 32. Total Returns, 2011 (through 25-May-2011)



Source: Citi Investment Research and Analysis

Appendix II. Recent Publications

Figure 33. Recent Features

Date	Title	Description	Location on FI Direct
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 and 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
21 Apr 10	Saddle-up with Zero Coupon Tranches	POs offer a zero coupon bond-like structure on junior index and bespoke tranches. Their low initial prices and access to leverage with no credit line make them attractive.	Credit >> Global CDO
21 Apr 10	CLO Managers Buy More CLOs	Over the last year, CLO managers added $650MM of mostly senior CLO debt to their deals.	Credit >> Global CDO
21 Apr 10	Structured Credit Market Update	At least three ABS CDOs are being unwound and will add to supply of senior tranches of CLOs and other CDOs.	Credit >> Global CDO
31 Mar 10	CLO New Issue Opens – But is it Value?	Tranches have more subordination and higher coupons that earlier vintage deals, and senior tranches still look cheap for their risk compared to corporates.	Credit >> Global CDO
31 Mar 10	CLO Manager Consolidation Continues	To date, nearly 40 US mandates have changed hands, and we are seeing some initial activity in Europe.	Credit >> Global CDO
31 Mar 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
31 Mar 10	LCDX Tranches – Half Empty or Half Full?	Credit investors have regained an appetite for CSOs, but the recovery has not been as dramatic as that in loans and CLOs.	Credit >> Global CDO
9 Mar 10	Expressing a View on Credit-FX Correlation	Credit investors who want to try to benefit from, or manage the risks due to, the correlation in credit spread and currency movements can utilize quanto CDS to express their views.	Credit >> Global CDO
9 Mar 10	Investing in Vintage iTraxx Tranches	We believe shorter dated vintage iTraxx tranches offer interesting buy and hold opportunities.	Credit >> Global CDO
8 Mar 10	CLO Equity Returns – Who Managed to Deliver	We evaluate the performance of equity tranches in roughly 90 percent of outstanding transactions, spanning across 132 managers in the US and 55 in Europe.	Credit >> Global CDO

Source: Citi Investment Research and Analysis

Figure 34. Market Primers and Handbooks

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

Appendix A-1

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