European Structured Finance Special Report

Rating Criteria for European Arbitrage Collateralised Debt Obligations

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■ Summary

Although the European arbitrage collateralised debt obligation (CDO) market is still in its infancy, Fitch expects the increasing availability of high-yield bonds and leveraged loans to boost CDO market growth, creating a major investor base in European leveraged finance and high-yield debt. This report examines Fitch's rating criteria for European arbitrage CDOs. This rating process generally resembles the rating process for US arbitrage transactions. However, although the approach is well established in the US, there are key differences for European arbitrage CDOs that must be considered. This report analyses these within the general analytical framework of rating CDOs. The main areas that differ from the US approach are collateral type, recovery rates and timing of recoveries, diversification requirements, portfolio manager considerations, and multicurrency issues.

The term CDO encompasses both collateralised loan obligations, in which the collateral being securitised is primarily loans, and collateralised bond obligations, in which the collateral is primarily bonds. CDO structures generally fall within four categories — cash flow, market value, hybrid (some combination of cash flow and market value), or derivative. Cash flow CDOs rely on the cash flow generated by the underlying diversified asset pool to service the vehicle's rated debt. Cash flow transactions generally do not require the collateral asset pool to be marked to market and are typically less actively traded than a market value transaction.

Cash flow structures are further subdivided into balance sheet and arbitrage transactions. Balance sheet CDOs are used primarily by financial institutions to manage their credit exposures and/or improve returns on economic or regulatory capital. An arbitrage CDO exploits the difference between the cash flow generated from high-yield bonds and bank loans and the cash flow required to service the notes issued via the CDO.

Market value structures rely on the market value and liquidity of the underlying asset pool to meet required payments of principal and interest on the investment vehicle's rated debt.

Derivative transactions are synthetic structures in which assets are "referenced" but not truly securitised. Synthetic CDOs transfer credit risk, or the total rate of return on the referenced assets, to the CDO noteholders and equity investors.

This report focuses exclusively on cash flow arbitrage CDOs with European assets and discusses distinctions from Fitch's US cash flow CDO criteria *(see Fitch Research on "Rating Criteria for Cash Flow Collateralized Debt Obligations," dated Nov. 4, 1999)*.

■ Collateral Type

Arbitrage CDOs are simply asset-backed securities where the collateral pool can include various classes of debt products or focus solely on one asset class. The most commonly used assets are leveraged loans and high-yield bonds, although some structures include mezzanine loans and emerging market debt.

Leveraged Loans

Leveraged loans are highly structured loans resulting, usually, from either leveraged buyouts (LBOs) or mergers and acquisition transactions. They are at the top of the capital structure of the borrower and usually benefit from both collateral and covenant support. Leveraged loan ratings are based on the entity or default rating of the corporation, but transactions involving these structures are often rated higher than the unsecured debt, reflecting the higher recovery levels of their senior secured position. Thus, leveraged loans benefit from higher ratings and recovery rates compared with other debt products.

The European leveraged loan market has grown considerably over the past 12–18 months. In a recent Fitch study *(see Fitch Research on "Going from Strength to Strength?" dated 24 Jan. 2000)*, LBO transactions grew from 181, with a value of Euro currency unit (€) 13.7 billion in 1998 to 260 with a value of €21.0 billion in 1999. This upward trend likely will continue into the foreseeable future as other countries follow the lead of the UK, France, and Germany, which were primarily responsible for the recent growth. Unlike the high-yield bond market, there has not been a particular concentration of LBOs in any one industry sector.

High-Yield Bonds

Although the European high-yield bond market is still small compared with the US, it has grown significantly over the past few years, despite a few unsteady periods. With issuance up to €18.1 billion in 1999, Europe now accounts for approximately 17% of the global high-yield market. It showed itself able to withstand the 1998 credit shock and rebound in a relatively short period.

Currently, the main problem in the European high-yield bond market is the lack of industry sector diversity. Telecommunications and media continue to be the dominant sectors, accounting for more than 70% of recent issuance, a situation unlikely to change in the foreseeable future. This causes a considerable problem for European arbitrage CDOs that benefit from industry diversity. In addition, structural subordination and strong pro-secured creditor insolvency regimes are likely to result in substantially lower recovery rate assumptions for European high-yield bonds *(see Fitch Research on "Different Countries, Different Structures," dated 31 Jan. 2000)*.

Mezzanine Debt

Mezzanine loans in Europe are typically issued by companies too small to issue high-yield bonds. Therefore, these loans tend to be in the region of €80 million–€160 million. In Europe, mezzanine loans are usually issued by the same company in the group structure that issued the senior secured loan and has a second charge over the security, with similar covenants to those in the senior secured loan. As such, a company's mezzanine loan usually ranks higher than its high-yield bond in terms of recoveries and, hence, may achieve higher ratings.

This market is relatively small compared with the leveraged loan and high-yield bond markets. In Europe, it has traditionally been dominated by a few asset managers and participants that have extensive experience with the debt product.

■ Rating Process

In general, Fitch's rating process can be summarised in the following steps:

- Examine the capabilities of portfolio manager.
- Determine probability of default of assets.
- Project timing of defaults.
- Assess recoveries.
- Estimate recovery timing.
- Model and stress cash flows.

Diversification, structure, and interest rate and currency exposure will all have an impact on the aforementioned factors.

■ Portfolio Manager

Fitch's rating process begins with an assessment of the portfolio manager and how the CDO fits within the investor's overall strategy. Given that Fitch views the asset manager as key to the transaction's performance, asset manager due diligence is an integral part of the rating process *(for further information, see Fitch Arbitrage Collateralised Debt Obligation Transactions — Due Diligence Outline, page 11)*.

Fitch recognises that the manager's performance is vital for the most subordinate classes of debt. Therefore, the results of the due diligence weigh most heavily in Fitch's analysis of these classes.

When evaluating portfolio managers, Fitch looks for proven experience in managing portfolios of similar assets and a demonstrated ability to manage

portfolios through economic downturns. Fitch checks for adequate staffing to handle the administrative requirements of the planned CDO. A team of Fitch's Structured Finance and Corporate analysts evaluate the manager's experience and track record, focusing on the assets to be included in the CDO.

Cash flow CDOs vary in complexity from static pools with little management and/or trading after the transaction is closed to highly complex structures with a greater degree of trading capabilities. For any but the most simple, a manager must demonstrate ability in manoeuvring the portfolio to stay within the investment guidelines.

In view of the relative youth of the high-yield market in Europe, portfolio managers are likely to have a limited track record in the management of this asset type. Fitch recognises this but still expects a manager to be able to demonstrate a reasonable amount of experience within the market. In addition, managers are expected to have gained experience in asset categories that complement the high-yield portfolio to improve diversification.

From Fitch's perspective, superior performance is defined by stable, risk-adjusted returns. In viewing historical performance, Fitch examines the impact of removing the manager's largest individual gains, among other things, recognising that regular gains across the portfolio will help to maintain a steady stream of payments.

Fitch looks favourably upon institutional sponsorship, particularly with regard to investment in the most junior tranche of the CDO, because it aligns the economic interests of the portfolio manager with the performance of the CDO. Institutional sponsorship also may make Fitch more comfortable with a smaller management team, as additional resources could then be provided by the larger institution, if needed.

Fitch is not looking for teams that can function only when the economic environment is benign. Rather, it looks for teams with the depth and experience to weather economic downturns. As part of its interviews, Fitch talks to staff members to ensure some level of expertise with distressed credits.

Fitch's review typically encompasses a full day of interviews with an organisation's senior management and key individuals responsible for credit analysis and portfolio management for the proposed transaction. Fitch analysts randomly select credit files for review and conduct an operations tour to verify systems, compliance, and infrastructure capabilities.

Fitch analysts prepare a comprehensive appraisal of the portfolio manager, which is presented to an internal credit committee for approval. Results of this play a substantive role in determining structural flexibility and, to a lesser extent, credit enhancement levels.

Ultimately, there is no amount of credit enhancement that can compensate for a manager that Fitch feels is not adequate or capable of fulfilling the required responsibilities.

■ Default Probabilities

The short track record of the European high-yield market, particularly in the bond sector, and the fact that most corporates in Europe are not rated mean that a purely European default study is not yet possible. However, the credit quality of two similarly rated securities should be the same regardless of which Fitch group rated these securities. For example, a 'BB' US high-yield bond should have the same probability of default as a 'BB' European high-yield bond. For this reason, Fitch's methodology for analysing default probabilities of the assets in the collateral pool will be identical for both European and US transactions.

Fitch's assessment of default probabilities is based on the credit quality of the portfolio, usually measured by the latter's weighted average rating. To arrive at this, the Fitch factors are applied. The outstanding amount of all the credits in each rating category should be multiplied by the relevant factor, as shown in the Fitch Factors table on page 4. These products should be summed and then divided by the aggregate outstanding amount of the pool. The Fitch factors are, by design, skewed, with the weighting increasing as the credit quality decreases.

Underlying assets in an arbitrage CDO are rated either on an explicit (public) or a shadow basis. For high-yield bonds, the Fitch public rating is used. In the event that no such rating exists but there are two other public ratings, the lower of these is used. In the event that there is only one public rating for the bond, Fitch may apply a "haircut" to this rating or use a Fitch shadow rating. For leveraged loans, which are largely unrated in Europe, where a Fitch public rating does not exist, a Fitch shadow rating is completed by Fitch's loan products analysts. As loan ratings include "notching" based on the recovery characteristics, the respective entity rating is used to assess default probabilities.

The weighted average rating of the pool can then be used to determine the level of defaults a CDO will

Fitch Factors

Rating	(%)
AAA	1.3
AA+	2.0
AA	2.3
AA–	3.3
A+	4.0
A	5.0
A–	7.5
BBB+	10.0
BBB	14.0
BBB–	20.0
BB+	37.0
BB	43.5
BB–	46.5
B+	50.0
B	52.2
B–	65.0
CCC+	90.0
CCC and Below	100.0

have to withstand to achieve the desired rating. To demonstrate this, starting on the left-hand column of the default probability matrix below, select the row that corresponds with the weighted average rating of the collateral. Move to the right to determine the stressed default rates for the proposed rating levels, as indicated by the column headings along the top of the matrix. For example, a pool of assets with a 'BB' weighted average rating would be stressed at a 21.50% default rate for a CDO debt rating of 'BBB'. To achieve an 'AAA' rating, the same transaction would have to withstand 43.50% of defaults.

■ Timing of Defaults

Assumptions regarding timing and distribution of defaults for European CDOs also are identical to US transactions. Fitch currently employs, at minimum, two stress tests, front- and back-loaded, for each class of debt.

Front-Loaded Stress Test

Under the front-loaded stress test, defaults are assumed to occur on a fully funded asset pool after the completion of ramp-up. Any collateral assets with delayed funding provisions, such as revolving bank credit facilities, are assumed fully drawn. For investment-grade stress runs, defaults are assumed to occur over the first five years of the transaction. The respective percentage of the aggregate default number *(see Default Distribution Assumptions — Front-Loaded Test table, page 5)* is multiplied by the original collateral balance. Interest is not received on assets defaulting during that period. This test is designed to simulate a large-scale depression with massive collateral defaults occurring simultaneously and at the worst possible times for the transaction.

For front-loaded, non-investment-grade stress tests, the aggregate default number is spread evenly over the first six years of the transaction or on the life of the transaction for 'BB' or 'B' stresses, respectively.

Back-Loaded Stress Test

Fitch tests the sensitivity of the capital structure by conducting back-loaded scenarios as well. These simulations prove to be more punitive to structures that distribute substantial residual income early in the life of the transaction and to structures that allow the interest on subordinated tranches to be paid in kind, or "pik-ed."

In the back-loaded scenario, the base default rate of the 'B' rating column is divided by 10 years to get an annual rate that is applied in every year of the transaction. During the reinvestment period, the

Default Probability Matrix

(%)

WAR*	B–	B	B+	BB–	BB	BB+	BBB–	BBB	BBB+	A–	A	A+	AA–	AA	AA+	AAA
AAA	0.00	0.00	0.00	0.00	0.00	0.20	0.35	0.50	0.60	0.70	0.80	0.85	0.95	1.00	1.05	1.30
AA+	0.00	0.00	0.10	0.30	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.25	1.30	1.50	2.00
AA	0.00	0.00	0.20	0.40	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.35	1.40	1.75	2.30
AA–	0.00	0.00	0.25	0.45	0.65	0.75	0.90	1.00	1.10	1.20	1.30	1.40	1.75	2.25	2.50	3.30
A+	0.00	0.20	0.30	0.50	0.70	0.90	1.00	1.10	1.20	1.30	1.40	1.80	2.50	3.00	3.50	4.00
A	0.30	0.75	0.84	0.93	1.03	1.12	1.21	1.30	1.39	1.48	1.60	2.60	4.10	4.30	4.50	5.00
A–	0.60	1.00	1.25	1.50	1.75	2.00	2.50	2.75	3.25	4.00	4.50	5.00	5.50	6.00	6.50	7.50
BBB+	1.50	2.00	2.25	2.50	2.75	3.00	3.25	3.75	4.25	6.00	6.50	7.00	8.00	8.50	9.00	10.00
BBB	3.00	4.00	4.17	4.34	4.50	4.66	4.82	5.00	6.00	9.50	10.00	10.50	11.25	12.00	12.75	14.00
BBB–	4.00	5.00	5.25	5.50	5.75	6.00	6.50	7.50	8.00	10.00	11.00	12.00	13.50	15.00	17.00	20.00
BB+	9.00	10.75	11.50	12.50	13.50	14.50	16.00	17.00	18.00	21.00	22.25	23.50	25.75	27.75	30.75	37.00
BB	11.00	16.00	16.80	17.70	18.70	19.60	20.60	21.50	22.40	25.90	27.00	28.10	31.50	32.50	33.50	43.50
BB–	14.00	17.75	18.25	19.00	20.00	21.00	22.50	23.50	27.00	29.00	31.50	33.00	35.50	37.50	40.00	46.50
B+	17.00	22.00	22.75	23.75	25.00	26.25	28.00	29.50	31.00	33.75	35.20	37.00	40.00	42.00	44.00	50.00
B	20.00	25.00	26.00	27.40	28.40	29.40	30.60	31.80	33.00	36.00	38.60	41.20	44.20	45.40	46.60	52.20
B–	24.00	27.00	28.00	29.25	30.50	32.25	35.50	38.00	40.00	43.00	45.00	47.00	51.00	53.00	55.00	65.00
CCC+	27.00	30.00	32.00	36.00	37.00	38.00	40.00	42.00	44.00	50.00	55.00	60.00	67.00	73.00	79.00	90.00
CCC	32.00	35.00	37.00	41.00	42.00	43.00	45.00	47.00	49.00	55.00	60.00	65.00	72.00	78.00	84.00	100.00

*Weighted average rating of collateral.

Default Distribution Assumptions — Front-Loaded Test
(%)

Year	Investment-Grade Stress	BB Rating Stress	B Rating Stress
One	33	16.67	10
Two	25	16.67	10
Three	16	16.67	10
Four	13	16.67	10
Five	13	16.67	10
Six	—	16.67	10
Seven	—	—	10
Eight	—	—	10
Nine	—	—	10
10	—	—	10

default percentage is applied to the original collateral balance. After the reinvestment period, the appropriate default percentage is applied to the outstanding collateral balance at the beginning of each period.

Additionally, there is a stress premium that is added to the base default rate over the last three years of the transaction. The stress premium is the differential between the base default rate from the 'B' column and the aggregate default rate of the proposed rating. This differential is divided by three and applied evenly over the last three years of the transaction, in addition to the base default rate.

For example, in a pool of assets with a weighted average rating of 'BB', the base annual default rate applied would be 1.6% (16% divided by 10%). For the stress test of the 'AAA' rated debt, the default percentage applied in the last three years of the transaction would be 10.8% {[(43.5% – 16.0%)/3.0%] + 1.6%}. While this test does not usually drive the enhancement levels, it validates that the structure can withstand ongoing defaults with a spike in defaults at the end.

In some cases, Fitch runs a stress test with defaults spread evenly over the life of the transaction, testing the structure's ability to withstand long periods of negative cash flow. Alternatively, stress tests with defaults occurring directly after the reinvestment period ends may be run.

■ 10-Year Default Rate

The default probability matrix is based on the historical average of the 10-year default probabilities. For transactions with shorter durations, the percentages can be adjusted downward, as listed in the table at right.

■ Recovery Rates

One of the main difficulties in assessing European CDOs is the lack of statistical information on recovery rates for various debt instruments. By comparison, there is a considerable amount of information on US default rates and recovery levels *(see Fitch Research on "Syndicated Bank Loan Recovery Study," dated Oct 22, 1997, and "High-Yield Default Risk — The Benefits and Limits of Diversification," dated Dec. 16, 1999)*. To address this lack of information, Fitch completed a study of three European insolvency regimes (France, Germany, and the UK) and compared them with the US *(see Fitch Research on "Regimes, Recoveries and Loan Ratings: The Importance of Insolvency Legislation," dated Oct. 11, 1999)*.

This study concluded that the French, German, and UK insolvency regimes were very different from the US and, hence, that it was inappropriate to use US recovery rate assumptions. In summary, the UK was the most pro-secured creditor regime, where other groups of creditors were unlikely to receive any realisations from insolvency proceedings unless full settlement of the secured creditors' outstanding principal and interest had been made. Germany is also strong in its support of secured creditors compared with the US. In France, distributions are shared more equally among creditor classes. To supplement this research, Fitch recently published the first independent study on recovery rates for UK secured loans *(see Fitch Research on "UK Secured Loan Recovery Study," dated 29 Feb. 2000)*. This research illustrated that the average recovery rate on a pool of 55 UK secured loans, which were primarily to small and medium-sized companies, was 76.5%.

In the absence of further statistical data, Fitch has used these studies, in conjunction with an understanding of the major European insolvency regimes, to determine conservative benchmark recovery values on various debt instruments across European jurisdictions. It is important to note that the secondary market in both high-yield bonds and loans in Europe is still in its infancy compared with the US. Hence, in a distressed scenario, it may not be possible for the asset manager to

Adjustment of 10-Year Default Rate
(%)

	Three-Year Deal	Five-Year Deal	Seven-Year Deal
Investment-Grade Collateral	45	65	90
Non-Investment-Grade Collateral	55	75	90

Recovery Rates
(%)

	Senior Secured Loans	Junior Secured Loans	Senior Unsecured Loans	Structurally Subordinated Debt
France	35–45	30–40	20–40	0–20
Germany	50–60	40–50	20–40	0–5
UK	75–85	40–60	15–30	0–5

immediately trade out of the situation, possibly making him or her more reliant on workouts.

The table above indicates the recovery rates that Fitch expects to assign various asset types in the three regimes studied.

Fitch ascribed rates for senior secured bank loans based on the assumption that they rank at the top of the capital structure and have a first charge over the collateral available in that jurisdiction. The range given for recoveries on junior secured debt assumes that the instrument has a second charge over the assets available. The actual rate applied to senior unsecured debt and unsupported, structurally subordinated, debt will depend on the individual capital structure of the company, i.e. the presence of higher ranking debt, the industry sector, and the asset manager's experience in the asset class and in trading out or workouts.

In an arbitrage CDO, it is not possible to analyse the exact recoverability of the assets since the collateral pool will largely be assembled after the transaction closes. Therefore, Fitch made conservative assumptions regarding recoverability for various assets in most European countries, as shown in the table below. The initial table was expanded to include other countries by grouping regimes that are similar to France, Germany, and the UK.

Recovery Timing and Workout Periods

Fitch's recent recovery study showed that the average time to repayment of defaulted debt in the UK was 15 months. This increased considerably if recoveries were heavily dependent on the sale of real estate. Given the control exercised by secured creditors in distressed scenarios in the UK compared with other jurisdictions, it is likely that time to repayment in other European countries will be longer. Therefore, for Fitch's modelling purposes, a recovery assumption of 30 months is used.

Fitch assumes that, given the lack of liquidity in the European loan market, defaulted credits will have to be held through workout. Therefore, Fitch does not generally request a predetermined sale date of distressed debt, which, given the illiquid European loan market, might hamper recoveries. This assumption applies less to high-yield bonds, as the secondary market has greater liquidity for distressed credits. Recovery timing is dependent on the workout

Recovery Rate Assumptions
(%)

	Senior Secured Loans	Junior Secured Loans	Senior Unsecured Loans	Structurally Subordinated Debt
Ireland	75.0	50.0	17.5	0.0
UK	75.0	50.0	17.5	0.0
Austria	55.0	40.0	22.5	5.0
Belgium	50.0	35.0	20.0	5.0
Denmark	50.0	35.0	20.0	5.0
Finland	50.0	35.0	20.0	5.0
Germany	55.0	40.0	22.5	5.0
Iceland	50.0	35.0	20.0	5.0
Luxembourg	50.0	35.0	20.0	5.0
Netherlands	50.0	35.0	20.0	5.0
Norway	50.0	35.0	20.0	5.0
Sweden	50.0	35.0	20.0	5.0
Switzerland	55.0	40.0	22.5	5.0
France	40.0	30.0	25.0	10.0
Italy	30.0	20.0	15.0	5.0
Portugal	40.0	30.0	25.0	5.0
Spain	40.0	30.0	25.0	5.0

Obligor Concentration Matrix
(No. of Obligors)

Collateral	Stress Test					
Rating	AAA	AA	A	BBB	BB	B
AAA	1	1	1	1	0	0
AA	2	1	1	1	0	0
A	4	3	2	1	1	1
BBB	5	4	3	2	1	1
BB+	7	6	5	3	1	1
BB	8	7	6	4	2	1
BB–	9	8	7	5	3	1
B+	10	9	8	6	4	1
B	11	10	9	7	5	2
B–	13	11	10	8	6	5
CCC+	18	14	12	10	9	7

experience of the portfolio manager, which will determine whether a sale or possible workout is appropriate. However, the higher the likelihood of a full workout, the higher the likely recoveries on the defaulted assets.

■ Diversification

Diversification across industries, obligors, and countries is crucial in any CDO to limit unexpected losses.

Diversification by Obligor

Fitch likes to see as much obligor diversification as possible to reduce the overall impact of individual defaults; therefore, Fitch expects single obligor concentrations to be in the range of 1.0%–2.5% of the total collateral pool.

Fitch employs an obligor concentration matrix that tests the structure's ability to withstand simultaneous defaults of the larger obligors at any point in the life of the transaction *(see table above)*. In the case of affiliated companies, a default correlation of one is assumed, thereby treating borrower groups as one exposure. For example, an 'AAA' rated tranche should be able to survive the eight largest 'BB' credits defaulting.

Recovery assumptions are applied to the results of this test to arrive at a net loss number at each rating level, which must be covered by the subordination beneath the tranche. These results are compared with the credit enhancement required by the default probability matrix-driven tests. The more stringent enhancement requirement drives final credit enhancement levels. It is important to note that this matrix is meant to provide guidance and may not be appropriate for all transactions.

Diversification by Industry

Diversification by industry is one of the more difficult areas for European arbitrage CDOs. In particular, the European high-yield bond market is still not highly diverse, given the concentration in telecommunications and media.

Fitch's opinion on industry diversification differs from the opinion that more is better. Traditional CDOs have been required to diversify the portfolio across as many as 20 different industries. However, since high-yield securities are not issued in all industries, this diversification requirement could force managers into subperforming asset categories or ones in which they may not have significant experience.

Fitch conducted a study of historical industry default behaviour in the US to estimate the marginal benefits of diversification *(see Fitch Research on "High-Yield Industry Default Risk — The Benefits and Limits of Diversification," dated Dec. 16, 1999)*. This study concludes that, while few would dispute the benefits of diversification, such benefits diminish when industry diversification is increased from 15 to 20 sectors for an average manager.

Thus, based on the targeted asset types and a manager's demonstrated strength in sector selection, Fitch permits a limited amount of industry concentration; generally, at least 10 industries must be represented in an arbitrage CDO. Fitch believes that diversification requirements have to be considered in conjunction with the portfolio manager's experience in the invested asset classes.

Diversification by Country

Diversification by country can be an important factor, as the general economic environment typically has an impact on the default probability of obligors situated in one country. However, it is difficult to measure the benefits of diversification by country and/or region as obligors will have different sensitivities to economic cycles. In addition, for longer term transactions, if multiple countries suffer recessions, the performance of the transaction could be affected, even if recessions do not occur simultaneously. For Europe, given the introduction of the Euro, it remains to be seen how closely correlated the economies are within "Euroland."

One important consideration is whether particular industries can be classified as global or local. In cases of more local industries (e.g. real estate), diversification across countries and/or regions can potentially improve portfolio diversification. The Industry Classifications table on page 8 indicates Fitch's view as to whether a particular industry would be generally classified as global or local. However, this distinction is generic and

Industry Classifications

Industry	Classification
Aerospace and Defence	Global
Automobiles	Global
Real Estate	Local
Broadcasting and Media	Global
Banking and Finance	Global
Building and Materials	Local
Cable	Global
Chemicals	Global
Computer and Electronics	Global
Consumer Products	Global
Energy (Oil and Gas)	Global
Environmental Services	Local
Farming and Agricultural	Local
Food, Beverage, and Tobacco	Local
Gaming, Lodging, and Restaurants	Global
Health Care	Local
Pharmaceuticals	Global
Industrial/Manufacturing	Local
Leisure and Entertainment	Local
Metals and Mining	Global
Paper and Forest Products	Global
Retail	Local
Supermarkets and Drug Stores	Local
Telecommunications	Global
Textiles and Furniture	Local
Transportation (Excluding Shipping)	Local
Utilities (Power)	Local

may not be appropriate for specific companies within an industry.

Note that Fitch industry classifications have been revised for the classification in the table above and, therefore, may differ from industries listed in Fitch's cash flow criteria *(see Fitch Research on "Rating Criteria for Cash Flow Collateralized Debt Obligations," dated Nov. 4, 1999).*

Fitch generally allows for one global industry to reach a maximum of 20% of the aggregate portfolio balance or two global industries at 15% each and all others limited to 10% each. At all times, the top three industries must not exceed 45% in aggregate. For local industries, Fitch allows a maximum of 20% of the aggregate portfolio balance within a single industry in different countries.

While Fitch accepts these higher concentrations for some industries, these are subject to the asset manager's demonstrated expertise and a proven track record in such industries.

Given the fact that a high level of diversification is difficult to achieve in the European market, Fitch expects that most European arbitrage CDOs will invest in multiple asset categories to achieve diversification.

As mentioned, Fitch assesses the manager's ability to manage across a range of debt instruments.

■ Analysis of Financial Structure

Fitch expects that the financial structures employed in European arbitrage CDOs will be similar to US arbitrage CDOs. However, there are some European aspects, notably multicurrency issues and different interest rate stresses, that must be taken into account.

Multicurrency Structures

In an attempt to diversify, arbitrage CDOs can be structured such that the underlying collateral pool is denominated in more than one currency. While this assists the diversification side, it can lead to additional risk factors. Besides a direct mismatch of asset currencies to liability currencies, supplementary risks can arise in cases where a high level of defaults occur and/or where the distribution of defaults across currencies would not be proportional to their relative size in the portfolio, causing hedging programmes to be out of balance.

Fitch analyses the respective hedge structure to assess the exposure of the transaction to currency risks. Ideally, currency risk is hedged to the maximum extent possible.

Any exposure to currency risks has to be accounted for and increases the credit enhancement required for the transaction. The adequacy of the hedge mechanism provided and additional credit enhancement requirements are assessed by Fitch on a case-by-case basis.

Structural Protection

Cash flow CDOs incorporate overcollateralisation and interest coverage tests, in general, at the senior and total debt levels. This is to ensure that adequate cash flow is available to pay interest obligations and that asset value is sufficient to ensure principal payments on the rated debt. If these tests are breached, cash flows are redirected to pay down the most senior class of debt outstanding until compliance is restored.

Overcollateralisation Test: The overcollateralisation test is defined as the sum of the collateral principal and cash balances divided by the rated note principal balance. Nondefaulted assets are usually valued at par for this test. Defaulted assets are valued at the lower of the Fitch recovery assumptions for that asset class and market value. Fitch gauges the assumptions behind the overcollateralisation levels; excessively aggressive

assumptions can lead to overcollateralisation tests that can be easily breached.

Fitch reviews the prices at which securities are purchased for a CDO and examines those purchased substantially below par. Overly high overcollateralisation tests may lead managers to purchase discounted collateral to enhance par value, which could impair the credit quality of the portfolio. Such a problem may not be apparent when the collateral is performing well but may be revealed when the portfolio experiences some deterioration in credit. Therefore, Fitch looks at the assumptions used to derive the overcollateralisation tests to evaluate the ability of the CDO to meet these tests over the life of the transaction.

The manager may sell a credit-impaired asset at a discount if he or she is of the opinion that further deterioration is an unacceptable risk. However, since such an asset is carried at par until it is sold, the overcollateralisation level will immediately drop at the time of the sale unless the sale is coupled with the purchase of a replacement asset at a discount and/or the sale of other assets at a premium.

Since breach of an overcollateralisation trigger may result in redirection of subordinated interest, careful attention must be paid to when and for how long interest due to subordinate classes is redirected. If Fitch's rating addresses timeliness of interest to subordinated classes, an overcollateralisation trigger may cause a rating default for certain subordinate classes.

Interest Coverage Test: The interest coverage test is defined as the interest proceeds divided by interest due on the rated notes. Interest coverage tests verify that the interest proceeds are sufficient to cover funding costs of the rated notes.

Interest coverage tests are performed as frequently as coupon interest payments are made and whenever assets are deleted from or added to the pool.

When a trigger is breached, interest payable to subordinated classes is redirected to pay down the most senior classes until compliance is restored. As with the overcollateralisation tests, careful attention must be paid to interest payments to subordinate classes.

■ Reinvestment Period

Underlying assets may amortise and repay earlier than the scheduled maturity, but arbitrage structures permit reinvestment within a predetermined period.

In addition to the tests described, the weighted average rating, weighted average maturity, and weighted average coupon tests help maintain portfolio characteristics that are closely aligned with initial cash flow modelling assumptions.

The minimum weighted average rating test preserves the credit quality of the collateral asset pool. The weighted average maturity test requires that sufficient principal proceeds are available to make note payments, when due, and protects the structure from exposure to market value risk upon liquidation, as collateral assets would need to be sold into an unknown market environment to redeem the rated notes.

Analysis of the impact of the minimum weighted average coupon on the stress test is significant, since a high weighted average coupon may be impossible to maintain if interest rates decline. The portfolio must be able to survive with lower cash flows if the manager is unable to replace maturing debt in accordance with the weighted average coupon.

■ Interest Rate Mismatches and Stresses

To the extent that there is a basis mismatch between the assets that constitute the CDO collateral and the obligations of the CDO notes, the cash flow model incorporates interest rate shocks. Hedging programs are often adopted to mitigate interest rate risk that could result in increased liability funding costs.

Most arbitrage CDO structures incorporate a programme involving derivative instruments, like swaps or forwards, prior to closing. This hedging should leave flexibility for early redemption of part of the rated debt.

Fitch stresses interest rates to reflect the required rating category of the notes based on historical increases in the London Interbank Offered Rate (LIBOR). The stresses are used to test the ability of the swap or cap to hedge potential interest rate risk.

Fitch developed interest rate stresses for cash flow transactions for the Sterling LIBOR (STG LIBOR) and the European Interbank Offered Rate (EURIBOR), as detailed in the tables at the top of page 10. Interest rate stress scenarios are naturally more severe for investment-grade stress runs. In the case of STG LIBOR, the structure is subjected to an additional absolute rate increase of 5.00% against the current rate in year one, ignoring the forward curve (applied periodically according to the payment periods). Year two is then increased by 0.50%. The

If Three-Month STG LIBOR Equals 6.200%

	Year One	Year Two	Year Three
First Quarter	7.45	11.33	11.70
Second Quarter	8.70	11.45	11.70
Third Quarter	9.95	11.58	11.70
Fourth Quarter	11.20	11.70	11.70

STG LIBOR – Sterling London Interbank Offered Rate.

If Three-Month EURIBOR Equals 3.875%

	Year One	Year Two	Year Three
First Quarter	5.69	11.25	11.63
Second Quarter	7.50	11.38	11.63
Third Quarter	9.31	11.50	11.63
Fourth Quarter	11.13	11.63	11.63

EURIBOR – European Interbank Offered Rate.

rate is held at this level for the remainder of the transaction's life. For EURIBOR, the absolute rate increase of 7.25% is applied in year one and a 0.50% increase in year two.

For debt tranches rated below-investment-grade, STG LIBOR-denominated tranches receive a rate increase of 1.75% in year one and 1.00% in year two. For tranches linked to EURIBOR, year one receives a rate increase of 2.75% and year two an additional 2.00%. These rate shocks are applied quarterly or semiannually, depending on the length of the payment periods in the transaction. The rate remains flat from year two until maturity. These interest rate stresses are applied to the current rate to test the resilience of the capital structure throughout a full economic cycle.

In the less usual case, where the assets are floating and fixed-rate debt is being issued but is not completely hedged, LIBOR should be decreased in the structure. For investment-grade tranches, the decrease for STG LIBOR would be 4.00% in year one and 2.00% in year two. EURIBOR would decrease by 2.75% in year one and 1.00% in year two. For below-investment-grade tranches, the decrease for STG LIBOR would be 3.25% in year one and 2.00% in year two, while EURIBOR would decrease by 2.50% in year one and 1.00% in year two.

Interest Rate Increase
(%)

	Year One	Year Two
STG LIBOR		
Investment-Grade Run	5.00	0.50
Below-Investment-Grade Run	1.75	1.00
EURIBOR		
Investment-Grade Run	6.75	0.50
Below-Investment-Grade Run	2.50	1.25

Interest Rate Decrease
(%)

	Year One	Year Two
STG LIBOR		
Investment-Grade Run	4.00	2.75
Below-Investment-Grade Run	3.25	2.00
EURIBOR		
Investment-Grade Run	2.75	1.00
Below-Investment-Grade Run	2.50	1.00

STG LIBOR – Sterling London Interbank Offered Rate.
EURIBOR – European Interbank Offered Rate.

■ Legal Issues

The legal considerations for arbitrage and balance sheet CDO transactions are substantially the same as for other asset-backed securities transactions. Most important are the bankruptcy remoteness of the issuer, priority of security interests in the collateral, and the enforceability of the various agreements governing the parties in the transaction.

Fitch anticipates that most transactions will have underlying assets and/or transaction parties from multiple jurisdictions, which, in general, will increase the complexity of the legal analysis involved in European arbitrage CDOs.

■ Surveillance

Fitch monitors all cash flow CDOs on a monthly basis, tracking compliance with portfolio guidelines, cash generation, and collateral quality. Fitch visits portfolio managers at least once per year to discuss CDO performance and will follow up quickly if it sees any unexpected results in monthly reports.

Copies of all Fitch Research referenced in this report are available on Fitch's web site at www.fitchratings.com.

Fitch Arbitrage Collateralised Debt Obligation Transactions — Due Diligence Outline

I. Organisation and Management Structure
- Company history and background
- Organisation, management, and expertise
- Legal structure
- Financial conditions of the company
- Relationship with parent and affiliate

II. Portfolio Management
- Portfolio composition
- Portfolio performance and growth in recent years
  - Investment strategy
  - Security selection process
- Organisation
  - Functional areas and staffing levels
  - Key officers and responsibilities
  - Size and coverage of research staff
- Credit Risk
  - Use of external ratings for investments
  - Internal credit evaluation system
  - Management of credit limits by counterparty
  - Management of distressed credits
  - Approved list and watch list review
  - Modification of approved list
  - Policy governing credit risk and credit appreciated investments
- Market Risk
  - Use of derivatives
  - Hedging
  - Pricing procedures

III. Operations and Procedures
- Compliance responsibility and systems
- File maintenance
- Internal and external audits and quality control
- Collateralised debt obligation management procedures
- Computer system (hardware and software)
- Disaster recovery and emergency plans

IV. To Be Provided Before Site Visit (If Available)
- Recent financials of organisation (minimum three years)
- Historical performance data (monthly performance of composite and benchmark indexes since inception of composite)
- Past five years' performance, excluding best and worst years
- Credit and investment policy
- Information on other collateralised debt obligations' type, size, asset composition, and performance
- Management organisational chart

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