Default risk sharing between banks and markets: the contribution of collateralized loan obligations *

Günter Franke† Jan Pieter Krahnen‡

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Abstract

This paper contributes to the economics of financial institutions risk management by exploring how loan securitization affects their default risk, their systematic risk, and their stock prices. In a typical CDO transaction a bank retains a very high proportion of the expected default losses, and transfers only the extreme losses to other market participants. This enables the bank to expand its loan business, thereby incurring more systematic risk. It also raises its beta. While we do not find a significant stock price effect around the announcement of a CDO issue, in line with the irrelevance proposition, we do find some cross sectional variations related to issue characteristics.

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†Konstanz Universitaet and CFS Center for Financial Studies, Frankfurt; E-Mail: franke@wiwi.uni-konstanz.de

‡Goethe-Universitaet and CFS Center for Financial Studies, Frankfurt, and CEPR. Correspondence: CFS, Taunusanlage 6, D-60329 Frankfurt(Main), Germany, E-Mail: krahnen@wiwi.uni-frankfurt.de

1 Introduction

Consider a bank which securitizes part of its loan portfolio in a CDO (collateralized debt obligation) transaction: What does this imply for the default risk exposure of the the issuing institution? This study will look at financial institutions that securitize part of the loan book, including relationship-specific loans, analyzing the impact of securitization on risk and market value of the issuing bank. Our focus is on tranching as a major characteristic of collateralized debt obligations. Tranching determines the risk sharing between the bank and the various investors buying the bonds issued in the transaction. The analysis in section 2 suggests that observed tranching for a CDOs has strong implications for the issuing bank's credit risk exposure.

First, and contrary to what many observers believe, the expected default loss of the securitized portfolio largely remains on the books of the issuing institution. Second, in a fully funded transaction the risk of extreme unexpected losses, i.e. tail risk, is tranfered from the bank's balance sheet to investors, typically financial or non-financial institutions. We argue that the combined effect of retaining the first-loss piece, as given by the equity tranche and additional reserve accounts, and selling senior tranches will reduce the bank's exposure to extreme (systemic) risk.

But this enables the bank to expand its loan business so that in the end its systematic risk may increase. The direct effects of securitization on the bank's default risk are derived from simulations of the portfolio's default rates. The default rate distribution and the first loss position of the bank determine the effective risk transfer to investors in a fully funded transaction.

Additional effects are obtained from analyzing the effects of the default rate correlations on the bank's aggregate position. Usually a bank securitizes only part of its loan book. Hence the risk effects of securitization depend on the correlation between the securitized and the non-securitized loans. Higher correlations are generated by a stronger exposure of the loans to a macrofactor of default risks. The strength of this factor determines the shape of the portfolio's loss distribution and the extent of risk reduction achieved by securitization. It also affects the joint risk effect of securitization and the ensuing expansion of the loan business. In the end, the diversification effect of attracting more loans of different obligors in different industries will be smaller the less important are idiosyncratic risks relative to macro risks.

Expanding the loan business through loan securitization will expose the bank relatively more to macrorisks than to idiosyncratic risks. Given the strong correlation between credit spreads and the market return, as documented by [7], we hypothesize that the bank's beta increases with securitization and expansion. The empirical findings support this conjecture (section

3). We use a new data set of European securitizations to analyze this beta effect and the announcement effect on the banks' share prices. While we find no abnormal return around the announcement date, there is a significant rise in the bank's systematic risk. The cross sectional analysis reveals some differences between static and dynamic transactions.

In the concluding section 4 we summarize our findings.

2 Tranching and the allocation of risk

2.1 Contract design

Information asymmetries are a major obstacle to trading debt claims, in particular claims against small obligors about whom little is known publicly. Adverse selection and moral hazard of the bank create problems similar to those in the insurance business. Therefore, similar mechanisms of protection are applied in CDO transactions. The main instruments are first loss positions (deductibles in the case of insurance contracts) and risk sharing arrangements (coinsurance in the case of insurance contracts). First loss positions have ben shown to be optimal arrangements in a number of papers, including [1], [24], [10].

There are basically two types of CDO transactions, fully funded asset backed securities (ABS) and synthetic transactions (CLN). In an ABS transcation the bank sells part of its loan portfolio to a special purpose vehicle (SPV) which refinances itself through the issue of bonds. Usually the bank has to take a first loss position, i.e. the bank agrees to absorb default losses up to a specified limit. To achieve this, the bank can buy the non-rated tranche (equity tranche) which absorbs all default losses up to its par value, before other tranches have to bear any further losses. In addition or alternatively, the bank can set up a reserve account which absorbs all default losses in a similar way. In these transactions, the bank can use the proceeds from the sale of its loans to generate new business.

In a CLN (credit linked note) transaction the SPV issues bonds and invests the proceeds usually in high quality debt claims. The bank has no access to the proceeds. Quite often these proceeds are only a small fraction of the value of the loan portfolio for which the banks buys protection. This protection is bought through a credit default swap between the bank and the SPV. Again, the bank usually takes a first loss position by establishing a threshold such that the SPV has to compensate the bank for default losses of the underlying portfolio only for losses exceeding the threshold. Moreover, the SPV never pays a compensation in excess of the par value of the issued bonds. Hence, if this par value is only a small fraction of the initial value of the underlying loan portfolio, then the investors cover default losses only up to this fraction. The bank thus retains the risk of default losses exceeding those covered by the SPV. The bank may buy protection for these risks through a senior credit default swap.

The importance of default risk for the size of the first loss position can be seen from a sample of 43 European CDO transactions, for which we could get a standardized measure of portfolio default risk. This is done by converting Moody´s weighted average rating factor or, if it is not available, the weighted average quality of the underlying loans into a weighted average default probability ($wadp$). We then regress the nominal size of the first loss piece on the weighted average default probability, the issue date, and Moody´s diversity score (ds). The latter statistic captures the size and industry diversification of the underlying asset portfolio. Its score is increasing if portfolio assets are spread more evenly across more numerous industries.

$flp = c + \beta \cdot wadp + \gamma \cdot ds + \delta \cdot date + \varepsilon$

The regression result finds β to be positive and highly significant ($p = 0.00$), while γ is negative and weakly signifikant ($p = .07$). All other variables are insignificant. Thus, the weighted average default probability is a strong determinant of the size of the FLP, confirming our conjecture that the first loss position increases with expected default loss of the underlying portfolio. As will be shown, the FLP thus yields a significant protection of investors against adverse selection and moral hazard. The protective role of the FLP will become more apparent when, in the next section, we take into consideration the underlying portfolio loss distribution and estimate the share of expected default losses covered by the first loss position.

The shape of the loss distribution is essential for understanding the relevance of the diversity score for the size of the first loss position[1]. A large diversity score is indicative of a steep loss distribution, with loss observations being more heavily concentrated around the mode.

A common feature of asset securitizations is the allocation of portfolio risk to several layers of claims. These layered claims, or tranches, obey the principle of strict subordination. Losses up to the par value of the lowest tranche are completely absorbed by the holders of this tranche. If accumulated losses of the underlying asset portfolio exceed the par value of the lowest tranche,

[1] The diversity score is Moody's measure of the degree of diversification achieved in a given asset portfolio.

which is the detachment point of the tranche and the attachment point of the next senior tranche, this will absorb the remaining losses, up to its par value of the second highest tranche, and so on. In this way, tranches which are more senior will only be affected if the waterfall of losses reaches their subordination level, after having wiped out all junior tranches.

According to the model in [9], optimal securitization design aims at a structure that facilitates funding of relationship specific assets by uninformed, remote investors. Senior tranches are suited for these investors since, by construction, they are largely free of default risk. Therefore, holders of senior tranches are rarely exposed to the moral hazard component of the underlying lending relationhips. Investors need not spend resources on monitoring the underlying lending relationships, lowering the required rate of return in equilibrium[2]. Issuing mezzanine tranches to sophisticated investors supports the reduction in delegation costs even further. These investors have an expertise in risk assessment and monitoring, providing a buffer between the first loss piece held by the issuer and the senior piece held by remote investors. Consistent with the model, we find in a simple OLS regression

$\#tranches = \ c + \beta \cdot wadp + \gamma \cdot ds + u$

that the diversity score has a positive and significant coefficient ($p = 0.01$), while $wadp$ is insignificant.

The implications of [9] relate to the risk allocation achieved by tranching the underlying collateral portfolio. By acquiring the senior tranche, remote investors take on macroeconomic risk. To be more precise, the payoff from holding a senior tranche is effectively indexed to system wide macroeconomic shocks. Define the macrofactor of default risks as the average default rate on the aggregate portfolio of debt claims. This factor is random and, by definition, ranges in the (0,1) interval. Then a well-diversified loan portfolio of average initial quality will only incur average default rates beyond, say, ten percent if the macrofactor is in the same range. Hence the senior tranches will only incur default losses if the macrofactor turns out to be very low.

This is not to say that in a like situation there is no moral hazard of the bank. It may well be that in a severe downturn situation banks do not care much about their loans anymore. Moral hazard behavior may then be difficult to detect, so that reputational costs are low. In other words, the senior tranches are only impaired if the macrofactor turns out to be poor. However, if the macrofactor turns out to be good, then even strong moral hazard behavior is very unlikely to affect the senior tranches at all.

[2] See [6] for a reiview of the relevanve of relationship lending in a bank-dominated financial system.

Idiosyncratic risks alone are then irrelevant for the senior tranche valuation.

In the next sections we will characterize the properties of junior and senior tranches, building on the information provided in the offering circulars of a large number of European CDOs.

2.2 Estimating the loss distribution

To estimate the loss distribution of the underlying portfolio and the implied loss allocation to the various tranches, we construct a loss estimator, and proceed as follows. First, we use the information in the offering circular[3] on the quality of the underlying loans and their initial portfolio weights, as indicated by a rating agency. If this information is not available, we use the average initial loan quality as indicated by a rating agency. Then we use Moody´s transition matrix for different loan qualities to estimate the default probabilities for particular loans over the lifetime of the transaction: we use Monte Carlo simulation to generate a distribution of rating migration paths assuming a 47.5% recovery rate throughout. Absent better data on loss given default, these assumptions are standard in the literature.

Multi-year asset value migration tables are derived from the one-year table through repeated multiplication, after adjusting transition rates for non-rated loans. The latter adjustment assumes that assets migrating from a given rating notch to the "non-rated" class over the year, are a random sample from all rated assets that were, at the beginning of that year, in this rating notch. The migration matrix is then mapped into a matrix of standard normal threshold values. For each asset, a random draw from the standard normal distribution yields a particular one period migration from the beginning of period to the end of period rating notch. To arrive at a portfolio return, the correlations between loan migrations need to be taken into account. This is done by a Cholesky transformation.

The correlation coefficient is initially set at 0.3 (0.0) for assets in the same industry (in different industries), following common practice[22]. Alterations of the assumptions on asset correlations will later on be used to analyze the impact of systematic risk on loss correlations between tranches.

The generation of final portfolio cash flows and their allocation to the tranches that constitute the issue is achieved in a last step. The cash flows of each period t are transformed in a realized final (compound) value, RFV_t,

[3] Offering Circulars (OC) are official documents describing the issue's collateral composition, among many other contractual and legal details of the arrangement. OCs are public information to be posted at issue date. In addition, most issues are accompanied by pre-sale reports published by rating agencies

using a flat term structure of interest rates (4%). If a credit event is recorded (default), then the assumed recovery is accounted for, and all further cash flows from this asset are set equal to zero. All final cash flows are allocated to tranches according to the principle of subordination, as defined in the offering circular. Finally, for each tranche, the nominal claims of each period, NV_t, are transformed into a final value as well, NFV_t. The sum of these final values over all tranches defines the final value of all claims. The ratio of these two final values defines the portfolio loss rate, $PLR_T = 1 - \frac{\sum_t RFV_t}{\sum_t NFV_t}$. Using 10,000 observations, a loss distribution is generated that reflects the loss cascading inherent in the tranche structure [4].

Figure 1 about here

Figure 1 shows the loss rate distribution of the London Wall 2002-2 transaction, issued by Deutsche Bank in 2002, which appears to be a typical example of a CDO transaction. Here we assume an intra-industry correlation of 0.3, and a zero interindustry correlation. The graph shows a pronounced skewness. The expected loss is 165 bp (1.65%) with a first loss position of 228 bp. By retaining the FLP, the originator bears the 84%-quantile of the loss rate distribution. Hence, a large fraction of losses is not transfered to investors, which serves as a strong barrier to adverse selection and moral hazard

2.3 Allocation of expected and unexpected loss in CDO transactions

How is the risk of an underlying portfolio allocated to tranches? In particular, to what extent are expected losses absorbed by the various tranches? In a typical issue, the first loss piece comprises between 2% and 10 % of the issue volume, while the senior AAA-rated tranche comprises as much as 80-90%. Table 1 contains information about our sample of European CDOs.

The sample consists of 40 European transactions and close to 200 tranches, see the list in Table 6.

[4] There are a few simplifying assumptions: (i) there is no rating upgrade once an asset has reached default status; (ii) a defaulted asset returns the recovery rate multiplied by the nominal amount immediately; (iii) every asset has a bullet structure, there is no prepayment; (iv) the recovery rates for CBOs are assumed constant for each tranche quality, ranging from 21.5% for subordinaste bonds to 47.5% for senior secured bonds.

In calculating the loss distributions for this European CDO sample, we rely on our own loss estimator, introduced in the last section. We then determine the tranching by defining the tranches such that their default probabilities correspond to Moody's multi-year default rate tables, starting with the most senior tranche, and ending with the lowest rated tranche. The remaining expected losses are then attributed to the unrated first loss piece. Table 1 summarizes the results of this exercise. The table presents average values by type of asset. We consider three asset classes, collateralized loan obligations (CLO) with large loans and bonds, CLOs with small corporate loans (CLO/SME), and the rest (other, including CBOs and portfolios of CDO tranches). These asset classes differ with respect to diversification and relationship intensity. First, the degree of diversification is low for CBOs and high for CLO/SME issues, while CLOs are somewhat in between, as evidenced by the average diversity scores. Second, the relationship character of the underlying lending relationship is probably highest in the case of the SME loans, and lowest in the case of CBOs, which typically comprise bonds issued by large caps.

Table 1 about here

Table 1 is instructive in several respects. First, the number of tranches tends to be positively related to the diversity score which, in turn, is related to the steepness of the loss rate distributions. Second, in all asset classes, the first loss piece covers more than 100% of expected loss. Variations are sizeable, but there is no clear picture across asset classes. Third, the average size of the first loss piece is 7.5%, with a significant variation between CLOs and CLO/SMEs. As a general picture, these numbers are consistent with the idea that FLPs take over most of the expected losses, and that the losses left over for the senior tranches are restricted to extreme, systematic events. Their expected value is very low, 0.01% on average, as is their default probability (0.5%).

2.3.1 Effects on the bank's overall default risk

Assuming that all tranches are sold to outside investors, except the first loss piece, what are the consequences for the risk exposure of the issuing institution? The answer depends on several aspects: first, what other assets does the bank have on its book and how are their cash flows and their default risks correlated? Second, what would be the effect of securitizing all default risks? Third, how does securitization change the bank‘s loan policy? In order to improve our understanding, we consider a bank with a portfolio of 50 identical loans extended to obligors in 5 different industries, one year to maturity, and the same quality. The latter is set equal to a B rating, implying a 8.5 % default rate[18]. The bank can either keep the loans in its books, or securitize them. For the securitized portfolio the bank takes a first loss position. The bank then reinvests the proceeds in a loan portfolio with similar properties as the inital loan book.

Table 2 shows the first four moments of the distribution of loss rates for the bank portfolio which pursued the strategy to securitize the loan portfolio completely and to reinvest the proceeds in loans of the same average quality, and the same correlation structure, as the original portfolio. In allocating risk to the tranches, we have assumed throughout that there are 6 rated tranches, AAA. AA. A, BBB, BB, B. The first loss piece is retained. The moments depend on the assumed intra- and interindustry correlations, therefore we report different correlations scenarios. In the first, the base case, intra-industry dependence is set a 0.3, while inter-industry correlation is zero. The other scenarios show a stronger dependency, implying the existence of a common systematic factor. Higher correlations reflect a stronger macrofactor of default risks.

Table 2 about here

Table 2 suggests several regularities. First, if the correlation between industries increases, the standard deviation of loss rates (i.e. unexpected loss) increases (columns 2, 4, and 6 in the lower panel, "original portfolio"). By the same token, skewness and kurtosis are increasing. Second, a comparison of the original portfolio (i.e. before securitization) and the new portfolio (after securitization) shows that expected loss of the loan book roughly doubles, due to the retention of the first loss piece. However, skewness and kurtosis are both reduced. Figure 3 is again the difference of two loss rate distributions, the original and the new portfolio under the first correlation scenario. It shows clearly that the loss distribution is shifting to the right, and that extreme realizations are reduced.

Table 3 extends the exercise by changing some parameter values in the simulation. First, there are now 2 underlying portfolios with 100 loans each. Their initial quality is set at a BB-level, and there are three industries, two in the first and 2 in the second poirtfolio. The portfolios have one industry in common, suggesting a common factor. The values reported in the table refer to the loss rate distribution of the loan book. The columns "new portfolio" present the properties of the loan book after securitization. In contrast to the earlier case, proceeds are now assumed to be reinvested in the second portfolio, yielding a "new portfolio" that consists of the first loss piece after securitization (assumed to be retained), plus the newly invested loan book.

Table 3 about here

A comparison between the "original portfolio" columns in table 3 shows a similar pattern as in table 2. Increased correlations lead to more unexpected losses. We also find skewness and kurtosis to increase, albeit to a lesser extent than in the first case. This effect is probably due to the increased number of loans in the second case.

If we compare the original portfolio with the new portfolio, holding correlations constant, we find a similar pattern as before. The average loss rate of the loan book increases after securitization, while unexpected losses increase only slightly. This is a consequence of the improved diversification potential relative to the case in table 2.

Furthermore, both skewness and kurtosis are reduced, again to a lesser extent than before. Changing the correlation assumption from (0.3; 0.0) to (0.7; 0.3) strengthens the influence of a common factor on loan loss rates. We observe that unexpected loss increases with correlation, although the increase is relatively small.

Increased correlation, i.e. a stronger impact of a macrofactor, can also be seen from Figure 2. It shows the difference of two frequency distributions, one being the original portfolio with correlation assumptions (0.3; 0.0), the other being the original portfolio with correlation assumptions (0.7; 0.3). The first is in col.2, the second in col. 6. Probability mass shifts from the center (6%-24% interval) to both tails.

Figure 2 about here

Hence, the first loss position and the senior tranche have to bear higher expected losses, implying lower expected losses for the mezzanine tranche.

If we repeat the analysis by concentrating on the effect of securitization and reinvestment, as in Table 3, we can draw a similar graph. However, in Figure 3 probability mass is shifted from both tails to the center, i.e. to the (16%-42% interval).

Figure 3 about here

The bottom line of these simulation exercises is that securitization with flp-retention is changing the distributional pattern of the loan book in the same direction, for different assumptions concerning the banks reinvestment policy. In all cases we have looked at, expected and unexpected loss is rising, while skewness and kurtosis are declining.

The simulation exercise begs the question whether securitization will have an impact on the systematic risk of a financial intermediary. We have assumed that first loss pieces will be retained, while all other tranches are not. Under these assumptions, tranching may change the granularity of the underlying loan book, which in turn affects systematic cash flow risk. As a result, a measure of equity systematic risk might be affected as well. We will look into this matter next.

3 Share price reactions to the issue of Collateralized Debt Obligations

In this section we want to analyze how the securitization of loan assets affects the equity valuation of the issuer. In accordance with the last section, emphasis will be on effects that are due to tranching, in particular the retention of the first loss piece. Earlier studies, including the event studies by [15] and [23] have neglected the risk repackaging aspect of loan securitization. However, we believe tranching and its implications for risk sharing to be the key for assessing the economic consequences of securitization.

3.1 Hypotheses and test design

Our main hypothesis relates to the tranching and its effect on the systematic risk of the intermediary. As described in the preceding section, the standard technology applied in the CDO market uses non-proportional risk sharing as the guiding principle. Optimal tranching tailors the equity piece to the expected default rate of the loan portfolio. When the equity piece is retained by the originator, while other tranches are sold to external investors, securitization will systematically alter the exposure of a bank. In particular, it will raise its systematic risk, due to risk concentration through, e.g. increased granularity. This implies a higher correlation with the macrofactor of default risks. The question then is how this translates into beta changes of the bank's stock returns. [7] found a correlation of 0.6 to 0.8 between the credit spread changes of a corporate bond and the stock returns of the corporation. This suggests a high correlation between the aggregate macrofactor of default risks and the stock market return. Hence, a bank with a strong exposure to the macrofactor should have a stock return being highly correlated with the stock market return. Since the bank beta equals this correlation multiplied by the bank's stock return standard deviation, divided by the market return's standard deviation, we conjecture that securitizing loans and expanding the loan business will raise the bank's beta. This is our first hypothesis

Hypothesis 1 *Risk shifting through the issuance of collateralized debt obligations alters the risk exposure of the originating bank. If equity pieces are retained, while other tranches are sold, and the bank expands its loan business, improving the diversification of its loan portfolio, then the bank's beta will increase.*

Furthermore, risk reallocation is expected to be stronger for institutions that engage repeatedly in securitizations and that, over time, increase the share of equity tranches among its assets. This is our second hypothesis

Hypothesis 2 *Repeated issuance of collateralized debt obligations will raise repeatedly the bank's beta.*

The first two hypotheses relate to beta changes after securitizations, rather than expected securitizations. Otherwise one would expect to observe the compound risk shifting effect at the time of the first issue, t_0. Announcement effects of new CDO issues on beta would then be indeterminate, because their impact on the bank's risk exposure would have been anticipated, though possibly with noise.

We now turn to the stock price reaction, as captured by the abnormal return in a typical event study. The latter is the surprise effect triggered by the announcement of the securitization. The abnormal return is determined by the interpretation that investors attach to the issue announcement[5]. If stockholders interpret the securitization as a pure change in the bank's financing strategy, then in a perfect market there should be no stock price

[5] From conversation with practitioners we know that the valuation of CDO mezzanine tranches is typically accompanied by costly verification of the underlying loss distribution and its allocation to tranches by both sides of the market, the sell side and the buy side. The process of issue placement has been modeled as an auction [20].

effect unless the change in the financing strategy redistributes wealth from the stockholders to the bondholders. Since the stockholders hold the equity piece and the bondholders hold the senior tranche of the bank's assets; securitization should reduce the expected default losses of the bank's bondholders and, thus, enrich them at the expense of the stockholders. This would argue in favor of a negative stock price reaction.

Similarly, if the bank uses an ABS transaction to obtain new funding, then stockholders may interpret the transaction as unfavorable information about the bank's funding needs and react by a stock prce decline: this; however; would not be true for a synthetic transaction because then the bank does not receive funding. Finally, the transaction cost of securitization is nonnegligible adding to a negative stock price impact:

On the other side, the securitization enables the bank to expand its loan business, this may be considered by the stockholders as a valuable real option of the bank so that the stock price should increase. Similarly, the securitization protects the bank against major default losses, and thereby reduces the costs of financial distress. This would also be good news for the stockholders.

Summarizing, the net impact of securitization on the bank's stock price is hard to predict. Across the entire sample we do not expect significant stock price reactions to the announcement of securitizations. However, there are a number of characteristics that may be relevant cross-sectionally. Among these characteristics are the synthetic nature of the deal, because synthetic deals reduce the funding component in an issue and, therefore, synthetic issues have a smaller impact on the bank's asset composition, rerlative to a fully funded transaction [wg. Verbriefungsmultiplikator].

A second characteristic of securitization transactions that may be relevant for cross sectional differences is the nature of the issue as static or dynamic. Static issues maintain the original asset composition of the collateral portfolio throughout the life of the transaction. This typically implies a gradual redemption of the outstanding issue, in accordance with repayment of the underlying loans. Dynamic issues, in contrast, maintain their original volume throughout the entire term of the issue. If loans in the collateral portfolio are redeemed, the issuer replaces them by new loans, safeguarding certain quality standards. While replenishment standards vary between issues, a general implication is that banks are required to assign new loans to the collateral in a systematic, non-random way.

Since both properties - synthetic/true-sale and static/dynamic- exert an influence on the asset composition of the bank, we expect both characteristics to be consequential for the value effect of the issue announcement.

Hypothesis 3 *1. The pricing of CDO issues on the primary market is fair and leaves no room for simple economic arbitrage deals. The announcement of CDO deals, therefore, leads to zero abnormal returns, on average.*

2. Cross-sectionally, announcement effects will be related to issue characteristics that have implications for the bank's future asset composition.

For testing these hypotheses we will rely on an event study methodology. Since there are many event data in a relatively short period of time with a lot of overlap, and since there are several banks with repeated issues, the set of regression equations is run as a system. We are applying a SUR estimation that enhances efficiency by taking into account correlations between the error terms. These correlations may be due to an omitted variable that is common to all regressors, a macro interest risk factor, for instance.

3.2 Data and results of the event study

In compiling our data set we initially looked at all transactions in Moody's European Securitization list of June 2003. The number of issues is 254, of which 185 have a Moody's "New Issue Report". It is this *New Issue Report* that contains the information required for conducting the study, including a description of the underlying assets as well as the covenants relevant for the issue. Among the many other features of the issue, the Report also contains the pricing of the tranches at the issue date and the name of the originator. Not every issue has a single originator, because there are several ABS issues that lack a single originator[6].

For 112 transactions we were able to identify the originator. We imposed the additional restriction that the originator is a listed company (else no stock price is available), and arrive at a sample of 92 transactions from 31 banks. We excluded the non-European banks and finally have 77 transactions issued by 27 banks. These issues are used for the event study and, later on, for the cross sectional analysis.

Table 4 presents the descriptives for our final data set[7]. In the upper panel of Table 4 one can see that the average size of transactions is small

[6] Several ABS products are pass through transactions that represent the earnings of retail networks, e.g. Promise-I 2002-1.

[7] The descriptive statistics in Table has information on 74 of these 77 institutions, due to missing balance sheet data for three banks.

relative to the entire balance sheet, about one half percent of total assets. For repeat issuers this adds up to 5-10% of total assets, and an even larger share of total loan book. The average number of tranches over all transactions is 6. The lower panel refers to a subsample of the 77 issues, comprising 51 issues. It excludes all transactions whose issue date is less than 5 months (100 days) after another issue by the same issuer. This subsample will later be used in the regression analysis. Since this subsample excludes observation from repeat issuers, and repeat issuers turn out to be large issuers, the relative size of the issues (column 5, Share of balance of total assets) is larger than in the upper panel. The basic model is an augmented event study estimation.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \gamma_{1,i} D_i^{event} + \gamma_{2,i} D_i^{other\ event} + \beta_i^{\Delta} D_i^{after} R_{m,t} + \varepsilon_i$$

The dependent variable $R_{i,t}$ as well as the independent variable $R_{m,t}$ are excess returns, defined as the log return minus log German inter bank one month lending rate, FIBOR (EURIBOR since 1999). The explanatory variables include the log of market return, defined as the DJ EuroSTOXX index, the dummy D^{event} that captures the abnormal return over the event window. The window extends from day -20 to day +20 around the announcement date. Announcement dates were assumed to be the first public notification that could be identified in Lexis-Nexis, or in pre-sale reports of the three major agencies. The coefficients were estimated over a 200-days window, symmetrically around the event window. Thus, for each event the time series extends over 240 trading days, approximately one year. Since we are interested in a possible change of systematic risk, the regression has a second variable capturing systematic risk, delta-beta(β^{Δ}), which is multiplied by a dummy, D^{after}, which equals one for the 100 days following the event window, again (-20, +20). The coefficient β^{Δ} measures the extent to which the after-event beta diverges from its pre-event value. The null hypothesis sets after-event beta at zero.

The estimation is complicated by the fact that for many cases in our sample, there are repeat issuers, and the interval between two consecutive announcement dates by the same issuer frequently is less than 100 days. Thus there is a separate regression for every transaction. Hence there is overlap among the estimation windows. In order to disentangle the effect of the original event on beta from the effect of a later event, we include a dummy "other event", $D^{other\ event}$, which captures abnormal returns in a -20/+20 days window around the later event.

However, in some cases there is more than one "other event", up to a maximum of three. To deal with these frequent issue-cases, we set the dummy D^{after} equal to two (three) for the second (third) overlapping event. Thus, we assume that β^{Δ} is of the same magnitude for all successive and overlapping events. Due to the overlap of events, and the relatively short period for which data are available (1999-2002), we estimate the equations as a system of seemingly unrelated regressions (SUR). The SUR methodology increases the efficiency of the estimation in that correlations between the error terms are accounted for.

The type of regression, Panel II in Table 5, explores the cross-sectional determinants of two key variables in our analysis, the abnormal return ($\gamma_{1,i}$) and the change in systematic risk (β_i^{Δ}). The estimated model is, where $X_j : \{\gamma_{1,i},\ \beta_i^{\Delta}\}$

$$X_j = \alpha_j + \lambda_{1,j} D^{dynamic} + \lambda_{2,j} D^{synthetic} + \lambda_{3,j} D^{CLO} + \lambda_{4,j} D^{CBO} + \lambda_{5,j} D^{other} + \lambda_{6-8,j} D^{year} + \lambda_{9,j} D^{dyn} D^{CLO} + \varepsilon_j$$

The explanatory variables generate partitions of the sample. In particular, $D^{dynamic}$ is a dummy variable that equals one for managed issues, i.e. collateral portfolios that are being replenished over the life of the issue. $D^{synthetic}$ separates between synthetic and fully funded true sale issues, where the dummy equals one for synthetic issues. D^{CLO}, D^{CBO}, and D^{other} subdivides the sample into four categories according to the type of the underlying asset portfolio, as loans, bonds, mortgages (the reference group), and all others (e.g. credit card or leasing claims). Finally, the D^{year}-dummy stands for the issue years, with 2002 as the reference year.

Table 5 reports the result of the regressions. We will discuss the results starting with panel A. The augmented event study produces two important results. First, the average cumulative abnormal return around the announcement date (-20, +20) is very small and statistically insignificant. This holds true for the event window (γ_1), as well for any overlapping other event window (γ_2). This finding is consistent with the result in [23]. Like him, we find the average cumulative returns to differ significantly between calendar years, as can be seen from equations $B.1$ and $B.2$ (λ_{6-8}). Returning to the time series regression $A.1$, we observe that the coefficient measuring a change of systematic risk after the event, β_i^{Δ}, is positive and significantly different from zero. Its positive sign suggests that banks engaged in securitizations are increasing their exposure vis-a-vis the markt return. Since the coefficient captures the average increase in systematic risk per overlapping event, the risk increasing effect of asset securitizations is higher for repeat issuers than it is for one-time issuers.

A possible explanation for this finding has been offered in section 3.1 of this paper. There it was argued that due to securitization and loan expansion tend to increase systematic risk of the bank.

In $A.2$ we reran the regression supressing all observations with overlapping events. By construction, the subsample has fewer observations (53 instead of 77), and it underrepresents repeat issuers, i.e. large issuers. While the γ_1-coefficient is similar in size and significance, β_i^{Δ} is now much smaller and only marginally significant ($p = .09$). Thus, the beta-increasing effect of securitizations is more relevant and more visible for institutions that engage repeatedly in securitizations, and that are more likely to systematically alter their loan portfolio as a consequence of their access to the capital markets.

The cross section analysis reported in Panel B of Table 5 offers additional insight in what drives the increase in beta after securitizations. In $B.1$ the change of beta is regressed on characteristics of the issues. Among the structural characteristics, the dummy for managed issues, λ_1, is the only one that turns out siginificant. Since its sign is negative, it signifies that managed isues have a lower increase in systematic risk, i.e. the bank may be less motivated to increase granularity in the aftermath of a securitization, than if the issue is of a static nature. The variables representing the type of underlying asset, like CLOs, CBOs remain insignificant altogether.

Clearly, these findings are explorative in nature, and they will have to followed up by an integration of structural data concerning the collateral assets as well as balance sheet details of the issuing institution.

3.3 Conclusions

This paper has made an attempt to evaluate the effect asset securitization has on the systematic risk exposure of financal institutions. We analyze the design of CDO transactions and its impact on the default risk exposure of the originating bank. Adverse selection and moral hazard problems, which are considered strong barriers to trading default risks, are largely eliminated by a substantial first loss position of the originator. The size of the first loss position has been shown to depend on the average default probability of the underlying portfolio. The tranching typically leads to a large senior tranche which in the case of a fully funded transaction may be sold to remote investors. Securitization then protects the originator against high default losses that otherwise would lead to financial distress. The impact of securitization on the bank´s default risk is illustrated by various simulations. These studies demonstrate the impact of correlations on the bank‘s risk exposure, and on the mezzanine and the senior tranches. If the bank uses the ensuing risk reduction to expand its loan business, then its systematic risk increases.

This is also comfirmed by the empirically observed increases in the bank's stock market beta. We do not find a significant securitization announcement effect on the bank's stock price.

These finding indicate that the contractual design of securitization transactions determines capital market responses to an intermediary's issue activity. Therefore, an evaluation of the economic implications of securitizations for financial institutions risk management on the micro level, and on financial stability on the macro level necessitates first and foremost an understanding of the effective risk transfer.

Further work along these lines will have to dig deeper in at least two directions, the full incorporation of credit enhancement provisions, and the effective allocation of tranches to investor groups. This latter question is also of paramount importance for regulators who are concernd with the stability of the financial system.

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Figure 1: Loss distribution of London Wall 2002-2, 10'000 iterations

This table displays the loss distribution of London Wall, as it was simulated using the information contained in the Offering Circular. A loss rate distribution for the entire portfolio is generated that takes into account the correlation within and between industries, the credit migration risks referencing Moody's tables, and the rules of subordination of tranches specified in the OC. The chart shows on the vertical axis the frequency of observations, and on the horizontal axis the associated loss rate, truncated at 10there was no observation surpassing this threshold.

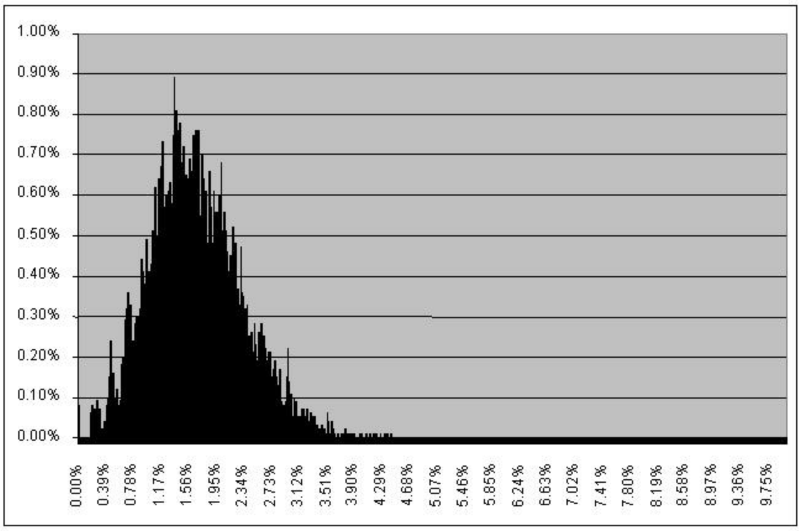

Figure 2: Increase in correlation and marginal loss distribution, 10'000 iterations

This table displays the differential loss rate distribution of a simulated loan portfolio with a low and a high level of correlation. In the underlying collateral portfolios there are 100 assets each, all BB rated, 2 industries, the pairwise within-industry correlations increase from 0.3 to 0.7, while pairwise between-industry correlations increase from 0.0 to 0.3. The resulting differential loss rate distribution is displayed in the figure.

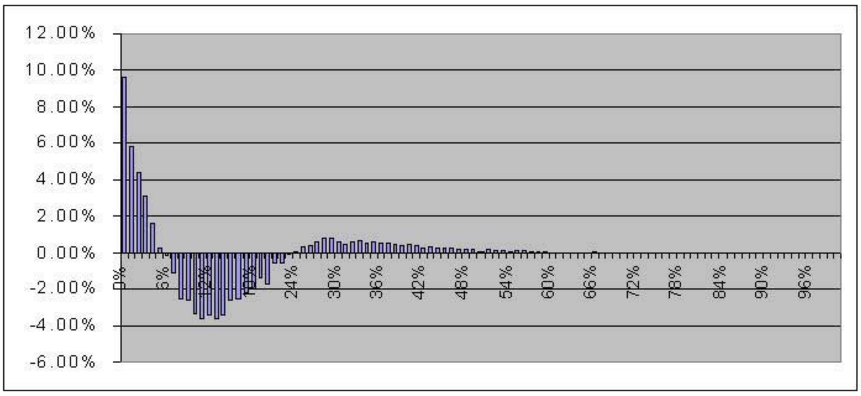

Figure 3: Securitization, reinvestment and marginal loss distribution, 10'000 iterations

This table displays the differential loss rate distribution of a simulated loan portfolio with and without securitization, followed by reinvestment. Simulation parameters are similar to those underlying Figure 2. In the underlying collateral portfolios there are 100 assets each, all BB rated, 2 industries, the pairwise within-industry correlations increase from 0.3 to 0.7, while pairwise between-industry correlations increase from 0.0 to 0.3. The resulting differential loss rate distribution is displayed in the figure.

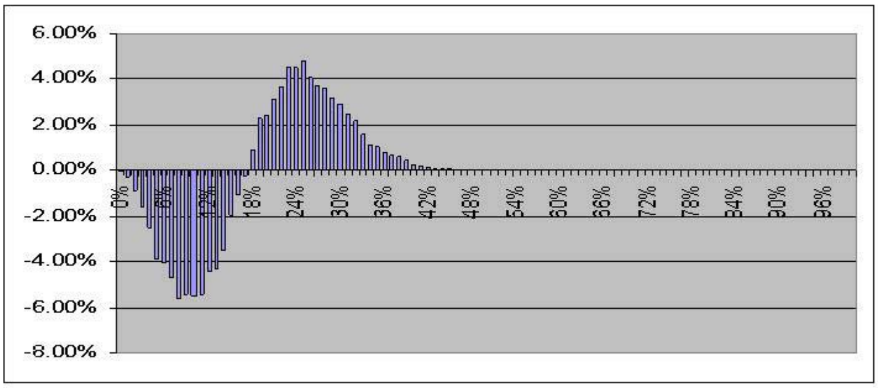

Table 1: Loss rate distribution of European CDOs: Descriptive Statistics

This table summarizes basic characteristics of the CDO sample used in the estimation of expected and unexpected loss. CLOs are collateralized loan obligations, typically loans to large caps plus corporate bonds, CLO/SMEs are collateralized loan obligations comprising loans to small and medium industry. Other consists of divergent asset classes, e.g. CBO transactions and portfolios of CDO tranches. The numbers in the table are averages across the transactions listed in the column. CDF is the probability of positive loss rates, the average loss of a tranche is its expected loss divided by the par value of the tranche, size is the nominal value of a tranche relative to the nominal amount of the issue, FLP/E(loss) is the share of expected loss covered by FLP, maturity is the weighted average term of the tranches, no. of rated tranches is the number of different rating categories, where tranches have a published rating by one of the big three agencies, Moody's, S+P, or Fitch. No. of loans is the number of distinct loans included in the collateral portfolio. Diversity score is a score, according to Moody's, in the intervall (1, 100+) that describes the degree of diversification of the assets in the portfolio. 1 the lowest, 100 is a high value, but may be higher for very granular portfolios with assets from many different industries.

	SME CLO	CLO	Other	Total
CDF Senior tranche (in %)	0.50	0.65	0.55	0.53
Avge. loss senior tranche (in %)	0.0037	0.0114	0.0064	0.0062
Avge. Loss FLP (in %)	77.9	65.4	40.2	57.2
Size Senior tranche (in %)	88.8	85.9	91.4	89.7
Size FLP (in %)	7.83	9.47	6.80	7.56
FLP/ E(loss) (in %)	123.9	121.5	162.9	138.3
Maturity (in years)	6.64	7.67	6.15	6.55
No. of rated tranches	4.57	4.17	2.85	3.65
No. of loans	2,302.8	153.0	99.6	878.8
Diversity Score	89.93	40.4	46.04	60.56
No. of transaction	14	6	20	40

Table 2: Reinvestment of securitization proceeds: Simulation results for the loss rate distributions

This table summarizes the results of a simulation exercise. The original portfolio consists of 50 loans in a B rating with one year to maturity. The new portfolio is obtained by securitizing the original portfolio retaining a first loss piece of 10.11 percent and reinvesting the par value of the original position minus the first loss piece in another portfolio which has the same characteristics. In allocating risk to the tranches, we have assumed throughout that there are 6 rated tranches, AAA, AA, A, BBB, BB, B. There are three scenarios in the table, which differ by their correlation assumptions. The lower panel shows the first four moments of the resulting loss rate distribution for the bank's loan book, including the retained first loss tranches, for the three scenarios. The first column (original portfolio) describes the loan book before securitization, the second (new portfolio) describes the loan book after the securitization transaction.

Panel I: Assumptions regarding correlations						
Within industries	0.3		0.5		0.7	
Between industries	0.0		0.0		0.3	
Panel II: Moments						
	Original portfolio	New portfolio	Original portfolio	New portfolio	Original portfolio	New portfolio
Mean	5.67%	10.51%	5.70%	10.30%	5.64%	9.52%
Standard deviation	3.52%	5.43%	4.29%	6.61%	7.63%	11.26%
Skewness	0.81	0.44	1.00	0.52	2.03	1.34
Kurtosis	0.68	-0.32	1.04	-0.46	4.76	1.13

Table 3: Reinvestment of securitization proceeds: Further results for the loss rate distribution

This table summarizes the results of a simulation exercise. The original portfolio consists of 100 loans in a BB rating with ten years to maturity. The new portfolio is obtained by securitizing the original portfolio retaining a first loss piece of 11.69 percent and reinvesting the par value of the original position minus the first loss piece in another portfolio which has the same characteristics. The loans belong to one of two industries, A and B, whose correlations (within, between) are specified in the columns of the table. After securitzation of the entire book, and retention of the first loss piece, the proceeds are invested in industry B and C, such that the old and the new loan book have a common factor, captured by the correlation between A and B, C and B, respectively. In allocating risk to the tranches, we have assumed throughout that there are 6 rated tranches, AAA. AA, A, BBB, BB, B. There are three scenarios in the table, which differ by their correlation assumptions. The lower panel shows the first four moments of the resulting loss rate distribution for the bank's loan book, including the retained first loss tranches, for the three scenarios. The first column (original portfolio) describes the loan book before securitization, the second (new portfolio) describes the loan book after the securitization transaction.

Panel I: Assumptions regarding correlations						
Within industries	0.3		0.5		0.7	
Between industries	0.0		0.0		0.3	
Panel II: Distributional properties						
	Original portfolio	New portfolio	Original portfolio	New portfolio	Original portfolio	New portfolio
Average	13.69%	22.30%	13.67%	20.92%	13.55%	18.67%
Std	6.16%	6.63%	8.31%	8.70%	12.00%	12.76%
Skewness	0.60	0.20	0.84	0.45	1.11	0.76
Kurtosis	0.23	0.02	0.60	0.11	0.84	0.16

Table 4: European CDO data set: descriptive statistics

This table presents descriptive statistics of the CDO data set. The numbers (except no. of issues) are averages across transactions. The upper panel uses information of 74 of the 77 issues underlying the estimations in section 3. For the remaining three issues there were no balance sheet data available on Datastream, the source of these data. The lower panel represents a subsample, which contains only those issues that did not experience a repeat issue by the same issuer within five months after the first transaction. There are two issues without balance sheet data in Datastream, leading to 51 issues included in Panel II. 'Size' is the Euro volume of collateral assets underlying the issue, "Number of tranches" is caculated on the basis of the offering circular. All tranches, including non rated tranches, are considered. "Share of balance sheet assets" divides Size by total assets of the bank. "Equity (book value)" is the sum of equity and open reserves, according to Datastream.

Panel I: European data set (n=74)					
Year	Number of issues	Size (collateral assets, € bn)	Number of tranches	Share of balance sheet assets, in %	Equitry (book value, € bn)
1999	10	1.682	6,4	0.54	12.5
2000	17	2.586	5.53	1,42	11.7
2001	20	2.629	5.60	2,08	14.7
2002	27	1.940	6.30	0.95	15.0
Panel II: Detailed data set (n=51)					
Year	Number of issues	Size (collateral assets, € bn)	Number of tranches	Share of balance sheet assets, in %	Equitry (book value, € bn)
1999	7	1.675	5.43	0.66	10.3
2000	14	2.640	5.36	1,52	10.8
2001	15	2.850	5.67	2,66	12.4
2002	15	1.912	6.60	1,48	9.6

Table 5: Announcement effects: regression results

This table reports the results of the event study relating to the announcement of CDO issues. Panel A presents the results of a SUR estimation of the determinants of excess stock returns of the issuing banks. Panel B is the cross sectional analsis of two coefficients generates in the first stage (Panel A). The first regression is a time series estimation with 77, resp. 53, events over a window of at least 240 trading days. The second set of regressions (Panel B) has 77 observations. All regressions use data from the period January 1999 to December 2002. In regression (A) the dependent variable R-it is the daily return on 27 banks (from Datastream). The explanatory variables are R-mt, D-event, D-other event and D-after. R-mt is the return on the EuroStoxx (from Datastream). D-event equals one for the event window [-20,+20], where the event is the announcement date of the CDO issue, D-other event equals one for all other event windows in the period [-120,+120], and D-after equals one for the period [+20,+120]. Wald-statistics (p-values) are in parentheses. In regression (B) the dependent variables are delta-beta and gamma from regression (A), the change in systematic risk after an event, and the cumulative abnormal return in the event window. The explanatory variables are D-dyn, D-CLO, D-CBO, D-other, D-99, D-00, D-01. D-dyn equals one for a managed issue. D-CLO, D-CBOand D-other equal one when the collateral portfolio consists of loans, bonds, or other assets. Mortgage backed securities are the reference group. D-99, D-00and D-01 equal one for the issue year 1999, 2000 or 2001. p-values are in parentheses.

$$(A)\quad R_{i,t} = \alpha_i + \beta_{1,i} R_{m,t} + \gamma_{1,i} D^{event} + \gamma_{2,i} D^{other\ event} + \beta^{\Delta}{}_i D^{after} R_{m,t} + \varepsilon_i$$

$$(B)\quad X_j = \alpha_j + \lambda_{1,j} * D^{dyn} + \lambda_{2,j} * D^{syn} + \lambda_{3,j} * D^{CLO} + \lambda_{4,j} * D^{CBO} + \lambda_{5,j} * D^{other} + \lambda_{6,j} * D^{99} + \lambda_{7,j} * D^{00} + \lambda_{8,j} * D^{01} + \varepsilon_j$$

	$\overline{\alpha_i}$	$\overline{\beta_1}$	$\overline{\gamma_1}$	$\overline{\gamma_2}$	$\overline{\beta^{\Delta}}$
A.1 (n=77) w/overlap	-0,0003 (0,982)	0,7413 (0,000)	-0,0003 (0,360)	0,0003 (0,456)	0,05097 (0,003)
A.2 (n=53) w/o overlap	-0,0003 (0,943)	0,6597 (0,055)	0,0165 (0,343)		0,00175 (0,094)

	X_j	α	λ_1	λ_2	λ_3	λ_4	λ_5	λ_6	λ_7	λ_8	$adj.R^2$
B.1	Δbeta	0,0610 (0,646)	-0,1650 (0,017)	0,1299 (0,158)	0,0061 (0,953)	-0,1109 (0,449)	-0,0565 (0,615)	-0,2820 (0,005)	0,1716 (0,036)	-0,0169 (0,826)	0,235
B.2	CAR	-0,0009 (0,553)	0,0004 (0,609)	-0,0015 (0,182)	0,0019 (0,159)	0,0023 (0,197)	0,0018 (0,194)	-0,0023 (0,058)	0,0010 (0,306)	-0,0003 (0,716)	0,048

Table 6: List of European CDO issues used for loss rate estimation

This table summarizes descriptive statistics of the issues that have been used to calculate the loss rate distribution in section 2 of the paper.

Name	Average Rating	Average loss Total PF	Average loss Senior Tr	Average loss FLP	CDF Senior Tr	CDF FLP	Size Senior Tr	Size FLP	Maturity	#rated tranches	CBO/CLO	#loans	Div Score
Dutch Care 2001-1	A1	0.64%	0.0048%	35.543%	0.67%	75.93%	96.50%	1.63%	8	3	CLO	169	12.4
Hesperic No. 1 plc	Baa1	1.67%	0.0030%	57.856%	0.40%	93.27%	94.46%	2.59%	6	5	CLO	104	31
IKB Credit Linked Notes 2000-1	Ba2	13.69%	0.0212%	79.353%	1.00%	100.00%	76.31%	16.50%	10	3	CLO	61	33
Leverage Finance Europe Capital I B.V.	B1	26.28%	0.0367%	84.381%	1.00%	100.00%	58.74%	29.74%	10	4	CLO	30	26
London Wall 2002-1 PLC	Baa2	2.36%	0.0013%	67.750%	0.40%	100.00%	94.46%	3.32%	6	5	CLO	330	70
London Wall 2002-2 PLC	Baa2	2.12%	0.0015%	67.566%	0.43%	99.93%	95.01%	3.01%	6	5	CLO	224	70
ARCH ONE FINANCE LIMITED	Baa1	0.95%	0.0012%	24.380%	0.20%	67.10%	95.24%	3.88%	4	2	other	70	47
ARGON CAPITAL PLC - SERIES 1	Baa1	2.07%	0.0053%	48.294%	0.53%	84.57%	92.48%	3.99%	7	5	other	53	30
Brooklands Euro Ref. Linked Notes 2001-1	Baa1	3.40%	0.0082%	59.390%	1.00%	99.83%	92.16%	5.57%	10	3	other	100	50
Cathedral Limited	Baa1/Baa2	1.56%	0.0015%	35.059%	0.30%	74.53%	92.75%	4.32%	5	3	other	52	36
CDO Master Investment 2 SA	Baa1	1.29%	0.0011%	41.621%	0.30%	90.87%	95.72%	3.06%	5	3	other	112	66
CDO Master Investment 3 SA	Baa1	1.26%	0.0010%	38.217%	0.30%	84.57%	95.07%	3.25%	5	3	other	86	60
CDO Master Investment SA	Baa1	1.26%	0.0015%	36.937%	0.37%	87.30%	94.98%	3.36%	5	3	other	100	49
CIDNEO FINANCE Plc	Baa2	4.30%	0.0124%	59.684%	1.03%	98.40%	89.15%	6.86%	10	3	other	57	34
CLASSIC FINANCE B.V. (Petra III)	A3	0.54%	0.0008%	43.447%	0.30%	87.23%	98.07%	1.20%	5	5	other	232	103
Credico Funding S.r.l.	Ba1	4.99%	0.0045%	41.337%	0.43%	99.87%	87.95%	12.05%	6	1	other	117	30
Deutsche Bank – United Global Inv. Gr. CDO I	Baa1	1.28%	0.0041%	56.747%	1.03%	94.83%	96.47%	2.11%	5	3	other	148	60
DYNASO 2002-1 LTD	A3	0.49%	0.0020%	27.718%	0.40%	57.77%	97.36%	1.73%	5	3	other	100	55
Eirles Two Limited Series	A3	0.93%	0.0042%	31.642%	0.53%	69.97%	95.96%	2.86%	7	3	other	74	40.8
European Dream 2001-1	Aa1	0.12%	0.0018%	12.412%	0.60%	13.07%	98.33%	0.85%	7	3	other	59	26
Helix Capital (Netherlands) B.V. 2001-1	A3	0.50%	0.0009%	23.878%	0.30%	52.83%	97.25%	2.07%	5	2	other	80	50
Lusitano Global CDO No.1, Plc	Baa3	2.02%	0.0015%	41.033%	0.20%	99.40%	93.54%	4.90%	4	3	other	218	35
Marche Asset Portfolio S.r.l.	Baa1	0.63%	0.0031%	16.150%	0.17%	42.27%	93.93%	3.84%	3	3	other	59	12
Redwood CBO	B2	49.86%	0.0586%	89.060%	1.00%	100.00%	36.90%	55.40%	10	3	other	100	45
Spices Finance Limited Peas	Baa2	1.57%	0.0016%	35.286%	0.30%	91.60%	94.39%	4.43%	5	2	other	100	56
Vintage Capital S.A.	Baa2	4.36%	0.0121%	42.688%	1.03%	99.67%	89.82%	10.18%	10	1	other	76	36
CAST 1999-1 Ltd.	Baa3	4.99%	0.0032%	78.130%	0.53%	100.00%	90.89%	6.12%	7	4	SME CLO	4389	70
CAST 2000-1 Ltd.	Baa3	4.99%	0.0056%	74.243%	0.53%	100.00%	90.42%	6.53%	7	4	SME CLO	1991	70
CAST 2000-2 Ltd.	Baa3	4.98%	0.0030%	78.042%	0.53%	100.00%	91.14%	6.15%	7	4	SME CLO	5178	95
HAT (Helvetic Asset Trust) AG	Ba2	6.85%	0.0016%	70.382%	0.30%	100.00%	87.45%	9.66%	5	3	SME CLO	650	100
HAT (Helvetic Asset Trust) II Limited	Ba2	6.82%	0.0016%	69.065%	0.30%	100.00%	87.84%	9.83%	5	4	SME CLO	1455	110
PROMISE-A-2000-1 plc	Ba1	8.37%	0.0065%	83.775%	0.67%	100.00%	86.49%	9.64%	8	5	SME CLO	1097	90
PROMISE-A-2002-1 plc	Ba1	8.28%	0.0051%	92.590%	0.70%	100.00%	87.42%	8.16%	8	6	SME CLO	1277	124
Promise-C-2002-1	Baa3	4.06%	0.0020%	75.229%	0.40%	100.00%	92.23%	5.19%	6	5	SME CLO	4578	90
Promise-Color-2003-1	Ba2	6.86%	0.0019%	87.143%	0.30%	100.00%	87.65%	7.23%	5	5	SME CLO	1512	80
Promise-G-2001-1	Ba1	6.13%	0.0059%	65.118%	0.53%	100.00%	87.84%	9.30%	7	4	SME CLO	100	85
Promise-I-2000-1	Baa3	5.99%	0.0040%	81.823%	0.67%	100.00%	89.61%	6.99%	8	5	SME CLO	2267	80
Promise-I-2002-1	Baa3	4.96%	0.0027%	78.964%	0.57%	100.00%	90.67%	6.00%	7	5	SME CLO	4172	80
Promise-K-2001-1	Ba1/Ba2	6.84%	0.0019%	76.065%	0.30%	100.00%	88.03%	8.86%	5	5	SME CLO	2916	100
Promise-Z-2001-1	Ba1	8.31%	0.0070%	81.274%	0.67%	100.00%	86.42%	9.95%	8	5	SME CLO	658	85