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Determinants of banks' engagement in loan securitization*

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Abstract

This paper provides new insights into the use of loan securitization. We analyze collateralized loan obligation (CLO) transactions by European banks from 1997 to 2004 and try to identify the influence that various firm-specific and macroeconomic factors may have on an institution's securitization decision. Our results suggest that loan securitization is an appropriate funding tool for banks with high risk and low liquidity. It may also have been used by commercial banks to indirectly access investment-bank activities and the associated gains. Regulatory capital arbitrage under Basel I does not seem to have driven the market.

JEL-Classification: G 21

Keywords: Securitization, credit risk transfer, collateralized loan obligations

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1 Introduction

Even though credit risk transfer (CRT) activity has a long history,[1] the first credit derivative transactions among a small number of banks did not occur before the early 1990s. Since then, CRT activity has been growing at a rapid rate. Between 2000 and 2006 European securitization issuance rose from Euro 78.2 billion to Euro 458.9 billion. Recent years have been characterized by significant product innovation, an increasing number of market participants and growth in overall transaction volume, while expectations of continued profit opportunities for financial intermediaries prevail. Among the different issuances by collateral type (residential and commercial mortgage-backed securities, leases, credit card receivables, auto loans, among others), the sector of collateralized debt obligations (CDO) with Euro 88 billion was the second largest in 2006 (19 percent) and growing at the fastest rate (up about 80 percent from Euro 48.9 billion one year earlier). Within the CDO market, CLOs were the leading sector with almost 40 percent of total issuance.[2]

Despite the dramatic growth in the market for credit risk, it is as to yet not entirely clear why banks engage in securitizing their loans. While securitization may help to increase liquidity, reduce credit or interest rate risk and improve leverage ratios and allows recognition of accounting gains (Ambrose et al. 2003), many financial institutions still choose not to securitize any of their loans. On the other hand, growth in CRT activity did not deteriorate despite the imminent introduction of the new regulatory environment of Basel II that will no longer allow regulatory capital arbitrage, which has been mentioned as the main argument for CRT in the early years.

In this paper, we try to find an answer to the question which factors drive a financial institution's decision to securitize loans. In contrast to earlier papers analyzing the market for CRT (Franke and Krahnen, 2006; Krahnen, 2005), we concentrate solely on the issuers' characteristics. Yet, both analytical angles complement each other as far as the observed performance of CRT markets is a result of issuers' intentions. With regard to market characteristics, participants agree on two fundamental facts. First, the aggregate amount of risk transfer that has occurred is small relative to the issuers' overall exposures and also relative to the notional size of the market (Minton et al., 2005). Second, CRT activity is a key part of the ongoing transformation of credit markets (Franke and Krahnen, 2006). Against this background, we try to characterize the factors that drive banks' willingness to securitize their loans.[3]

Our research focus is similar to the one taken by Minton et al. (2004), who test two hypotheses regarding the use of loan securitization: regulatory capital arbitrage and efficient financial contracting. Apart from the question of whether or not banks decide to engage in securitization at all, they also examine the size of transactions. However, in their sample on US private-sector financial companies, the fraction of financial firms securitizing assets is very small (rises from 2 percent in 1993 to less than 4 percent in 2002). Their results may therefore be strongly driven by the characteristics of large banks which were the first to adopt securitization activities. In our sample on European financial

[1] Including transactions such as guarantees. Also, loan syndications have been common for many years, see Basel Committee on Banking Supervision (2005a).

[2] For more detailed information, see Thomson Financial Securities Data, Bank for International Settlements (BIS) and The Bond Market Association.

[3] Franke et al. (2006) additionally analyze the influence of issuer characteristics on the design of CDOs.

institutions, in contrast, the proportion of securitizing firms increases from 1.6 percent in 1997 to 27 percent in 2004. Yet, as we do not obtain information on regulatory capital for all banks, we cannot focus as strongly on a test of the regulatory arbitrage hypothesis. We therefore put more emphasis on a detailed test of the efficient contracting explanation. In this respect, we analyze different firm-specific and macroeconomic variables that may have an impact on the efficiency of the securitization instrument with regard to reducing expected distress costs and therefore influence banks' engagement in that market (Gorton and Souleles, 2006).

Summarizing our results, we find that while we cannot reject an influence of banks' incentives to reduce regulatory capital, CRT activity seems to be strongly affected by firm-specific characteristics. As might have been expected, the probability of a bank engaging in loan securitization is found to increase in bank size, to decrease along with the bank's liquidity and to increase along with the bank's credit risk. Since our results additionally show that banks with high performance tend to securitize less than banks with low performance, we may conclude that securitization activity should therefore not be taken as a consequence of banks' "appetite for risk" (in order to increase performance) but rather as a risk-transfer tool. Yet, risk-transfer seems to be limited since banks in the highest credit risk decile are found to reduce their securitization activity along with higher credit risk. Loan securitization may therefore also be used by commercial banks in order to indirectly access investment-bank related activities and the associated gains. Additionally, we find that for stock-listed banks in the highest risk decile, a lower equity ratio will lead to a stronger inclination to securitize loans. Interestingly, the size of regulatory capital has a significantly negative effect only for stock-listed banks. These findings underline that banks primarily use CLOs to transfer and source risk in the market.[4] The new regulatory framework of Basel II should therefore not be expected to hamper the future growth of CRT markets.

The remainder of the paper is organized as follows. Section 2 will lay out the main hypotheses regarding variables that may influence banks' decision to securitize their loans. Section 3 will delineate the bank sample data and the empirical methodology used to test the variables' influence on banks' decisions. The subsequent section will describe the variables and their general statistics. Section 5 presents the results of univariate and multivariate tests that are discussed in section 6. Section 7 concludes.

2 Motivation for securitization-transactions

The increasing use of credit securitization in the last few years opened up a new way for financial institutions to transfer risk and raise liquidity. The strong increase in the cumulative volume of asset-backed securities (ABS) is often attributed to three motivating factors: *risk management, balance sheet restructuring* and *regulatory capital relief*. Before we turn to the different arguments, a brief description of the ABS-market and the construction of instruments is in order.

Generally, the CRT market consists of two major product categories: credit default

[4]The fact that not all financial institutions in our sample used a CLO for a true-sale but instead acted simply as an intermediary buying and selling securitized portfolios even strengthens this interpretation.

swaps (CDS) and CDOs. In a CDS, the investor buys the credit risk associated with a specific reference entity for a fixed time in exchange for a fee. The issuer in essence obtains an insurance against loan default. Within the class of CDOs, cash and synthetic CDOs may be distinguished.[5] In a cash CDO, the originator pools a portfolio of bonds or loans and sells this to a special purpose vehicle (SPV). This separate legal entity issues securities that are collateralized by the bonds. In a synthetic CDO, in contrast, the bank originating the loans does not actually transfer ownership of the loans; instead, the risk of the portfolio is transmitted through credit derivatives to the SPV or to investors. In both cases, a portfolio of credit risk exposures is pooled, segmented into tranches with different seniority and transferred to investors. The tranches display specific risk-return characteristics and obey the principle of strict subordination, i.e. the holders of the lowest tranche (equity tranche or first loss piece, FLP[6]) absorb all losses up to the par value of this tranche. If accumulated losses of the portfolio exceed this par value, the next senior tranche will absorb the remaining losses and so forth. Payments therefore follow a waterfall structure through the different (senior, mezzanine and equity) tranches and the FLP bears most of the risk contained in the underlying portfolio.[7]

Generally, CDOs help investors to overcome the illiquidity of bonds and loans that stem from market imperfections based on information asymmetries (DeMarzo, 2005). These are a major obstacle to trading debt claims, in particular with regard to claims against small and less well-known debtors (Franke and Krahnen, 2006). As market imperfections of this type are similar to those in the insurance business, protection mechanisms are applied in CDO transactions in the same vein. In particular the creation and retainment of FLP by the issuer are an important tool to overcome problems of adverse selection and moral hazard. By retaining the FLP, the tranche that is most susceptible to default due to moral hazard, the default risk of the securitized portfolio remains largely on the balance sheet of the issuing bank and so do monitoring incentives that reduce information asymmetries.[8] At the same time, by selling mezzanine and senior tranches, the risk of unexpected losses is transferred from the originator to investors and is hence much more strongly diversified on the market (Krahnen, 2005; Krahnen and Wilde, 2005; BIS, 2005b). ABS-transactions are therefore claimed to allow a more efficient *risk sharing* between issuer and investors.[9]

The *liquidity effect* of securitization transactions is particularly obvious in cash transactions. Here, the transfer of assets follows a true sale ("off-balance sheet") of the underlying portfolio to an SPV. The SPV then issues notes in order to fund the assets purchased from the originating bank. Obviously, this transaction leads to an inflow of cash and hence a possible restructuring of the bank's balance sheet (Gorton and Pennacchi, 1995), contingent on the reallocation of cash by the originator. With respect to this latter argument it

[5] Recent years have seen a large proportion of German securitizations as synthetic CDOs, whereas in Spain most securitization transactions involve a "true sale" as in a cash security.

[6] The FLP is not fully equivalent to the actual first loss position if the originator implements credit enhancements in the structure which are subordinated to the FLP. For a detailed description of different types of credit enhancements see Jobst (2002).

[7] For a more detailed description, in particular with respect to credit enhancements underlying the waterfall structure of CDOs, see Hein (2007).

[8] Arrow (1971), Townsend (1979) or Gale and Hellwig (1985) give a detailed analysis of incentive effects based on securitized claims.

[9] This argument is related to the theoretical framework in DeMarzo (2005) where it is shown that the contractual design of ABS-transactions can result in an efficient risk sharing between investors, allowing the direct funding of information sensitive assets via the capital markets.

is interesting to note that the funding costs involved with a securitization transaction are mainly related to the credit quality of the underlying portfolio and not to the rating of the originating bank (Krahnen, 2005). This also contributes to the marketability of these instruments since investors do not have to invest in additional research on the issuer but focus solely on the quality of underlying loans.[10]

Particularly in the early years of the CRT market, banks cited their interest in *reducing regulatory capital* as the main motivation for issuing CLOs (Duffie and Garleanu, 2001). International regulation in the Basel Capital Accord of 1992 uses the capital-asset ratio to ensure that banks hold sufficient capital buffer to bear default losses. In general, loan pools require regulatory capital of 8 percent of the reference pool's assets. In order to save on regulatory capital, banks may therefore try to securitize low-risk assets and retain high-risk assets (Ambrose et al., 2003). If, for instance, only the highest-risk tranche of a CDO is retained, then the regulatory capital shrinks considerably. While this regulatory capital arbitrage will no longer be possible under the new framework of Basel II, it may have contributed to the increase in securitization in the early years (Minton et al. 2004).

Despite the tremendous recent growth in CRT markets, only few academic papers have yet investigated in the implications of CDO transactions on the originating institution and the financial sector in general. While earlier work on the question why banks choose to securitize loans centered heavily on the regulatory capital arbitrage hypothesis (Calomiris and Mason, 2004), more recent papers find that other arguments may also play an important role. However, the multitude of different influencing factors has not yet been analyzed in a comprehensive empirical approach. In particular, the so-called efficient contracting hypothesis (Minton et al., 2004; Gorton and Souleles, 2006), viewing securitization mainly as a financial engineering innovation that allows intermediaries to access debt finance without facing financial distress costs, can hardly be disentangled in its effects from simple liquidity and balance-sheet arguments.

In this paper, we therefore try to identify general factors, additional to the already mentioned regulatory capital, risk management and balance-sheet arguments, that may have an influence on banks' decision of whether or not to engage in loan securitization. These additional arguments are based on very recent empirical research regarding the effects of ABS transactions on CRT markets and the financial sector in general, in particular with respect to wealth effects on the issuers and to the impact on systematic risk and financial stability.[11]

With regard to *wealth effects*, results are mixed. Ayotte and Gaon (2004) show that the structural design of true sale ABS-transactions has a valuable effect for weak originators and thus weak banks have strong incentives towards activities in the securitization market. Lockwood et al. (1996) find that wealth effects of securitization transactions are significantly related to financial slack of the bank in the quarter preceding the securitization announcement. In their study, financial slack is a proxy for the quality of the bank. Findings are therefore *quality specific*, with wealth increases for strong banks and wealth losses for weak banks. The authors argue that a securitization transaction by a weak bank results in a negative signal to the capital market in the sense of Myers and Majluf (1994),

[10] However, there remains some linkage to the originator's rating, if the SPV also enters into a servicer agreement with the originating bank. In such cases, investors and rating agencies will have to evaluate the servicer risk inherent in the transaction.

[11] For an overview of empirical results, see BIS (2005) and IMF (2006).

while strong banks will only engage in the securitization market when they are able to extract a positive net present value from the transaction. Thus, strong banks have a higher incentive to securitize, a result that is strengthened by the study of Thomas (2001), who, in a cross-section regression of cumulative abnormal returns, reports that the first entry of a successful originator in the securitization market is associated with significant gains.

Hänsel and Krahnen (2006) furthermore show that credit securitization tends to increase the *systematic risk* of the issuing bank. In a cross-sectional analysis they reveal that the issuer's beta rises significantly more if the bank is financially weak and is domiciled in a bank-based financial system. Furthermore, the initial systematic risk of the originator is found to have a significant impact on the change in systematic risk. Minton et al. (2005) moreover prove that the likelihood of a financial institution being active in CRT markets also depends on the *type of the bank* and the *size of total assets*.

Apart from aspects of credit risk, liquidity and equity capital, further motivation for a bank's decision to be active in the market for loan securitization may therefore come from the bank's performance (strong versus weak bank), its systematic risk, its size and bank type. The following empirical study will scrutinize the impact that these variables and more general macroeconomic factors may have on financial institutions' willingness to engage in loan securitization.[12]

3 Methodology and sample data

3.1 Sample

Our sample comprises all European banks in Bankscope for the period from January 1997 to December 2004 that satisfy two criteria. First, total bank assets must exceed Euro 150 million and second, the number of loans on each bank's balance sheet must be larger than 800 million. We hence concentrate on relatively large banks, drop all central banks and thus arrive at a final sample of 316 banks that comply with both criteria for at least one year.

Table 1 reports the number of banks for each year in our sample and their country-specific affiliation. The final sample consists of 1948 bank entries with an average of 243 banks per year, ranging from a minimum of 226 banks in 2004 to a maximum of 257 in 1997. Due to massive concentration processes in the banking sector, our sample parallels the generally-observed decrease in the number of banks per year. Overall, our sample comprises banks from 17 different countries. The main part of our sample (about 60%) is made up of financial institutions from Germany, France, UK and Italy.

Table 2 reports the classification of banks with regard to different business areas (taken from the Bankscope database). Commercial banks consistently make up slightly over 40 percent of the final sample and as such account for the largest fraction. Real estate banks, bank holdings and cooperative banks together roughly account for another 40 percent. Note that while the number of commercial banks in our sample has been slightly decreasing

[12]Note that since we do not dispose of information on the specific characteristics of banks' loans, we cannot test more elaborate hypotheses on risk transfer based on information asymmetries in the sense of Duffie and Zhou (2001).

Table 1: Sample summary statistics: bank origin

Year Country	1997	1998	1999	2000	2001	2002	2003	2004
Belgium	14	12	8	8	8	8	8	8
Denmark	8	9	10	10	7	7	6	6
Germany	64	58	59	60	55	56	54	55
France	33	31	35	34	36	36	34	32
UK	33	35	36	36	35	35	33	33
Ireland	4	6	6	6	7	7	7	7
Italy	31	28	27	27	28	23	23	22
Netherlands	11	11	13	13	13	13	13	13
Austria	4	5	5	6	4	6	6	6
Portugal	7	7	7	6	6	5	4	4
Sweden	7	7	8	8	8	8	8	7
Switzerland	10	8	8	8	8	9	10	9
Spain	18	17	15	14	14	14	14	14
Other	13	13	13	14	15	14	13	10
N	257	247	250	250	244	241	233	226

over the years (from 118 in 1997 to 95 in 2004), the number of real estate banks, bank holdings and cooperative banks has remained constant or even slightly increasing until 2000 and decreasing only afterwards. The number of other financing institutions has remained relatively stable. Investment banks make up only a very small fraction of less than 4 percent.

3.2 Measures of securitization

Data for individual issuances of securitization transactions stem from three different sources. First, we use the European Securitization Almanac (January, July, October 2004 and February 2005) by Deutsche Bank, second, we control each originator's securitization activities with the Quarterly CDO Deal List (September 2005) by Standard and Poor's and, finally, the European Securitization Deal List (March 2006) by Computershare Fixed Income Services Limited. All banks without issuance activities in the securitization market are cross-checked with Lexis/Nexis Database.

Table 3 reports the percentage of firms that securitized assets for any given year in our sample period. Panel A sorts the results by year and country of the originating bank, while panel B sorts the results by the originator's type (business area). Panel C finally accounts only for listed banks, as a subsample of the total data set. The fraction of financial institutions securitizing assets increases from 1.6 percent in 1997 to 27 percent in 2004. The largest fraction of securitization transactions is undertaken by banks with headquarters in Germany and the UK. In recent years, also banks in Spain have been active

Table 2: Sample summary statistics: main bank business areas

Year	1997	1998	1999	2000	2001	2002	2003	2004
Bank Type								
Bank Holding	28	29	31	33	32	34	29	28
Commercial Bank	118	111	110	106	104	101	100	95
Cooperative Bank	21	20	21	24	24	22	23	21
Investment Bank	9	10	10	9	9	9	9	9
Medium / Long Term Credit Bank	7	6	6	6	6	6	5	5
Non-banking Credit Institution	8	7	9	9	10	10	10	10
Real Estate / Mortgage Bank	33	32	32	33	29	27	26	26
Savings Bank	17	16	15	14	13	14	16	16
Governmental Credit Institution	16	16	16	16	16	18	15	16
N	257	247	250	250	244	241	233	226

in securitization processes. As can be seen from panel B, most transactions are initiated by commercial banks, to a much lesser extent also by mortgage banks, savings banks and investment banks. Table 3 also shows that the percentage of stock-quoted financial firms securitizing assets has increased. Yet, while in the first years of our sample (1997-2001), stock-listed institutions accounted for more than 50% of all CLO issuances, recent years have seen a significant decrease of this proportion to less than 40%. At the same time, the proportion of stock-listed banks in the full sample has increased from 26% to 36%.

3.3 Methodology

Our empirical approach analyzes how firm-specific and macroeconomic variables influence securitization behavior in a Probit framework. With simultaneous consideration of the different data sources we check for each year whether or not a bank in our data set securitized assets. Whenever there is at least one securitization transaction by the bank, the dependent variable in our regression takes on the value 1, otherwise, i.e. if there is no securitization activity, it takes on the value 0.

Within a limited dependent variable model,[13] we adopt a specification that is designed to handle the specific requirements of binary dependent variables, where the probability of observing a value of one is given by

$$Pr(y_i = 1 \mid x_i, \beta) = 1 - F(-x_i'\beta). \tag{1}$$

Here, F is a continuous, strictly increasing function that takes on real values and returns a value ranging form zero to one. By choosing a probit function for F, it follows that

[13] A broader discussion of the general approach may be found in Greene (1997) or Johnston and DiNardo (1997).

Table 3: Summary of securitization activities by financial entities

Frequency of ABS issuance by sample banks; *Overall* indicates number of banks, *N* number of banks which issue an ABS-transaction.

Year	1997	1998	1999	2000	2001	2002	2003	2004
Panel A:	*ABS Issuance by year and country*							
Overall	257	247	250	250	244	241	233	226
N	4	7	22	43	45	59	59	61
Percentage of sample	1.6%	2.8%	8.8%	17.2%	18.4%	24.5%	25.3%	27.0%
Belgium	1	1	0	1	2	2	2	2
Denmark	0	0	0	0	0	0	0	1
Germany	0	1	5	10	11	15	12	14
France	0	0	2	4	3	6	6	8
Great Britain	0	2	5	10	6	10	12	12
Ireland	1	0	0	2	0	1	0	0
Italy	0	0	2	4	10	6	5	3
Netherlands	2	1	2	4	3	4	5	5
Austria	0	0	0	0	0	1	0	0
Portugal	0	1	1	1	2	2	2	2
Sweden	0	0	0	0	0	0	0	0
Switzerland	0	0	1	3	3	2	3	3
Spain	0	1	4	4	5	9	11	9
Other countries	0	0	0	0	0	1	1	2
Panel B:	*Breakdown of issuance by type of firm*							
Bank Holding	0	0	0	0	2	1	1	2
Commercial Bank	3	6	13	31	29	38	38	37
Cooperative Bank	1	0	0	1	5	2	3	3
Investment Bank	0	0	1	2	1	3	4	5
Medium / Long Term Credit Bank	0	0	1	1	0	1	0	1
Non-banking Credit Institution	0	0	0	0	0	0	0	1
Real Estate / Mortgage Bank	0	1	3	6	4	8	5	6
Savings Bank	0	0	3	1	2	4	6	4
Governmental Credit Inst.	0	0	1	1	2	2	2	2
Panel C:	*Quoted banks*							
Quoted on the stock exchange	67	71	74	80	81	83	84	82
Percentage of sample	26.1	28.7	29.6	32	33.2	34.4	36.1	36.3
Number of issuances by quoted banks	2	5	13	22	25	25	24	24
Percentage of sub-sample	3.0	7.0	17.6	27.2	30.5	30.1	28.6	29.3
Percentage of all issuing banks	50.0	71.4	59.1	51.2	55.6	42.4	40.7	39.3

$$Pr(y_i = 0 \mid x_i, \beta) = F(-x_i'\beta). \tag{2}$$

Given such a specification, we can estimate the model parameters by using the method of maximum likelihood. The likelihood function is given by

$$l(\beta) = \sum y_i log(1 - F(-x_i'\beta)) + (1 - y_i) log(F(-x_i'\beta)). \tag{3}$$

The first-order conditions for this likelihood are nonlinear, so that obtaining parameter estimates requires an iterative solution. By default, our statistical program uses a second derivative method for iteration and computation of the covariance matrix for parameter estimates. Interpretation of the coefficient values is further complicated by the fact that estimated coefficients from a binary model cannot be seen as the marginal effect of the independent on the dependent variable. The interpretation of results may therefore only be based on the signs of significant coefficients.

4 Definitions of variables and descriptive statistics

4.1 Hypotheses and definitions of variables

Generally, we test whether different firm-specific and macroeconomic variables have an influence on the probability of a CLO-transaction by banks

$$\text{dependent variable} = f(\text{originator-specific variables, macroeconomic variables}) \ .$$

Among the firm-specific variables, different factors are included, based on the arguments presented in section 2. As the main variables we consider the originator's credit risk, leverage, performance and liquidity. In the following, we will describe each variable and its expected influence on the regressand in turn. A definition of variables and a summary of expected regressor signs is given in table 4.

The variable *risk* in our data set is supposed to reflect the originator's credit risk situation by measuring the bank's credit risk provision relative to net interest income. Since loan securitization allows a risk transfer of (a fraction of) the underlying portfolio to the capital market, we should assume that firms with higher asset risk will have a higher incentive to securitize. There may be two reasons for this particular effect, though: first, banks may have a certain "appetite for risk" in order to increase expected returns. Those banks may be heavily engaged in securitization in order to, e.g., set free capital that can be invested in other risky businesses delivering higher expected returns. Second, banks that "unvoluntarily" bear a lot of risk and hence face a high likelihood of financial distress may try to fund their lending activities by securitization rather than by holding the assets on balance sheet and funding them with debt and equity. In particular for this latter group of banks we expect that the effect should be strongest for firms with highest risk. To test this, we introduce a dummy variable (*high risk*) that is equal to one for the ten percent

of banks with highest risk and zero otherwise.[14] Additionally, we test whether the risk variable has an influence on this subgroup (via the additional regressor *high risk * risk*).

In order to try to capture the "appetite for risk" hypothesis, we also tested the influence of the *quality* of risk, a regressor that describes the ratio of the firm's gross interest income to total assets. In this respect, the quality variable refers to an ex-ante notion of risk that should better correspond to banks' incentives to increase risk-taking in order to generate higher expected returns than the simple risk measure mentioned above. According to the above reasoning, the *quality* variable should be expected to have a positive effect on a bank's propensity to engage in securitization activities. Still, we cannot rule out the case that the *quality* variable also acts as a (negative) proxy for "weak" banks that generate low interest income. In this case, the effect should be negative, since according to the first channel mentioned above, weak banks also have greater incentives to be active in the securitization market.

With respect to the regulatory capital relief hypothesis we include two proxies for the equity situation of the bank. *Tier 1*, describing the ratio of tier 1 capital relative to risk weighted assets, and *equity share* are both expected to exhibit a negative influence on a bank's propensity to issue CLOs, because the regulatory capital relief hypothesis suggests that banks with lower capital ratios should be more likely to securitize assets. Again, this effect should be strongest for banks with capital ratios near the regulatory required minimum. In order to take account of this, we generate a dummy variable (*low tier 1*) that is equal to one for the ten percent of banks with the lowest capital ratios and zero otherwise. We expect a positive sign for this dummy variable. To be consistent, we also test whether tier 1 capital has an effect among the subgroup of banks with lowest capital ratios via regressor *low tier 1 * tier 1*. For stock-listed banks, we additionally examine whether there is a significant effect in the group of banks with highest credit risk and lowest equity (regressors *high risk * low tier 1* and *high risk * low equity*). A positive sign of this regressor should indicate that in particular banks with problems in fulfilling the regulatory constraints choose to securitize their loans.

In line with earlier work on the wealth effects of securitization transactions, we take into account a differential impact of weak versus strong banks. In this respect, we use two variables as proxies for the performance of a bank: return on equity (*RoE*) and cost-income ratio (*CIR*). In the overall sample, both a positive or a negative coefficient may be conceivable due to earlier research results, while a positive sign seems reasonable for the banks with the lowest performance, measured by the decile with the highest value of the CIR variable (regressors *low performance* for the dummy variable and *low performance * CIR* for the effect of performance on the subgroup).[15]

Furthermore we include a proxy for the liquidity of the originator. As has been explained in section 2, securitization activities allow banks to separate credit origination from credit funding. As several empirical studies implied, securitization tends to be used mainly as a funding tool, such that the incentive to engage in securitization should be higher for banks with a shortfall in liquidity. We therefore expect a negative sign for the overall *liq-*

[14] The empirical models account for two different ways to calculate this dummy: in models I-V(a) the decentile is calculated with respect to the full data set, in models I-V(b) it is calculated for every year individually. The same holds for the additional dummies referring to tier 1 capital, liquidity and performance.

[15] For stock-listed banks we also include a test for the best-performing banks measured as those in the decile with lowest CIR values with regressors *high performance* and *high performance * CIR*.

uidity coefficient and a positive sign for the decile of banks with lowest liquidity (regressor *low liquidity* for the dummy variable and *low liquidity * liquidity* for the interaction term).

Finally, we include some general characteristics of the originating firm as additional regressors. First, we analyze the impact of firm size by taking account of *total assets*. This regressor is expected to display a positive sign due to economies of scale following from the fixed costs of setting up a CLO structure. As a second proxy for the size of the bank we include the number of assigned *loans*. The *tax* variable captures a combination of size and firm quality and therefore should be assigned a positive coefficient. In essence, it comprises the taxes paid relative to earnings before taxes. However, also a negative effect may be conceivable since securitization leads to a potential reduction in tax benefits from keeping the assets on balance sheet and financing them with debt. Therefore, institutions with high effective debt burden may securitize less (Minton et al., 2004). A high value of the *business* variable indicates that the bank generates high profits from investment banking activities or from related activities. Several studies show that investment banks are more likely to engage in securitization so that we expect a positive sign for this regressor. Still, the results with respect to this final variable may be strongly dependent on regulatory mechanisms and may therefore be relatively weak for European data.

Note that the multitude of variables may be summed up in three hypotheses. While the test of an effect of regulatory capital coincides with testing the regulatory capital arbitrage hypothesis, all variables that may affect a bank's financial distress costs allow for a test of the efficient contracting hypothesis. While the risk respectively quality variable certainly belongs to this group of factors, it also contributes to testing the appetite-for-risk hypothesis.

Table 11 in the appendix finally reports the different *macroeconomic variables* that are used as regressors. We employ the following country-specific variables for the whole sample: credit default probability, ratio of rating downgrades to upgrades, growth rate of GDP, short- and long-term interest rates and yield on a well-diversified stock index (CDAX for Germany, CAC40 for France, FTSE 350 for UK). Among the dummy variables, we consider *year-dummies, country-dummies* and *industry-dummies* for the banks. In the sample restricted on stock-listed banks, we additionally take into account the *volatility* of stock returns, the market-to-book ratio (*MBR*) and the firm's *beta*.

4.2 Descriptive statistics

Table 12 in the appendix presents the general statistics with regard to the different firm-specific as well as macroeconomic regressors. From the data, it can be seen that banks in our sample are very heterogeneous, in particular with respect to their risk characteristics, but also regarding their performance and equity capital holdings.[16] In particular the large range of tier 1 capital that banks hold is indicative of vastly different business strategies, also stemming - of course - from the different types of banks we are considering. Additionally, the switch from holding capital appropriate for Basel I to the new regulatory requests in Basel II, that should coincide with our sample period, may have led to relatively heterogeneous observations with regard to tier 1 capital. As we cannot infer the

[16]Further information can be obtained from table 13 in the appendix where descriptive statistics are given for three subgroups of banks: those with highest risk, with highest performance and lowest equity.

Table 4: Definition of firm characteristics

Definition of firm characteristics to be included as regressors in the probit regression on the probability to securitize assets. Dummy variables are calculated in two ways: in models I-V(a) the calculation of the percentile is based on the entire data set, in models I-V(b) the calculation has been carried out for each year. *Both* refers to different signs for strong and weak banks with respect to performance. *Ambiguous* reflects different predictions from theoretical work. Variable generation is based on Bankscope and Datastream database.

Regressor	Definition	Expected Sign
Asset characteristics:		
Risk	credit risk provision / net interest income	(+)
High risk (dummy)	decentile of banks with highest risk	(+)
High risk * risk	high risk (dummy) multiplied by risk variable	(-)
High risk * low tier 1 (dummy, stock-listed firms only)	high risk (dummy) multiplied by low tier 1 (dummy)	(-)
Quality	gross interest income / total assets	(both)
Equity characteristics:		
Tier 1	tier 1 capital / risk weighted assets	(-)
Low tier 1 (dummy)	decentile of banks with lowest tier 1 capital	(+)
Low tier 1 * tier 1	low tier 1 (dummy) multiplied by tier 1 variable	(-)
Equity share	equity / total assets	(-)
Performance characteristics:		
RoA	return on average assets	(both)
RoE	return on average equity	(both)
CIR	cost-income ratio	(both)
Low performance (dummy)	decentile of banks with highest CIR	(+)
Low performance * CIR	low performance (dummy) multiplied by CIR variable	(-)
Liquidity characteristics:		
Liquidity	money lent to other banks / money borrowed from other banks	(-)
Low liquidity (dummy)	decentile of banks with lowest liquidity	(+)
Low liquidity * liquidity	low liquidity (dummy) multiplied by liquidity variable	(-)
General characteristics:		
Total assets	total assets	(+)
Loans	assigned loans	(+)
Tax	taxes / earnings before taxes	(+)
Business	net fees & commissions / net interest revenue	(ambiguous)

exact switching time from our data, we may only hypothesize that large banks tended to change their regulatory capital holdings relatively early compared to smaller banks. Data with respect to the size of total assets and assigned loans also mirror the large disparity of the total sample. The same is true for the additional data on stock-listed banks as can be seen from the large ranges of volatility, market-to-book ratio and market beta values.

The statistics of macroeconomic regressors parallel the movement through the economic cycle. This is particularly obvious from the large range of values for GDP-growth rates, interest rates and the country-specific stock market index. A breakdown of the index' and interest rate's development in different countries can be found in table 14 in the appendix.

We may therefore conclude that our sample contains very heterogeneous financial institutions that focus on different business models and are observed in different phases of performance and economic (country-specific) business-cycles.

5 Results

5.1 Univariate Results

As a first step in our analysis, we group the banks into those that did not securitize loans and those who did issue CLOs and examine the differences in characteristics between the two groups. Results concerning univariate tests of differences with respect to the selected characteristics are given in table 5. It displays the number of observations in each group, the mean and standard deviation of the coefficient. As can already be seen, the smallest number of observations is obtained with regard to the test of tier 1 capital. The last column in table 5 provides the p-values of a test on the equality of the two subsamples' means.

Significant results are derived both with regard to firm-specific and macroeconomic variables. Among the firm-specific regressors it is only the equity share and the return on equity that do not lead to significant differences between the two subsamples. Among the macroeconomic variables we find that only the country specific index yield does not play a significant role.

Summarizing the univariate results we find that financial institutions deciding on securitizing loans seem to be lowly-performing, large firms with low capital ratios, high risk of lower quality and low liquidity. Additionally, they seem to be engaged more strongly in investment business. With regard to macroeconomic variables, we find that a higher probability of credit default and credit rating downgrades (with low yields on credit risk and a high spread), low GDP growth rates and interest rates seem to be conducive to securitization.

As table 6 shows, the ratio of firms using securitization versus those that did not is increasing over the years. Various dummy variables also account for significant differences between securitizing and non-securitizing financial institutions. Particularly in France, the UK and Spain there are significant differences between the sub-groups. Also, we find that commercial banks are much more likely to choose securitization while real estate banks are less likely to do so. Combined with the fact that securitizing banks derive significantly more profits from investment banking business, this points to an interesting first conclusion: by issuing CLOs, commercial banks possibly try to (indirectly) increase

Table 5: Univariate tests of differences in firm-specific and macroeconomic characteristics - all banks

N denotes the number of entries in the respective category. *Mean* refers to the mean value of the respective variable in the two sub-groups. p-values of the tests on equality of means are reported in the last column. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	securitization			no securitization			
Regressor	N_{sec}	mean	std. dev.	N_{nosec}	mean	std. dev.	p-value
Risk	278	21.37	25.75	1362	17.55	34.80	0.083*
Quality	290	9.86	6.03	1395	11.11	8.24	0.015**
Tier 1	220	7.80	2.24	825	9.51	8.33	0.003***
Equity share	296	4.62	2.20	1426	5.16	7.11	0.196
RoE	296	9.94	11.40	1420	10.62	10.92	0.334
CIR	290	63.98	15.86	1408	58.99	22.35	0.000***
Liquidity	278	86.06	92.47	1343	115.85	124.29	0.000***
Total assets	296	198,077	208,904	1,426	95,906	125,239	0.000***
Loans	296	91,554	91,422	1,424	46,194	56,041	0.000***
Tax	288	26.82	16.41	1364	30.23	16.34	0.001***
Business	286	49.99	85.66	1400	36.83	49.79	0.000***
CDP	296	2.51	0.87	1426	2.06	1.00	0.000***
DUR	296	2.40	0.99	1426	2.06	1.00	0.000***
GDP Rate	296	2.26	1.65	1426	2.50	1.68	0.028**
Index	294	220.40	60.15	1327	219.30	71.88	0.807
Short interest	296	3.71	1.18	1426	4.01	1.47	0.001***
Long interest	294	4.78	0.60	1381	5.05	0.78	0.000***
Credit risk spread	296	1.60	0.41	1426	1.31	0.58	0.000***
Performance AAA	296	0.05	0.12	1426	0.09	0.12	0.000***
Performance BBB	296	0.07	0.12	1426	0.09	0.12	0.001***

their stake in investment banking by using new instruments (of securitization) in their traditional business field of bank lending.

Tables 7 and 8 deliver the results of the same univariate analysis on stock-listed firms only. While the results are similar with regard to macroeconomic variables, firm-specific regressors lead to slightly different conclusions. Stock-listed financial institutions using securitization have a higher market-to-book ratio and beta than non-issuing firms, a lower capital ratio, a higher cost-income-ratio, much lower liquidity and only slightly higher total assets than firms that are not using CLOs. Overall, among stock-listed firms, the differences between securitizing and non-securitizing financial institutions are much smaller than in the total sample. In particular, risk characteristics do not seem to drive the difference between the two groups of banks. Interestingly, the stock-return volatility does not account for a significant difference. In this respect, our results differ from Minton et al. (2004), who find that issuing firms have a significantly lower stock return volatility.

5.2 Multivariate Results

Table 9 presents the results of a multivariate probit regression on the likelihood of issuing securitized assets via a CLO by all sample banks as delineated in section 3.3. Three different

Table 6: Univariate tests of differences in dummy variables - all banks

Overall, 1722 observations are included, with 296 securitizations and 1426 no-securitizations. N denotes the number of entries in the respective category, e.g. 257 bank entries in year 1997 of which 7 belonged to banks securitizing loans (N_{sec}) and 250 to banks not issuing CLOs, N_{nosec}. p-values refer to the respective χ^2-Test. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	overall	securitization		no securitization		χ^2-Test	
Regressor	N	N_{sec}	(in %)	N_{nosec}	(in %)	Pearson χ^2	p-value
Year 1997	257	7	0.02	250	0.18	44.41	0.000***
Year 1998	247	22	0.07	225	0.16	13.90	0.000***
Year 1999	250	43	0.15	207	0.15	0.00	0.996
Year 2000	250	45	0.15	205	0.14	0.14	0.713
Year 2001	244	59	0.2	185	0.13	9.76	0.002***
Year 2002	241	59	0.2	182	0.13	10.47	0.001***
Year 2003	233	61	0.21	172	0.12	15.30	0.000***
Germany	406	68	0.23	338	0.24	0.07	0.788
France	239	29	0.1	210	0.15	4.98	0.026**
UK	243	57	0.19	186	0.13	7.81	0.005***
Spain	106	43	0.15	63	0.04	43.36	0.000***
Italy	187	29	0.1	158	0.11	0.42	0.519
Other country	541	70	0.24	471	0.33	10.01	0.002***
Commercial	750	193	0.65	557	0.39	68.14	0.000***
Cooperative	212	33	0.11	179	0.13	0.45	0.504
Real	155	14	0.05	141	0.1	7.96	0.005***
Investment	106	20	0.07	86	0.06	0.22	0.636
Savings	65	16	0.05	49	0.03	2.62	0.106
Other type	434	20	0.07	414	0.29	64.52	0.000***

models are tested. Models I und II include only firm-specific regressors and year-, country- and business-dummy variables. As information about tier 1 capital is only obtainable for a subgroup of firms in our sample, it is included only in model I, so that model II - otherwise identical to model I - allows for a larger sample size.

Models Ia,b and IIa,b include the above-mentioned additional firm-specific dummy variables, where a 1 is assigned to those firms in the extreme decile of the sample with regard to the respective firm-specific variable (e.g. the 10 percent of firms with the lowest tier 1 capital in the entire data set) and a 0 otherwise. Generally, the decile is calculated with respect to the total data set in all models denoted by "a", while the decile is calculated per year in all models denoted by "b". Model III allows for macroeconomic variables as additional regressors.

Among the firm-specific variables, the magnitude of total assets has a significantly positive influence on the likelihood of securitization. In all models, a bank is more likely to engage in securitization, the "larger" the bank is with regard to total assets held. Also the riskiness of loans increases the likelihood of securitization (in all models but model III). A positive effect is also found for the quality of credit risk. A bank's liquidity, in contrast, reduces the probability of a CLO. An increasing effect is finally also found for the cost-income ratio. The equity share exerts a significantly positive effect only in the first

Table 7: Univariate tests of differences in firm-specific and macroeconomic characteristics - stock-listed banks only

N denotes the number of entries in the respective category. *Mean* refers to the mean value of the respective variable in the two sub-groups. p-values of the tests on equality of means are reported in the last column. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	securitization			no securitization			
Regressor	N	mean	std. dev.	N	mean	std. dev.	p-value
Risk	138	22.02	14.00	402	21.23	33.95	0.791
Quality	138	9.72	3.03	404	9.40	5.41	0.499
Tier 1	117	7.32	1.59	281	7.95	2.42	0.010***
Equity share	138	4.66	1.69	404	5.16	2.50	0.030**
RoE	138	11.14	8.52	404	11.18	12.43	0.970
CIR	138	64.37	16.12	401	60.95	14.37	0.020**
Liquidity	138	76.23	54.63	399	110.89	107.4	0.000***
Total assets	138	11.81	1.25	404	11.26	1.14	0.000***
Loans	138	11.17	1.10	404	10.64	1.08	0.000***
Tax	138	26.73	16.41	401	29.48	14.41	0.062*
Business	138	56.98	41.96	401	45.21	29.36	0.000***
CDP	138	2.44	0.88	404	2.13	1.01	0.001***
DUR	138	2.30	0.99	404	2.13	1.02	0.078*
GDP Rate	138	2.48	1.87	404	2.67	1.99	0.319
Index	138	231.24	56.88	366	215.40	73.74	0.023**
Short interest	138	3.71	1.15	404	4.22	1.84	0.003***
Long interest	138	4.83	0.61	392	5.13	0.90	0.000***
Credit risk spread	138	1.54	0.43	404	1.36	0.58	0.001***
Performance AAA	138	6.31	12.19	404	7.74	12.25	0.236
Performance BBB	138	7.88	12.38	404	8.30	12.09	0.724
Volatility	138	12.41	7.59	404	12.50	9.39	0.914
MBR	135	2.57	1.58	386	2.27	1.72	0.070*
Beta	133	0.67	0.21	392	0.57	0.28	0.000***

model. Interestingly, tier 1 capital does not have a significant impact on a bank's decision to issue CLOs.

From models Ia,b and IIa,b we can additionally infer that banks in the decile of highest risk have a significantly positive propensity to engage in loan securitization. Still, for those banks the probability of issuing a CLO decreases along with more credit risk as can be seen from the significantly negative sign of the *high risk * risk* coefficient. Further extreme cases such as the decile of firms with lowest performance or lowest liquidity do not seem to affect a bank's securitization decision significantly.

With regard to the dummy variables, we find significantly positive effects for all year dummies because of the increase in overall securitization activity. The country dummies for Germany, Italy and the UK are mainly significantly positive, for France the dummy is always negative. With respect to the bank's type we obtain highly significant and positive effects for almost all business types except for investment banks. Banks' securitization decisions moreover seem to be positively influenced by the robustness of the surrounding economy as mirrored by GDP-growth rates and the development of stock indices. Also the credit risk spread displays a significantly positive impact. Inclusion of macroeconomic

Table 8: Univariate tests of differences in dummy variables - stock-listed banks only

Overall, 542 observations are included, with 138 securitizations and 404 no-securitizations. N denotes the number of entries in the respective category, e.g. 67 bank entries in year 1997 of which 5 belonged to banks securitizing loans (N_{sec}) and 62 to banks not issuing CLOs, N_{nosec}. p-values refer to the respective χ^2-Test. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	overall	securitization		no securitization		χ^2-Test	
Regressor	N	N_{sec}	(in %)	N_{nosec}	(in %)	Pearson χ^2	p-value
LIST	542	138	0.47	404	0.28	38.02	0.000***
Year 1997	67	5	0.04	62	0.15	13.05	0.000***
Year 1998	71	13	0.09	58	0.14	2.20	0.138
Year 1999	74	22	0.16	52	0.13	0.82	0.364
Year 2000	81	25	0.18	56	0.14	1.46	0.226
Year 2001	82	25	0.18	57	0.14	1.29	0.257
Year 2002	83	24	0.17	59	0.15	0.62	0.432
Year 2003	84	24	0.17	60	0.15	0.51	0.477
Germany	98	35	0.25	63	0.16	6.63	0.010***
France	46	14	0.1	32	0.08	0.66	0.418
UK	77	17	0.12	60	0.15	0.54	0.462
Spain	93	21	0.15	72	0.18	0.49	0.484
Italy	38	23	0.17	15	0.04	26.48	0.000***
Other country	190	28	0.2	162	0.4	17.73	0.000***
Commercial	295	114	0.83	181	0.45	59.28	0.000***
Cooperative	43	12	0.09	31	0.08	0.15	0.701
Real	40	6	0.04	34	0.08	2.49	0.115
Investment	7	2	0.01	5	0.01	no test possible	
Savings	13	0	0	13	0.03	no test possible	
Other type	144	4	0.03	140	0.35	53.17	0.000***

variables does not, however, seem to increase the explanatory power of the regression over the basic model I with firm-specific and dummy variables only.

Results from the regression on stock-listed financial institutions are given in table 10. Again, the magnitude of total assets delivers significantly positive coefficients. Similarly to the results on all banks, risk has a significantly positive effect on the likelihood of issuing CLOs, while liquidity displays a negative albeit not always significant impact. The cost-income ratio, in contrast, does no longer have an unambiguous, significant influence on the probability of securitization. In contrast to the test on all banks, for stock-listed institutions we find a negative impact of tier 1 capital that is significant in three out of four models. While volatility and beta do not show any significant effects, the market-to-book ratio seems to influence a bank's securitization decision significantly positive.

As models IVa and IVb show, banks in the decile with lowest tier 1 capital have a lower propensity to engage in securitization transactions. This contrasts with the usual intuition of securitization transactions being used in order to save on regulatory capital. The significance of this dummy variable changes, however, if the decile with lowest tier 1 capital is calculated per year. This is due to the fact that securitization activity in our sample increased over the years while tier 1 capital gradually decreased. Results with regard to this dummy variable are therefore not very straightforward to interpret. Additionally,

Table 9: Multivariate results on the likelihood of CLO-transactions - all banks

Probit regression estimates of the likelihood of issuing assets via an ABS-transaction. The dependent variable equals one if a bank accomplishes an ABS-transaction and zero otherwise. Coef. is the coefficient estimate. p-values are estimated with the corresponding z-statistic. Log likelihood is the maximized value of the log likelihood function $l(\hat{\beta})$. McFadden R^2 is an analog to the R^2 reported in linear regression models. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	Model I	Model Ia	Model Ib	Model II	Model IIa	Model IIb	Model III
Regressor	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Constant	-7.665***	-8.133***	-8.220***	-8.222***	-8.101***	-8.163***	-6.690***
Risk	0.007***	0.033***	0.032***	0.004*	0.018***	0.020***	0.003
Quality	0.018*	0.020*	0.018*	0.061*	0.045	0.044	0.067**
Tier 1	-0.025	0.012	0.019				
Equity Share	0.068*	0.033	0.032	0.006	0.004	0.004	0.004
RoE	0.003	0.002	0.003	0.006	0.004	0.003	0.006
CIR	0.009*	0.013**	0.015***	0.010***	0.014***	0.015***	0.009**
Liquidity	-0.001**	-0.001*	-0.001*	-0.002***	-0.002***	-0.002***	-0.002***
LN (Total Assets)	0.307***	0.274***	0.273***	0.351***	0.313***	0.317***	0.349***
TAX	-0.004	-0.003	-0.003	0.002	0.002	0.002	0.000
Business	-0.001	-0.001	-0.001	-0.000	0.000	0.000	0.000
Year 1998	0.913***	0.890***	0.926***	0.730***	0.730***	0.754***	
Year 1999	1.476***	1.560***	1.535***	1.242***	1.248***	1.273***	
Year 2000	1.329***	1.434***	1.418***	1.240***	1.287***	1.303***	
Year 2001	1.592***	1.662***	1.623***	1.420***	1.432***	1.448***	
Year 2002	1.591***	1.643***	1.568***	1.403***	1.395***	1.387***	
Year 2003	1.711***	1.759***	1.668***	1.504***	1.496***	1.495***	
Germany	0.570***	0.081	0.078	0.349**	0.193	0.216	0.014
France	-0.378*	-0.632***	-0.590***	-0.291*	-0.327**	-0.304*	0.001
UK	0.580***	0.569***	0.549***	0.273*	0.325**	0.319**	-0.237**
Spain	-0.015	-0.346	-0.367*	0.124	-0.038	-0.017	0.568***
Italy	0.915***	0.949***	0.918***	1.113***	1.094***	1.090***	0.205
Commercial	1.477***	1.443***	1.422***	1.331***	1.318***	1.313***	-0.407**
Cooperative	1.481***	1.641***	1.590***	1.342***	1.481***	1.481***	0.296*
Real	1.063***	1.130***	1.093***	0.577***	0.515**	0.517**	0.110
Investment	0.601	0.372	0.422	0.655*	0.597	0.599	0.878***
Savings	1.171***	1.141***	1.110***	0.841***	0.802***	0.776***	1.289***
GDP rate							1.382***
Index							0.544**
Long interest							0.501
Credit risk spread							0.881***
Low tier 1		-2.041	-0.419				
Low tier 1*tier 1		0.482	0.166				
High risk		1.371***	1.161***		0.738***	0.493**	
High risk*risk		-0.037***	-0.035***		-0.020***	-0.020***	
Low performance		2.093	-0.134		2.201*	1.503	
Low performance*cir		-0.024	-0.003		-0.027*	-0.020	
Low liquidity		0.216	0.339		-0.289	-0.227	
Low liquidity*liquidity		0.005	0.002		0.029	0.031*	
Log likelihood	-379.40	-365.29	-365.23	-528.45	-519.31	-518.18	-518.44
Obs with Dep=0	739	739	739	1257	1257	1257	1160
Obs with Dep=1	213	213	213	268	268	268	266
Total obs	952	952	952	1525	1525	1525	1426
McFadden R^2	0.25	0.28	0.28	0.25	0.27	0.27	0.25

we find that the probability of issuing CLOs in this subgroup increases along with tier 1 capital. This finding may imply that loan securitization may help banks to fulfill their regulatory requirements but that the possibility to use this instrument is limited such that it may not be used as a last resort. Similarly to the results on the total bank sample, we find that banks in the decile with highest risk have a high propensity to engage in loan securitization but that the probability of issuing CLOs in this subgroup decreases along with credit risk. Again, this may point to a certain limit to use this instrument as a risk-transfer tool. Model IVc finally shows that banks with high risk and low equity have a high propensity to issue CLOs as given by the positive coefficient of the *high risk * low equity* regressor. Inclusion of this latter variable also strongly increases the explanatory power of the regression as can be seen from the rise in R^2 from 0.41 in model IVa to 0.44 in model IVc.

With regard to dummy variables, we find slightly less significant and also more ambiguous effects as compared to the full sample. In particular, the country dummies display less constant impacts: only for UK and Spain we do obtain significantly positive coefficients. While we also find positive (and mostly significant) effects for commercial, cooperative and real estate banks, the dummy for other banks - including investment banks - now displays a significantly negative coefficient.

Among the macroeconomic regressors, only the long-term interest rate and the index deliver significant effects with the expected signs, but no longer the credit risk spread.

5.3 Robustness analyses

Several auxiliary analyses have been conducted in order to improve the robustness of our results. With regard to regressors we tested different variables, in line with our informal arguments of section 4, for inclusion into the model. To mitigate the problem of multicollinearity, we excluded highly-correlated regressors. We therefore estimated correlation coefficients for each possible combination of two regressors. These coefficients are given in tables 15 and 16 in the appendix. Overall, five combinations of highly correlated coefficients were observed and led to the exclusion of variables *loans*, *short interest*, *credit risk spread, performance AAA* and *performance BBB* in the multivariate analyses.

Furthermore, we considered different model specifications in order to take account of the data reduction following from individual variable arrangements. This is particularly obvious for models accounting for equity characteristics that were not available for all banks. We therefore constructed one individual model (model I for the full sample, model IV for the sample on stock-listed banks) that entails variable *tier 1* capital, which reduced the number of observations to 952 in the full sample and to 365 in the test on stock-listed banks. In models II, III, V and VI we disregarded this variable in order to increase the number of eligible observations.

Finally, we also took into account different measures of performance, risk and liquidity, with only the most significant variables being included in our main analyses. We also checked the influence of additional dummy variables based on extreme regressor values, e.g. a dummy for the 10% of banks with lowest risk or highest performance. Results from a multivariate regression with these additional regressors can be obtained from table 17 in the appendix.

Table 10: Multivariate results - the likelihood of CLO-transactions for listed banks

Probit regression estimates of the likelihood of issuing assets via an ABS-transaction. The dependent variable equals one if a bank accomplishes an ABS-transaction and zero otherwise. Coef. is the coefficient estimates. p-values are estimated with the corresponding z-statistic. Log likelihood is the maximized value of the log likelihood function $l(\hat{\beta})$. McFadden R-squared is an analog to the R^2 reported in linear regression models. *, **, ***: significance at the 10%-, 5%- and 1%-level, respectively.

	Model IV	Model IVa	Model IVb	Model IVc	Model V	Model Va	Model Vb	Model VI
Regressor	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Constant	-6.297***	-5.829***	-5.469***	-6.994***	-7.495***	-6.774***	-6.937***	-5.149***
Risk	0.014**	0.051***	0.049***	0.061***	0.011*	0.035***	0.033***	0.007
Quality	-0.095	0.002	-0.043	-0.052	-0.038	-0.082	-0.082	0.006
Tier 1	-0.041	-0.201**	-0.206**	-0.319***				
Equity Share	0.100	0.088	0.095	0.152	0.057	0.029	0.030	0.039
RoE	0.003	-0.011	-0.009	-0.006	0.018	0.003	0.007	0.014
CIR	-0.012	-0.027**	-0.024**	-0.025*	0.011	-0.009	-0.001	0.010
Liquidity	-0.002	-0.001	-0.002	-0.002	-0.003**	-0.002**	-0.003**	-0.004***
LN (Total Assets)	0.393***	0.433***	0.406***	0.584***	0.322***	0.352***	0.315***	0.356***
TAX	-0.004	-0.007	-0.001	-0.014	0.003	0.005	0.005	0.002
Business	-0.002	-0.000	0.000	-0.000	-0.002	-0.000	-0.000	-0.004
Year 1998	0.593	0.030	0.214	-0.013	0.542	0.387	0.450	
Year 1999	1.095**	0.899*	0.893*	0.901*	1.001***	0.883**	0.919**	
Year 2000	1.284***	1.400***	1.395***	1.457***	1.267***	1.337***	1.345***	
Year 2001	1.253***	1.040**	1.091**	1.127**	1.202***	1.105***	1.203***	
Year 2002	1.147***	0.912*	1.025**	1.047**	1.139***	1.050***	1.208***	
Year 2003	1.281***	1.020**	1.067**	1.218**	1.189***	1.008***	1.137***	
Germany	0.731**	-0.654	-0.359	-1.021**	0.867***	0.304	0.453	0.506
France	0.130	-0.450	-0.398	-0.611	-0.158	-0.519	-0.465	-0.362
UK	0.701*	0.884**	0.869**	1.574***	0.902***	0.852***	0.925***	1.197***
Spain	0.609*	0.449	0.453	0.673*	0.715**	0.597**	0.605**	0.507*
Italy	-0.283	-1.212***	-0.951**	-1.340***	-0.138	-0.413	-0.397	-0.152
Commercial	1.015*	0.952	0.878	0.784	1.268***	1.354**	1.392***	1.307**
Cooperative	1.459**	2.103**	1.608**	2.042**	1.037*	1.194*	1.193*	1.034*
Real	1.292*	1.128	1.088	0.576	0.983*	1.165**	1.170*	0.867
Other bank	-1.512**	-2.233***	-2.216***	-3.911	-1.112**	-1.316**	-1.229**	-1.073*
Volatility	0.010	-0.009	-0.005	-0.003	-0.004	-0.008	-0.005	-0.002
MBR	0.127*	0.142*	0.144*	0.172**	0.052	0.094	0.093	0.044
Beta	0.131	0.595	0.392	0.486	0.164	0.246	0.227	-0.167
GDP rate								-0.036
Index								0.003**
Long interest								-0.446**
Credit risk spread								0.192
Low tier 1		-9.551*	-3.948	-8.127				
Low tier 1*tier 1		2.144**	0.898	1.880*				
High risk		5.982***	4.499***	6.365**		3.028***	2.440***	
High risk*risk		-0.127***	-0.100***	-0.148***		-0.066***	-0.055***	
Low performance		0.662	-2.077	0.907		-0.122	-3.732	
Low performance*cir		0.006	0.033	0.003		0.015	0.051	
Low liquidity		1.945**	2.011**	-1.303		0.829	0.770	
Low liquidity*liquidity		-0.055	-0.0558*	0.042		-0.016	-0.013	
High risk*low equity				6.277***				
Log likelihood	-157.58	-133.79	-142.44	-125.07	-194.75	-180.80	-184.56	-189.09
Obs with Dep=0	253	253	253	253	367	367	367	329
Obs with Dep=1	112	112	112	112	131	131	131	131
Total obs	365	365	365	365	498	498	498	460
McFadden R^2	0.30	0.41	0.37	0.44	0.32	0.37	0.36	0.31

6 Discussion of results

Our results point to a refinement of the efficient contracting hypothesis regarding the use of loan securitization. Generally, we find that a bank is more likely to issue CLOs the larger the bank (more assets), the higher the bank's credit risk exposure, the lower its liquidity and the lower its performance (measured by the cost-income ratio). Interestingly, equity capital, or even more precise tier 1 capital, does not seem to influence banks' securitization decisions very strongly. We also find that banks in different countries display different propensities to engage in securitization activities, while we can hardly discriminate between banks' business types. With regard to macroeconomic factors, both GDP-growth and interest rates (and credit risk spread) seem to affect a bank's securitization decision positively.

Looking into even more details, we find that the risk impact also holds for the 10% of banks with highest risk. Yet, among these banks the risk variable reduces a bank's inclination to issue CLOs. With regard to performance and liquidity, however, we do not find a comparably significant effect in the respective extreme deciles.

With regard to the full sample, we may therefore conclude that banks obviously use loan securitization to transfer risk to the market and improve their liquidity situation. Yet, since risk and liquidity do not seem to impact banks' behavior in the extreme deciles (of banks with highest credit risk and lowest liquidity) our results may also point into one further direction: particularly commercial banks may make use of loan securitization in order to indirectly tap the markets for investment bank activities (and the associated gains) without directly crossing the traditional border to investment bank businesses. The additional finding that lowly-performing banks show a high inclination towards securitization activities may be taken as a sign against the "appetite-for-risk" hypothesis, while the positive effect of risk quality on the securitization decision supports this hypothesis.

For stock-listed banks, size and credit risk remain important driving factors for the securitization decision. Yet, liquidity reasons seem to play a lesser role, the same holds for performance arguments, while an equity-capital shortage seems to become a more important factor. In particular, loan securitization can be shown to grow more likely the lower tier 1 capital. Yet, this effect is reversed for firms with lowest tier 1 capital. It can only be found for those firms with highest risk and lowest equity capital, who are again very likely to engage in loan securitization. Taken together, these findings may be indicative of securitization transactions mainly being used as a risk-transfer and funding tool that allows a more efficient risk-sharing and liquidity transformation.

Still, as the reversal of the *risk* regressor's effect in the extreme decile shows (both for the total sample and for stock-listed banks only), the use of loan securitization as a risk-transfer tool is limited. This result coincides with observations from CRT markets which conclude that banks tend to retain the highest-risk tranches and therefore risk-transfer is (still) small relative to notional size.

7 Conclusion

Based on recent research on the markets for credit risk transfer, this study examined firm-specific and macroeconomic factors that drive financial institutions' decision to engage in

loan securitization transactions. While we cannot reject the hypothesis that banks use loan securitization to save on regulatory capital, we find that the main factors driving banks' securitization decisions are the size of total assets, credit risk, liquidity and performance. As such, we conclude that banks active in loan securitization are large, lowly-performing institutions with high credit risk and low liquidity. Obviously, securitization transactions are therefore used to reduce the bank's exposure to default risk and to increase its liquidity situation. Still, the instrument's risk-transfer and funding capacity seems to be limited: firms in the lowest decile of liquidity do not show a significant inclination towards loan securitization; for firms in the highest credit risk decile, the variable's effect even gets reversed.

As a conclusion we may state that the market for credit risk does not seem to be hampered by the new regulatory framework of Basel II that will no longer allow for regulatory capital arbitrage. Rather, it seems that commercial banks try to tap the market for investment bank activities and possibly also try to feed their appetite for risk in order to increase expected return via CLO issuances.

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Appendix

Table 11: Definition of macroeconomic and dummy variables

Regressor	Definition
Macroeconomic variables:	
CDP	credit default probability
DUR	rating downgrade-upgrade-ratio
GDP Rate	GDP-growth rate
Index	country specific yield of a well diversified stock index (Germany = CDAX, France = CAC40, UK = FTSE 350)
Short interest	Libor 3 month
Long interest	long-term interest rate of country specific government bonds
Credit risk spread	difference between yield of AAA- and BBB-rated risk indices
Performance AAA	yield of AAA-rated credit risk index (MSCI Overall)
Performance BBB	yield of BBB-rated credit risk index (MSCI Overall)
Dummy variables:	
LIST	1 if bank is listed, 0 otherwise
Year 1997	1 in 1997, 0 otherwise
Year 1998	1 in 1998, 0 otherwise
Year 1999	1 in 1999, 0 otherwise
Year 2000	1 in 2000, 0 otherwise
Year 2001	1 in 2001, 0 otherwise
Year 2002	1 in 2002, 0 otherwise
Year 2003	1 in 2003, 0 otherwise
Germany	1 if bank registered in Germany, 0 otherwise
France	1 if bank registered in France, 0 otherwise
UK	1 if bank registered in UK, 0 otherwise
Spain	1 if bank registered in Spain, 0 otherwise
Italy	1 if bank registered in Italy, 0 otherwise
Other country	1 if bank not registered in countries above, 0 otherwise
Commercial	1 if commercial bank, 0 otherwise
Cooperative	1 if cooperative bank, 0 otherwise
Real	1 if real estate bank, 0 otherwise
Investment	1 if investment bank, 0 otherwise
Savings	1 if savings bank, 0 otherwise
Other type	1 if bank not registered in classification above, 0 otherwise
For quoted banks only:	
Volatility	stock return volatility
MBR	market-to-book ratio
Beta	beta coefficient calculated via market model

Table 12: Descriptive statistics - firm-specific and macroeconomic variables

Descriptive statistics for banks in our sample in the time period 1997 to 2004. Calculations are based on the full sample of 1948 banks.

Regressor	N	mean	std. dev.	median	range
Firm specific:					
Risk (in %)	1640	18.19	334.66	130.40	[-238.76; 724.94]
Quality (in %)	1685	10.89	79.19	91.17	[0.00; 97.08]
Tier 1 (in %)	1045	9.15	7.50	7.80	[1.80; 87.00]
Equity share (in %)	1722	5.07	6.54	4.35	[0.27; 86.59]
RoE (in %)	1716	10.50	11.00	10.44	[-110.04; 115.51]
CIR (in %)	1698	59.84	21.46	61.84	[0.71; 441.33]
Liquidity (in %)	1621	110.74	119.94	77.56	[0.00; 995.80]
Total assets (in billion)	1722	113.47	148.17	50.74	[0.17; 994.97]
Loans (in billion)	1720	53.99	65.78	26.86	[0.00; 419.41]
Tax (in %)	1652	29.64	16.40	29.28	[0.00; 99.84]
Business (in %)	1686	39.06	57.66	31.19	[0.00; 868.86]
Macroeconomic:					
CDP (in %)	1722	2.14	1.00	2.16	[0.66; 3.82]
DUR	1722	2.12	1.00	2.06	[0.85; 4.16]
GDP Rate (in %)	1722	2.46	1.68	2.00	[-1.10; 11.70]
Index (Basis 1995)	1621	219.50	69.88	206.50	[114.10; 778.70]
Short interest (in %)	1722	3.96	1.43	3.56	[0.33; 13.97]
Long interest (in %)	1675	5.00	0.76	4.91	[2.63; 9.92]
Credit risk spread (in bp)	1722	136	57	150	[27;226]
Performance AAA (in bp)	1722	8	12	10	[-15;22]
Performance BBB (in bp)	1722	9	12	16	[-7;20]
For quoted banks only:					
Volatility	542	0.12	0.09	0.11	[0.01; 1.25]
MBR	521	2.35	1.69	2.13	[-14.48; 9.99]
Beta	564	0.59	0.46	0.53	[-1.26;3.64]

Table 13: Descriptive statistics - sub-groups

General and descriptive statistics with regard to firm-specific variables for three subgroups of banks: banks in the decile of highest credit risk (highest risk)of lowest cost-income ratio (highest performance) and of lowest equity (lowest tier 1 capital).

Banks with highest risk							
General statistics:		Number of securitizations = 46					
Year	1997	1998	1999	2000	2001	2002	2003
N	14	22	16	26	19	37	31
Country	Germany	France	UK	Spain	Italy	Other country	
N	89	30	3	26	3	14	
Bank	Commercial	Cooperative	Real	Investment	Savings	Other type	
N	68	16	17	4	2	58	
Firm specific regressors:							
	Mean	Std. dev.	Median	Range			
Risk	74.46	78.65	51.41	[37.20;724.94]			
Quality	11.98	8.83	10.3	[0.00;83.42]			
Tier 1	7.81	4.95	6.4	[4.30;44.92]			
Equity Share	4.25	6.84	0.46	[0.46;86.59]			
RoE	1.41	16.95	5.54	[-110.04;32.63]			
CIR	57.78	24.3	60.95	[14.59;172.42]			
Liquidity	85.36	94.43	65.67	0.40;692.47]			
Total assets	120,364	124,619	69,970	[12,452;526,452]			
Tax	20.43	18.87	18.54	[0.00;70.20]			
Business	51.49	101.01	23.85	[0.00;868.86]			
Banks with best performance							
General statistics:		Number of securitizations = 9					
Year	1997	1998	1999	2000	2001	2002	2003
N	31	28	21	26	21	19	19
Country	Germany	France	UK	Spain	Italy	Other country	
N	69	14	4	17	6	55	
Bank	Commercial	Cooperative	Real	Investment	Savings	Other type	
N	50	69	0	1	0	45	
Firm specific regressors:							
	Mean	Std. dev.	Median	Range			
Risk	24.32	35.12	17.67	[-41.36;239.53]			
Quality	10.53	7.43	8.18	[0;46.49]			
Tier 1	18.56	19.03	11.10	[5.10;84.30]			
Equity Share	5.11	11.10	2.99	[0.46;86.59]			
RoE	9.90	11.41	10.24	[-110.04;33.25]			
CIR	21.80	8.37	24.21	[0.71;32.48]			
Liquidity	159.01	200.05	79.97	[0.00;973.66]			
Total assets	52,730	52,641	35,858	[593.7;301,777]			
Tax	30.30	16.40	31.71	[0.00;70.81]			
Business	5.14	10.48	0.36	[0.00; 56.58]			
Banks with low equity							
General statistics:		Number of securitizations = 25					
Year	1997	1998	1999	2000	2001	2002	2003
N	24	21	15	17	12	9	6
Country	Germany	France	UK	Spain	Italy	Other country	
N	53	15	0	28	2	6	
Bank	Commercial	Cooperative	Real	Investment	Savings	Other type	
N	49	8	12	3	1	31	
Firm specific regressors:							
	Mean	Std. dev.	Median	Range			
Risk	39.72	80.46	25.02	[-12.36;724.94]			
Quality	10.50	3.83	9.87	[0.46;21.69]			
Tier 1	5.02	0.67	5.15	[1.80;5.70]			
Equity Share	3.52	1.95	2.98	[0.30;9.15]			
RoE	7.24	17.34	7.54	[-71.24;115.51]			
CIR	63.98	14.92	66.28	[22.45;109.95]			
Liquidity	89.00	74.02	73.82	[12.52;595.61]			
Total assets	117,610	125,281	76,944	[10,325;695,344]			
Tax	33.92	18.50	38.69	[0.00;75.25]			
Business	40.71	45.81	32.42	[0.00;282.40]			

Table 14: Country-specific separation of macroeconomic variables *index* and *long interest*

	1997	1998	1999	2000	2001	2002	2003
Index							
Germany	173.8	234.7	249.8	332.9	262.5	195.5	149.4
France	147.3	197.6	242.9	334.8	268	202.6	166.5
UK	139.9	168.1	187.5	190.1	165.9	137.3	120.8
Italy	139.6	219.7	241.4	316.4	249.5	190.8	170.6
Spain	194	284.2	309.8	336.5	271	217.8	206.5
Long Interest							
Germany	5.64	4.57	4.49	5.26	4.8	4.78	4.07
France	5.58	4.64	4.61	5.39	4.94	4.86	4.13
UK	7.13	5.6	5.01	5.33	5.01	4.91	4.58
Italy	6.86	4.88	4.73	5.58	5.19	5.03	4.25
Spain	6.4	4.83	4.73	5.53	5.12	4.96	4.12

Table 15: Correlation matrix of regressors - I

	Risk 1	Quality	Tier 1	Equity share	RoE	CIR	Liquid.	Total asset	Loans	Tax	Busi.
Risk	1.00	0.01	-0.15	-0.05	-0.33	0.03	-0.03	0.08	0.06	-0.14	0.21
Quality	0.01	1.00	-0.02	-0.11	0.01	0.06	0.13	0.10	-0.20	0.01	0.11
Tier 1	-0.15	-0.02	1.00	0.36	0.02	-0.38	0.02	-0.22	-0.21	-0.09	-0.14
Equity share	-0.05	-0.11	0.36	1.00	0.00	-0.09	-0.09	-0.24	-0.14	-0.09	-0.04
RoE	-0.33	0.01	0.02	0.00	1.00	-0.26	-0.04	-0.04	0.00	-0.03	0.05
CIR	0.03	0.06	-0.38	-0.09	-0.26	1.00	-0.08	0.19	0.09	-0.06	0.26
Liquidity	-0.03	0.13	0.02	-0.09	-0.04	-0.08	1.00	-0.05	-0.12	0.10	-0.05
Total asset	0.08	0.10	-0.22	-0.24	-0.04	0.19	-0.05	1.00	**0.87**	-0.10	0.14
Loans	0.06	-0.20	-0.21	-0.14	0.00	0.09	-0.12	**0.87**	1.00	-0.07	0.03
Tax	-0.14	0.01	-0.09	-0.09	-0.03	-0.06	0.10	-0.10	-0.07	1.00	-0.06
Business	0.21	0.11	-0.14	-0.04	0.05	0.26	-0.05	0.14	0.03	-0.06	1.00
CPD	0.00	-0.07	-0.01	-0.01	-0.06	0.04	-0.05	0.13	0.13	-0.12	0.02
DUR	0.06	-0.10	0.00	0.00	-0.10	0.05	-0.02	0.11	0.11	-0.09	0.02
GDP Rate	-0.13	0.06	0.04	0.01	0.26	-0.07	-0.06	-0.15	-0.15	-0.11	0.04
Index	-0.06	0.04	0.03	0.04	0.07	-0.09	0.00	-0.10	-0.10	0.00	-0.01
Short interest	-0.08	0.09	-0.02	0.04	0.18	0.00	0.06	-0.09	-0.05	0.04	-0.02
Long interst	-0.06	0.09	-0.01	0.03	0.15	-0.04	0.00	-0.13	-0.10	0.09	-0.06
Volatility	0.13	0.10	0.02	-0.04	-0.17	0.14	0.09	0.09	0.06	-0.12	-0.06
MBR	-0.17	0.18	0.05	0.13	0.30	-0.06	0.04	0.07	0.05	-0.01	0.10

Table 16: Correlation matrix of regressors - II

	CPD	DUR	GDP Rate	Index	Short inter.	Long inter.	Vola	MBR	Cr spread	Perf. AAA	Perf. BBB
Risk	0.00	0.06	-0.13	-0.06	-0.08	-0.06	0.13	-0.17	0.04	-0.06	-0.08
Quality	-0.07	-0.10	0.06	0.04	0.09	0.09	0.10	0.18	-0.12	0.13	0.10
Tier 1	-0.01	0.00	0.04	0.03	-0.02	-0.01	0.02	0.05	0.00	-0.01	0.00
Equity share	-0.01	0.00	0.01	0.04	0.04	0.03	-0.04	0.13	-0.01	0.01	0.01
RoE	-0.06	-0.10	0.26	0.07	0.18	0.15	-0.17	0.30	-0.09	0.08	0.09
CIR	0.04	0.05	-0.07	-0.09	0.00	-0.04	0.14	-0.06	0.05	-0.02	-0.03
Liquid.	-0.05	-0.02	-0.06	0.00	0.06	0.00	0.09	0.04	-0.04	0.02	0.01
Total asset	0.13	0.11	-0.15	-0.10	-0.09	-0.13	0.09	0.07	0.16	-0.12	-0.10
Loans	0.13	0.11	-0.15	-0.10	-0.05	-0.10	0.06	0.05	0.16	-0.12	-0.10
Tax	-0.12	-0.09	-0.11	0.00	0.04	0.09	-0.12	-0.01	-0.14	0.08	0.08
Business	0.02	0.02	0.04	-0.01	-0.02	-0.06	-0.06	0.10	0.04	-0.01	0.00
CPD	1.00	0.46	-0.18	0.32	-0.04	-0.25	-0.05	-0.04	0.76	-0.04	0.01
DUR	0.46	1.00	-0.39	-0.14	-0.32	-0.45	0.10	-0.16	**0.87**	**-0.60**	**-0.66**
GDP Rate	-0.18	-0.39	1.00	0.35	0.31	0.34	-0.09	0.28	-0.35	0.46	0.43
Index	0.32	-0.14	0.35	1.00	0.05	-0.01	-0.05	0.20	0.09	0.34	0.36
Short interest	-0.04	-0.32	0.31	0.05	1.00	**0.80**	0.09	0.26	-0.31	0.46	0.30
Long interest	-0.25	-0.45	0.34	-0.01	**0.80**	1.00	0.07	0.19	**-0.55**	**0.64**	0.44
Volatility	-0.05	0.10	-0.09	-0.05	0.09	0.07	1.00	-0.04	0.02	-0.07	-0.15
MBR	-0.04	-0.16	0.28	0.20	0.26	0.19	-0.04	1.00	-0.14	0.19	0.20
Credit risk spread	**0.76**	**0.87**	-0.35	0.09	-0.31	**-0.55**	0.02	-0.14	1.00	**-0.58**	**-0.53**
Performance AAA	-0.04	**-0.60**	0.46	0.34	0.46	**0.64**	-0.07	0.19	**-0.58**	1.00	**0.86**
Performance BBB	0.01	**-0.66**	0.43	0.36	0.30	0.44	-0.15	0.20	**-0.53**	**0.86**	1.00

Table 17: Multivariate results - the likelihood of CLO-transactions for all banks (model VII and VIII) and listed banks (model IX)

Probit regression estimates of the likelihood of issuing assets via an ABS-transaction. The dependent variable equals one if a bank accomplishes an ABS-transaction and zero otherwise. Coef. is the coefficient estimates. p-values are estimated with the corresponding z-statistic. Log likelihood is the maximized value of the log likelihood function $l(\hat{\beta})$. McFadden R-squared is an analog to the R^2 reported in linear regression models. Bold figures refer to significant coefficients, as can be seen from the given p-values.

	Model I	Model II	Model III
Regressor	Coef.	Coef.	Coef.
Constant	-8.023***	-7.199***	-6.530***
Risk	0.017***	0.033***	0.040**
Quality	0.113**	0.044	-0.275**
Tier 1		0.036	-0.071
Equity share	0.000	0.007	0.164*
RoE	0.005	-0.001	-0.006
CIR	0.006	0.002	-0.003
Liquidity	-0.003***	-0.001	-0.002
LN (Total Assets)	0.327***	0.300***	0.454***
Tax	0.002	-0.003	0.002
Business	0.000	0.000	-0.002
Year 1998	0.754***	0.859***	0.136
Year 1999	1.275***	1.452***	0.630
Year 2000	1.274***	1.353***	1.197**
Year 2001	1.443***	1.552***	0.918*
Year 2002	1.454***	1.509***	0.833*
Year 2003	1.502***	1.547***	0.882*
Germany	0.203	0.020	-0.186
France	-0.309*	-0.586***	-0.421
UK	0.217	0.355	0.832*
Spain	0.026	-0.249	0.384
Italy	1.047***	0.934***	-1.011**
Commercial	1.318***	1.415***	0.800
Cooperative	1.502***	1.873***	1.230*
Real	0.547**	1.106***	1.037
Investment	0.536	0.459	
Savings	0.834***	1.034***	
Other bank			-2.375***
Volatility			-0.008
MBR			0.147*
Beta			0.287
Low equity		-1.794	
Low equity*tier 1		0.418	
High risk	0.735**	1.295***	4.175***
Low risk	-0.070		-0.504
High risk*risk	-0.019***	-0.037***	-0.086**
Low quality	0.312		-4.110**
High quality	-0.316		0.089
Low quality*quality	0.008		0.380**
High performance	-4.553**	-18.224*	1.343
Low performance	0.025		1.160**
High performance*CIR	0.149**	0.605*	-0.009
Low liquidity	-0.267	0.918*	1.798*
High liquidity	0.341		0.415
Low liquidity*liquidity	0.024	-0.035	-0.051
High risk*low equity		0.217	
Log likelihood	-513.52	-357.16	-137.42
Obs with Dep=0	1257	740	253
Obs with Dep=1	268	213	112
Total obs	1525	953	365
McFadden R^2	0.276	0.295	0.389