What Do We Know about Banks' Securitisation?: The Spanish Experience[1]

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ABSTRACT

The present work analyses the reasons that Spanish financial entities have carried out securitisation programs in the period 2000–2007 on such a scale that Spain has become the European country with the largest issue volumes, second only to the U.K.

The results obtained from applying a logistic regression model to a sample of 408 observations indicate that liquidity and the search for improved performance are the decisive factors in securitisation. The hypotheses of credit risk transfer and regulatory capital arbitrage are not confirmed; therefore, the normative development of Basel II cannot be expected to affect the volumes issued in the future.

The study is complemented by a more detailed analysis, differentiating between programs of asset and liability securitisation.

JEL classification: G21, G28.
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1. Introduction

Securitisation is a financial technique that allows a batch of illiquid assets to be transformed into a liquid tradable instrument with a known flow of income payments. This transformation is made possible using an instrumental entity (a special purpose vehicle or SPV) that is separate, by law, from the entity with ownership rights to the instrument. Consequently, the technique allows banks to transform heterogeneous assets that, in the great majority of cases, are not negotiable into securities that are liquid, homogeneous and suitable for sale to third parties. The range of assets that can be securitised is very wide and includes not only present credit rights (interest from mortgage loans, credit card debt, consumer loans for car purchase, bonds, etc.) but also rights to future income flows (rights of authorship, property rental income, etc.).

Asset securitisation has, in recent years, become one of the more visible consequences of financial innovation. In Europe, issues of securitised assets have grown from 78.2 billion euros in 2000 to 711.1 billion euros in 2008, which represents an increase in volume by a factor of ten in less than a decade[2]. It is true that the current financial crisis, in which securitisation seems to have played a notable role, produced a halt in the commissioning of new securitisation programs during the second half of 2007 and the beginning of 2008. However, the pressing needs for liquidity of financial entities provoked a sharp change after the first quarter of 2008, and the volume issued in the latest year increased by almost 60% over that of the previous year.

Over this past decade, Spain has established itself as one of the most prolific European countries in issuing securitised banking assets, second only to the United Kingdom, even though this financial technique is a relatively recent phenomenon in this country. In fact, although off-balance sheet securitisation appears to have been subject to regulation for the

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[2] Data according to the European Securitisation Forum Data Report Q4: 2008 (2009).

first time in 1992[3], it was not until 1998 that the securitisation of all types of assets, with or without a mortgage guarantee, was permitted[4].

Despite this notable expansion of the market, there have been few empirical studies focusing on the specific characteristics of financial entities that lead to programs of securitisation. In this context, the work presented is intended to extend the existing scarce literature; it analyses the factors that have encouraged Spanish banks to securitise assets between 2000 and 2007.

The article is structured as follows: Section 2 presents a review of the existing literature and identifies the principal factors previously identified as determinants in the decision making process of a bank securitising some of its assets. Next, in Section 3, the most common structures of securitisation are described, and the situation in the Spanish market is analysed. Section 4 presents the sample and methodology employed in the empirical research, and the explanatory variables are described. The results obtained are presented in Section 5, and in Section 6, the major conclusions are presented. Finally, bibliographical references are listed in Section 7.

2. Factors determining securitisation, according to previously published studies

One part of the existing literature offers analyses of aspects such as the effect of securitisation on the risks incurred by the banks making use of this technique (Dionne and Harchaoui, 2008; Hänsel and Krahnen, 2007), on the quoted prices of the shares of the entities issuing securitisation programs (Lockwood, Rutherford and Herrera, 1996; Thomas, 1999, 2001), and on the supply of bank loans (Hirtle, 2007; Loutskina and Strahan, 2006), among others. Other authors, however, have focused on the principal factors leading a bank to securitise part of its portfolio.

Despite the indisputable securitisation market growth , the specific characteristics that lead financial entities to securitise a portion of their assets are currently not clear, although previous studies seem to agree on three main (but not mutually exclusive) groups of motivations, detailed below:

i. *Liquidity or the search for new sources of financing*. The liquidity effect of securitisation is particularly obvious in cash transactions. Here, the transfer of assets follows a true sale ("off-balance sheet") of the underlying portfolio to a special purpose vehicle (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 (funding) and hence a possible restructuring of the bank's Balance Sheet (Gorton and Pennacchi, 1995), contingent on the reallocation of cash by the originator. The need for liquidity has been stated to be the principal determinant factor of securitisation in recent empirical studies such as that of Agostino and Mazzuca (2008).
ii. *Transfer of credit risk*. Securitisation allows higher-risk financial institutions to originate and fund risky financial assets (e.g. mortgages, consumer loans, business loans, etc.) in a way that minimises financial distress costs (Gorton and Souleles, 2004). These institutions can use SPVs to remove loans from their balance sheet. SPVs are structured to remain "bankruptcy remote" from the originating firm, meaning that the creditors of the SPV do not have any claim against the originator's assets. Moreover, the bonds sold by the SPV are structured to make default or bankruptcy all but impossible (although there can be defaults on the underlying loans). According to this efficient contracting explanation, financial firms facing greater than expected financial distress costs (e.g., firms with high leverage and risky assets) are more likely to be active securitisers than other firms. Some recent studies emphasise the importance of this factor in the decision of a bank to securitise assets, including those of Minton, Sanders and Strahan (2004) and Bannier and Hänsel (2008). The latter authors describe securitisation transactions as being used mainly as a risk transfer and funding tool that increases the efficiency of both risk sharing and liquidity transformation.

    However, it is appropriate to remember that the originating entity usually repurchases the tranche of worst credit quality assets (known as those of first losses, or the equity

[3] Law 19/1992 of 7 July in regards to mortgage securitisation funds and companies, regulates the securitisation of mortgage loans that meet the requirements stipulated in the second section of the Law 2/1981 of 25 March for the regulation of the mortgage market.
[4] RD 926/1998 of 14 May regulates asset securitisation funds and securitisation fund management companies.

tranche) from the SPV in order to secure a sufficient degree of credit improvement for subsequent tranches, thereby allowing them to be placed at a lower cost in the market. This method limits the effective transfer of credit risk to the final investors.

iii. *Arbitrage of regulatory capital*. In another group of studies, it is argued that credit entities have resorted to asset securitisation in order to reduce their capital requirements (Ambrose, Lacour-Little, and Sanders, 2005; Calomiris and Mason, 2004; Duffie and Garleanu, 2001; Pennacchi, 1988; and Uzun and Webb, 2007, among others). This would involve exploiting the possibilities for arbitraging the regulatory capital required under the Capital Accord of 1988 (Basel I)[5].

The Basle II Agreement, which entered into effect in the majority of the countries of the European Union in 2008, remedies some of the weaknesses of the Basel I Agreement. Thus, the possible reduction in the capital requirements is closely associated both with the quality of the underlying portfolio and with the amount of risk exposure retained by the originating entity, preventing possible arbitrage of capital[6]. However, while some incentives to use regulatory capital arbitrage are reduced under the new framework of Basel II, which uses risk-sensitive capital ratios, arbitraging may have contributed to the increase in securitisation in the early years (Minton, Sanders and Strahan, 2004).

Bannier and Hänsel (2008) have argued against the hypothesis that banks have been arbitraging their regulatory capital and have even written about a significant "reverse" regulatory arbitrage effect: banks with low tier 1 capital securitise significantly less than banks with high tier 1 capital.

Apart from the factors indicated, it has been reported that another possible cause of the increased banking securitisation is the search for improved measures of performance of the entity (ROE, ROA, etc.) (Agostino and Mazzuca, 2008). However, in the existing literature, this does not appear to be considered a determinant variable to the same extent as the factors previously indicated. It should not be forgotten that the downside aspects of securitisation include the fixed costs of setting up the SPV, as well as a potential reduction in the tax benefits flowing from keeping the assets on the balance sheet and financing them with debt.

A final series of elements that seem to influence the decision of a financial entity to securitise some of its assets must be taken into consideration. These include the type (commercial bank, savings bank, credit cooperative, investment bank, etc.) and size of the financial entity. With respect to the originator type, Minton et al. (2004) state "that the efficient contracting hypothesis predicts that commercial banks and savings institutions securitize assets to a lesser degree than other institutions, because commercial banks and savings institutions do not bear the costs of financial distress (the deposit insurer does). In contrast, the regulatory arbitrage hypothesis predicts the opposite". Regarding the size of the financial entity, since setting up a securitisation program leads to significant fixed costs, we should expect only relatively large banks to securitize their loans (Bannier and Hänsel, 2008; Uzun and Webb, 2007).

With reference to the Spanish market, Martín-Oliver and Saurina (2007) conclude that the need for liquidity is the principal and only determining factor in the securitisation programs undertaken by the Spanish banks in the period 1999-2006. The authors do not find any empirical evidence that securitisation is being used as a mechanism to transfer credit risk or as a way of arbitraging regulatory capital.

This study extends the limited literature existing on this topic. It is the first in which separate analyses are made of the various factors guiding Spanish financial entities in their decisions to securitise their assets and those leading to the securitisation of their liabilities[7].

[5] In Jones (2000), there is an analysis of the principal techniques used to perform capital arbitraging under this Accord (Basel I). Prior to Basel II, the treatment of securitisation from the point of view of the regulation of capital was unsatisfactory. Regulation differed in the different jurisdictions, since treatment specifically for securitisation had not been foreseen in Basel I and in general, the regulations were less sensitive to risk. As the required capital was the same, the cost of holding low-risk assets is greater since the incremental capital is not economically justifiable. In order to save on regulatory capital, banks may therefore try to remove low-risk assets from their balance sheets and retain high-risk assets.

[6] For a more detailed analysis of the treatment of securitisation in Basel II, the Basel Committee on Banking Supervision (2004) and Catarineu and Pérez (2008) may be consulted.

[7] The securitisation of liabilities could be considered an inappropriate securitisation, although its structure is of the traditional type and it functions in a very similar way to the securitisation of assets. The only notable feature is that these liabilities cannot be sold to a fund: a third entity (an investment company or similar) is required to intervene, purchasing the liabilities issued by a credit entity and selling them immediately to the SPV.

The latter is a phenomenon originating from Spain, but currently it is also found in other countries.

3. Types of securitisation and the Spanish market

A fairly extensive classification in the markets distinguishes, as a function of the due date or term of the securities issued, between the following programs:

i. Programs that issue short-term securities (Asset-Backed Commercial Paper, or ABCP). Securitisations that issue short-term paper are programs in which the special securitisation vehicle (SPV) issues securities that predominantly have a term of less than one year, independent of the nature and the due date of the assets securitised.
ii. Programs that issue long-term securities. These comprise the major part of the market and can be divided between the following entities:
    i. *Asset-Backed Securities or ABS.* These are characterised by a very fragmented securitised portfolio composed of assets with a relatively homogeneous risk rating. In the majority of the markets, mortgage loans figure prominently among the assets backing these ABS securities. This gives rise to the well-known nomenclatures for the securitised bonds issued in these programs, such as:
        - RMBS (Residential Mortgage-Backed Securities) and
        - CMBS (Commercial Mortgage-Backed Securities).

    Other underlying assets packaged into ABS instruments are loans to companies and to the public sector, consumer loans for the acquisition of automobiles, and the rights to credit card repayments and invoice payments. In the past decade, these types of assets have become increasingly prevalent.
    ii. *Collateralised Debt Obligations or CDOs*. These are a more recent type of structure that is becoming increasingly relevant in the international market. In this case, the portfolio subject to securitisation is not so fragmented, while the assets comprising it usually have more heterogeneous risk ratings than in an ABS securitisation. In terms of the types of underlying assets used, CDOs differ between the following:
        - *Collateralised Bond Obligations (CBOs)*, for which the underlying assets are bonds and
        - *Collateralised Loan Obligations (CLOs)*, for which the collateral consists of bank loans.

    Moreover, the type of underlying assets may include structured products. In such cases, the CDO involves the securitisation of structured products that are themselves derived from already-existing securitisation structures (CDOs of ABSs).
    Another possible distinction of CDOs is based on the purpose of the transaction:
        - *Balance-sheet CDOs*. These enable the originator to securitise assets recorded on its balance sheet, allowing the originator to remove assets, free up regulatory capital, manage portfolio credit risk, diversify and reduce financing costs.
        - *Arbitrage CDOs*. These allow the originator to take advantage of the positive spread between the average yield on the underlying portfolio and the interest rate paid on the tranches issued.

Having given an overview of the most common securitisation structures (see table 1), the situation of the Spanish market in 2007 is described next[8].

- The total volume securitised by Spanish financial entities in 2007 reached 136.8 billion euros (46% more than the previous year), in contrast to barely 8 billion euros securitised in the first years of this decade.
- The securitisation of bank assets accounted for around 80% of the securitisation activity in Spain. The largest issuing sector was RMBS transactions, which accounted for 46% of total issuance in 2007; the securitisation of loans to companies (14.0%) and of credit to SMEs (7.5%) ranked second and third, respectively. As an emerging trend, 13 billion euros of interbank loans were securitised in 2007. The other types of underlying assets, together with the programs of short-term debt securitisation (ABCP), were only a small minority of the total assets.

[8] Data according to the Report on Banking Supervision in Spain in 2007. Bank of Spain (2008).

- For their part, securitisations of liabilities in 2007 were carried out exclusively on *mortgage certificates ("cédulas hipotecarias"*), the Spanish mortgage-covered bonds. These represented close to 20% of the total securitised assets, although they grew at a slower rate than in the preceding years. Such securitisation programs are usually classified in the international market as CDOs.
- The great majority of securitisations are of the traditional type; the synthetic type of securitisation, in which the credit risk of the portfolio securitised is transferred by the contracting of credit derivatives, only represents a small minority in Spain.
- Finally, commercial banks, savings banks and credit cooperatives, accounting for 99%, continue to be almost the only protagonists of securitisation in Spain.

4. Methodological aspects

4.1. Sample

The sample employed in the empirical research comprises all the Spanish commercial banks, savings banks and credit cooperatives included in the Bankscope database during the period 2000-2007 with information available for every one of the variables analysed. However, those entities that presented abnormal ratios or extreme values were eliminated from the sample as outliers. Once this filtering was completed, the final sample consisted of 408 observations, of which 117 correspond to commercial banks, 260 to savings banks and 31 to credit cooperatives. Table 2 shows the number of entities that comprise the sample for each of the years included in the investigated time span.

In order to research a more homogenous sample, the analysis focuses exclusively on those entities authorised by the Bank of Spain to capture funds from the public. However, as stated in the preceding Section, these entities account for almost all issues in the Spanish securitisation market.

Furthermore, the time frame considered is sufficiently long for a longitudinal analysis, but not long enough for significant structural changes to have taken place. This period also coincides with a substantial expansion of the securitisation activity in Spain, encouraged by a change in the regulation that, almost until the end of the 1990's, did not allow the securitisation of all types of assets. For that reason, this study focuses on the period from 2000 to 2007 (the latest year available in Bankscope at the time of the study).

Finally, the data on the securitisation activity undertaken by the entities considered in the period of the analysis are obtained from the documents that the various entities issuing securitisation programs are compelled by law to deposit with the Spanish National Securities Market Commission (CNMV)[9]. In table 3, it can be seen that the percentage of Spanish banks that securitise has increased considerably in this decade, increasing from 29.1% in 2000 to more than 90% in 2007. Sorting by type of entity, it is the savings banks that securitise most: seven of every ten have undertaken some securitisation program during these eight years, whereas only half of the commercial banks and credit cooperatives have made use of this financial technique.

4.2. Definition of variables

The primary objective of this study is to determine what factors have been decisive in the development of Spanish banking securitisation in the period 2000-2007. To this end, a series of specific characteristics of the financial entities (explanatory variables) have been identified; our objective was to capture, among those factors referred to in the literature, the primary motivations (see Section 2).

Dependent variable

For each year considered, it is determined whether a bank in our data set has securitised assets. Therefore, the dependent variable can take one of two values:

1 if the financial entity has acted as originator in at least one securitisation transaction or
0 if there has been no securitisation activity.

Explanatory variables

Three motivations have regularly been put forth in the literature as being responsible for the securitisation activity of the banks: the search of new sources of financing or liquidity, the

[9] Information obtained from the web page of the CNMV (www.cnmv.es). Data on synthetic securitisation are not collected.

transfer of credit risk and arbitration of regulatory capital. A fourth factor has been added to the list that refers to improvement of the performance measures of the entity, as well as a set of control variables. All of these variables are in accord with those put forward in similar studies (see table 5). That is, whether an entity securitises or not is a function of liquidity, credit risk, regulatory capital, performance, and the control variables.

A) Liquidity (or funding):

Following the line established in earlier studies, this study considers three variables as *proxies* of the liquidity factor:

- (1) Interbank Ratio: This is defined as the percentage ratio of money lent to other banks divided by money borrowed from other banks. If this ratio is greater than 100, it indicates that the bank is a net placer rather than a borrower of funds in the market, and therefore it is more liquid.
- (2) Net Loans/Deposits & S.T. funding: This liquidity ratio indicates the relationship between loans and deposits as a percentage. The higher this ratio, the less liquid the bank will be.
- (3) Liquid Assets/Deposits & S.T. funding: This is a deposit run-off ratio and expresses the percentage of sudden customer and short term fund withdrawals that could be met. The higher the ratio, the more liquid and less vulnerable the entity will be to a classic run on the bank.

In theory, one would expect a financial entity to be more predisposed to securitise part of its portfolio when the assets of the entity are less liquid. It would be precisely this lack of liquidity that would motivate banks to seek new sources of financing in the securitisation market.

B) Credit risk

The second group of variables is intended to measure the risk profile of the financial entity. This will help determine whether the Spanish banks have employed securitisation as a way of transferring part of their credit risk. If this were the case, the banks with assets of lower quality should show a greater securitisation activity.

Two variables have been chosen for this:

- (4) Loan Loss Reserve/Gross Loans: This ratio indicates how much of the total loan portfolio is covered by the entity's current reserves. It is a reserve for losses expressed as a percentage of total loans. Given a similar charge-off policy, a higher ratio corresponds to a lower quality loan portfolio.
- (5) Non-performing Loans/Gross Loans: This is a measure of the amount of total doubtful loans (as a percentage). Lower ratios correspond to better asset quality.

C) Regulatory Capital Arbitrage

Logically, the less regulatory capital a financial entity holds, the greater is its incentive to securitise its assets. The variables employed to measure the relationship between securitisation and the hypothesis of arbitrage of the regulatory capital include the following:

- (6) Capital Adequacy Ratio: This ratio is the total capital adequacy ratio under the Basle rules. It measures Tier 1 + Tier 2 capital, which includes subordinated debt, hybrid capital, loan loss reserves and the valuation reserves as a percentage of risk weighted assets and off balance sheet risks. This ratio should be at least 8%.
- (7) Equity/Total Assets: As equity is a cushion against asset malfunction, this ratio measures the amount of protection afforded to the bank by the equity invested in it. The higher the ratio, the better protected the entity is.

D) Performance

To address performance, a series of relative variables has been identified to monitor the effect of efficiency improvement as a motivator of the bank in its propensity to securitise:

- (8) Return On Assets (ROA): This is perhaps the most important single ratio in comparing the efficiency and operational performance of banks. The ratio considers the returns generated from the assets financed by the bank.
- (9) Return On Equity (ROE): The return on equity is a measure of the return on shareholder funds. Obviously, the higher this figure is, the better, but one should be careful in weighting this ratio too heavily in an analysis, as it may be high at the expense of an over-leveraged balance sheet.

- (10) Cost to Income Ratio (CIR): This ratio is currently one of the most focused on. It measures the overheads or costs of running the bank, the major element of which is normally salaries, as a percentage of income generated before provisions.

Previously published studies have not found conclusive results based on these variables. Agostino and Mazzuca (2008) found that a negative effect on the financial entity's performance indicators would be expected (i.e., the higher its ROA and/or ROE, or the lower its CIR ratio, the lower the probability of the entity deciding to securitise loans). Thus, the need to improve the bank's overall financial efficiency or performance is considered a possible causal factor of banking securitisation. However, Bannier and Hänsel (2008) argue, based on the risk-appetite argument, that banks with relatively superior performance should be particularly active in loan securitisation.

E) Control Variables

For control purposes, some general characteristics of the originating firm have been included in the analysis as additional regressors. First, the impact of firm size is analysed; it is measured as the log of the entity's total assets ((11) firm size). This variable is expected to be positive, as scaling economics follow from the fixed costs of setting up a securitisation program.

Second, two dummy variables are included to identify commercial banks and savings banks, respectively ((12) bank type). This allows an evaluation of whether the character of the entity influences the decision to securitise assets.

Last, year difference effects are controlled for by including a dummy variable for each year considered in the analysis ((13) year).

Table 5 summarises the explanatory variables and their expected signs considered in the present study.

4.3 Methodology

As a first approximation, a univariate analysis of the sample was performed. This yielded the principal descriptive statistics of the explanatory variables and is intended to indicate the main differences between the two groups studied. This preliminary study was followed by a multivariate analysis, which explores the possible causal relationship between the probability of securitising and the explanatory variables to be isolated. For this analysis, a logistic regression model was chosen.

Logistic regression (also known as the logistic model)[10] is a form of regression used when the dependent variable is dichotomous (in this case, to securitise or not) and the independent variables are of any type. It is normally employed when trying to obtain a function to predict whether an observation belongs to a particular group or when trying to analyse the influence of a series of independent variables on the dependent variable (in our case, the bank's characteristics that may influence its decision to securitise or not).

The logistic equation is:

$$Z_{i,t} = b_0 + b_1 \cdot Interbank\ Ratio_{i,t-1} + b_2 \cdot Loans/D\&ST_{i,t-1} + b_3 \cdot Liquid\ A/D\&ST_{i,t-1} + b_4 \cdot LL\ Reserve/Gross\ L._{i,t-1} + b_5 \cdot Non\text{-}perf.\ L/Gross\ L_{i,t-1} + b_6 \cdot Capital\ Ratio_{i,t-1} + b_7 \cdot Equity/TA_{i,t-1} + b_8 \cdot ROA_{i,t-1} + b_9 \cdot ROE_{i,t-1} + b_{10} \cdot CIR_{i,t-1} + b_{11} \cdot Size_{i,t-1} + b_{12} \cdot Bank\ Type_{i,t} + b_{13} \cdot Year_{i,t} + \varepsilon_{i,t} \quad [1]$$

Here, $Z_{i,t}$ is the log odds of the dependent variable for the i^{th} case in the t^{th} period, b_0 is a constant, and the *"b"* terms are the logistic regression coefficients, also called parameter estimates.

To avoid potential problems of endogeneity, all bank-specific variables enter into the regression equation staggered by one period.

The relationship between Z_i and the probability of securitising (π_i) for the i^{th} case is described by the link function

$$\pi_i = \frac{1}{1 + e^{-Z_i}} \quad [2]$$

[10] An alternative to logistic regression analysis is probit analysis. These two analyses are very similar to one another. While logistic analysis is based on log odds, probit uses the cumulative normal probability distribution. Both produce similar results in this case. The probit analysis is available upon request.

5. Results

5.1. Univariate analysis

Table 6 shows a first order descriptive analysis of the sample divided into two groups: banks that have undertaken a securitisation program during the time period considered and banks that have not (263 against 145).

The variables selected as indicators of liquidity, namely the (1) Interbank Ratio, (2) Net Loans/ Deposits & Short-term funding, and (3) Liquid Assets/ Deposits & Short-term funding, evolve in the expected direction. Banks that securitise assets have a lower interbank ratio (133.05% vs. 136.18%); this would indicate that the financial entity resorting to securitisation is a net borrower of funds in the interbank market and is therefore seeking to improve its financial position. Also, the mean percentage of loans relative to deposits and other short term financing is 97.67% for banks that securitise, compared with 75.96% for those that do not. Similarly, liquid assets make up 14.87% of short-term bank financing for entities that securitise as opposed to 23.84% for entities that don't. All these variables seem to indicate that, on average, the banks that resort to securitisation present lower liquidity than those that do not.

The ratios employed to measure the bank's credit risk, namely, (4) Loan Loss Reserve/Gross Loans, and (5) Non-performing Loans/Gross Loans, yield different results. While the former is slightly higher for financial entities that securitise assets (2.00% vs. 1.95%), the Non-performing Loans/Gross Loans ratio does not yield the expected results (0.95% for banks that securitise compared to 1.04% for those that do not). One would expect that this last ratio would be higher in banks that develop securitisation programs, which would imply that securitisation is used as a way to transfer credit risk. The subsequent analyses will confirm whether this variable has statistical significance.

The univariate analysis also shows that banks using securitisation present, on average, lower capital ratios than those that do not (11.64% vs. 12.82%). However, both cases are significantly higher than the minimum 8% required by the Basel capital agreements. Also, equity constitutes a smaller percentage of the total assets of the entities that have chosen to securitise assets.

All three variables measuring banking efficiency or performance (ROA, ROE and CIR) show worse mean results for the group of banks that securitise. This could indicate that some financial entities have decided to resort to securitisation as a way to improve their ratios of performance.

Finally, the mean size of the banks that securitise, measured as the log of its total assets, is only slightly lower than that of those banks that do not do so (15.58 vs. 15.71), although the statistical range is very high in both cases.

Next, a study of the variance (ANOVA) was carried out to determine whether the differences found in the mean values of the variables analysed are statistically significant[11].

At the univariate level, four of the considered variables show a significantly different behaviour in those financial entities that have undertaken a securitisation program versus those that have not done so (see table 7). Those four variables are:

- (2) Net Loans/Deposits & Short-term funding
- (3) Liquid Assets/Deposits & Short-term funding
- (6) Capital Adequacy Ratio
- (10) Cost to Income Ratio (CIR)

In summary, at the univariate level, significant differences seem to exist in the mean levels of liquidity (variables (2) and (3)), regulatory capital (variable (6)), and banking efficiency (variable (10)) between the banks that securitise and those that do not. On average, those financial entities that securitise present lower liquidity, lower capital ratios, and lower performance.

5.2. Multivariate analysis

Having carried out the initial univariate analysis, we next apply a logistic regression model; first, however, we perform an analysis of multicolinearity between the independent

[11] The basis of ANOVA is the partitioning of sums of squares into between-group and within-group. These calculations are used via the Fisher statistic (F) to analyse the null hypothesis. The null hypothesis states that there are no differences between means of different groups, suggesting that the variance of the within-group samples should be identical to that of the between-group samples (resulting in no between-group discrimination capability).

variables previously selected. A study of the matrix of correlations indicates that the coefficients of bivariate correlation are all close to zero, except for those between ratio (8) ROA and the variables (7) Equity/Total Assets and (9) ROE. This dependence was subsequently confirmed by the analysis of multicolinearity. The Variance Inflation Factor (VIF) of these variables is close to 10 for all of them, and in the case of the ROA ratio, it reaches a value of 14.462[12]. As a result, this ratio has been eliminated from the analysis, leading to a substantial improvement of all the VIFs of the independent variables, whose values are now below 2 and, in the majority of cases, close to 1[13].

Once the multicolinearity had been dealt with, the logistic model could then be determined. Table 8 reflects the results of applying the logistic regression to the sample of banks (model 1). Of the set of variables considered in the study, five[14] (two ratios of bank's liquidity and ratios of performance, size, and bank type) present statistical significance[15]:

- (1) Interbank Ratio
- (2) Net Loans/Deposits & Short-term funding
- (10) Cost to Income Ratio (CIR)
- (11) Size
- (12) Bank Type

The signs of the coefficients[16] confirm the expectations. Thus, one would expect a greater likelihood of securitisation by a bank when the Interbank ratio is lower or when the proportion of the entity's loans that are financed with deposits and other short-term debt (less liquidity) is higher. On the other hand, a high Cost to Income ratio could motivate the bank to securitise part of its portfolio of assets with the object of improving its profitability.

The Exp(b)[17] of the (10) CIR variable is equal to 1.119; it can thus be stated that when this ratio increases by one unit, the odds that a bank will opt to securitise increase by a factor of 1.119, when other variables are controlled. This leads to a new conclusion: of the three ratios with statistical significance, it is the CIR ratio that appears to exert the most influence on the probability that a bank will securitise.

On the other hand, the fact that the financial entity is a savings bank seems to have a positive influence on the probability that the entity will opt to securitise assets. This is an expected result, since 70% of the Spanish savings banks undertook securitisation programs in the period studied, compared with only 50% of commercial banks and credit cooperatives. Also, the logistic model seems to indicate that large banks are more disposed to securitise than smaller ones.

Using securitisation as a mechanism for transferring credit risk is not a relevant factor over the period considered. This could be because the Spanish banks have been retaining an increasingly larger share of the risks associated with securitisation (the "originate-to-hold" as opposed to the "originate-to-distribute" model of securitisation).

Finally, the hypothesis of arbitrage in regulatory capital is not confirmed by the logistic model.

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[12] The Variance Inflation Factor (VIF) measures the impact of colinearity among the variables in a regression model. The VIF shows us how much the variance of the coefficient estimate is being inflated by multicolinearity. The square root of the VIF tells you how much larger the standard error is, compared with what it would be if that variable were uncorrelated with the other X variables in the equation. A commonly given rule of thumb is that VIFs of 10 or higher (or equivalently, tolerances of .10 or less) are often regarded as indicating multicolinearity. In weaker models, even values above 2.5 may be a cause for concern.

[13] This absence of multicolinearity was corroborated by analyzing the Index of Condition.

[14] Statistical significance was also found for the years included in the analysis as dummy variables.

[15] The Wald statistic is an alternative test commonly used to test the significance of individual logistic regression coefficients for each independent variable (that is, to test the null hypothesis in logistic regression that a particular logit (effect) coefficient is zero).

[16] Parameter estimates (b coefficients) associated with explanatory variables are estimators of the change in the logit caused by a unit change in the independent variable. The b coefficients vary between plus and minus infinity, with 0 indicating that the given explanatory variable does not affect the logit (that is, it makes no difference to the probability of securitising). Positive or negative b coefficients indicate that the explanatory variable increases or decreases the logit of the dependent variable, respectively.

[17] Exp(b) is the odds ratio. The odds ratio is the natural log (base e) of the exponent, b, where b = the parameter estimate. For continuous variables, the odds ratio represents the factor by which the odds (event) change for a one-unit change in the variable. An Exp(b)>1 means the independent variable increases the logit and therefore increases odds (event). If Exp(b) = 1.0, the independent variable has no effect. If Exp(b) is less than 1.0, then the independent variable decreases the logit and the odds (event).

5.3. Results according to the characteristics of the underlying portfolio

As reported in Section 3, most of the securitisation programs undertaken in Spain have mortgage loans as underlying assets, with the securitisation of other assets, such as commercial loans or consumer credits, accounting for a much smaller fraction. In any case, the securitised portfolios consist of large numbers of assets of relatively low individual value with similar risk profiles (ABS-transactions).

However, a significant percentage of the total securitisation carried out in Spain (approximately 20% of the total) consists of securitising liabilities issued by credit entities. The great majority of these involve *mortgage certificates or bonds*[18], although operations have also been carried out with subordinated debt and treasury bonds. In a high percentage of cases, these involve structures of the CDO type. By definition, the securitisation of liabilities cannot be used to transfer the rights and risks associated with the assets. Therefore, one would expect that the transfer of credit risk would not be a motivating factor in this type of transaction; in contrast, it could be expected to motivate ABS transactions.

To check the validity of this starting hypothesis, the original sample has been broken down into two non-exclusive subgroups to look for differences in the behaviour of the financial entities depending on the type of securitisation program undertaken (of assets versus liabilities).

The results obtained from this logistic regression model to the two types of securitisation indicated are given in table 9 (models 2 and 3).

In this analysis, determining factors when securitising assets continues to be the objective of greater liquidity (ratio (2) Loans/Deposits & ST debt) and improved performance (ratio (10) CIR), as confirmed. However, the principal and, indeed, sole motivation appears to be the search for an improved liquidity in the case of the securitisation of liabilities (ratios (1) Interbank Ratio and (2) Loans/Deposits & ST debt).

In reality, the securitisation of liabilities constitutes an alternative way of placing these liabilities on the market. The reason is that securitisation, by means of the subordination of the securities issued (the tranche structure), can obtain the maximum credit rating (AAA) for almost the whole of the issue, bettering in many cases the credit rating of the originating credit entity itself.

The transfer of credit risk remains an irrelevant factor for explaining the undertaking of securitisation programs by the Spanish banks. None of the variables used to measure the bank's credit risk show statistical significance in both types of programs. While this would be expected in the securitisation of liabilities by means of CDO-type structures, it would not necessarily be expected in the case of securitisation of assets (ABS transactions). This would again suggest that Spanish banks have opted for an "originate-to-hold" model, as opposed to the "originate-to-distribute" model of securitisation.

Besides, the hypothesis of arbitrage in the regulatory capital is not confirmed in either model, which seems to definitively discount the notion that securitisation may have been employed by the Spanish banks as a way of arbitraging regulatory capital.

Finally, the type of financial entity is shown to be relevant when a securitisation program is undertaken. The savings banks have a greater propensity than the commercial banks to opt for the securitisation of liabilities.

5.4 Analyses of robustness

Several analyses have been carried out to assess the robustness of the results obtained.

First, with respect to the variables employed as regressors, the previous models (models 2 and 3) were re-estimated in order to retest those hypotheses for which statistical significance was not found. To this end, the Non-performing Loans/Gross Loans ratio was replaced by the Loan Loss Provisions/Net Interest Income ratio as proxy for the measurement of credit risk of the financial entities (models 4 and 5). This latter ratio has been employed previously by authors such as Bannier and Hänsel (2008) and measures the relationship between the provisions in the profit and loss account and the interest income over the same period. Ideally, this ratio should be as low as possible, and in a well-run bank, if the lending book presents higher risk, this should be reflected by higher interest margins. In the same way, the Tier 1 ratio was employed in place of the capital ratio as a proxy variable to analyse the possible utilisation of securitisation as a mechanism for arbitraging regulatory capital

[18] These are covered bonds issued by Spanish financial institutions and collateralised by mortgage loans.

(models 6 and 7). This ratio has frequently been employed in previously published studies to measure the relationship between securitisation and the hypothesis of arbitration of regulatory capital (for example, by Agostino and Mazzuca, 2008; Bannier and Hänsel, 2008 and Calomiris and Mason, 2004). This ratio is shareholder funds plus perpetual non-cumulative preference shares as a percentage of risk-weighted assets and off-balance sheet risks measured under the Basle rules, and it should be at least 4%. In both cases, the results do not differ from those obtained previously, thus again confirming the irrelevance of the two hypotheses that the transfer of credit risk and the arbitrage of regulatory capital are factors in the securitisation activity of Spanish banks (see Table 10).

Second, the method used to select variables has been modified, utilising a forward conditional stepwise method (models 8 and 9). The forward stepwise logistic regression method determines automatically which variables to add from the model, starting with the constant-only model and adding variables one at a time until reaching the step at which all variables not in the model have a significance, in this case, higher than 0.05. In comparison with the previous models, the most striking difference occurs in the variables that determine the ABS-type securitisation, where the ratio (7) Equity/Total Assets appears with statistical significance, although with a different sign from that which would be expected (see model 8). According to this, the more solvent financial entities would be more inclined to securitise their assets. This "reverse" regulatory arbitrage effect has also been observed by Bannier and Hänsel (2008) in the European market.

Finally, a third test of robustness was carried out to evaluate the method of estimation used in the analysis. Because panel data are involved, the model can be estimated with fixed or random effects. Fixed effects models assume that the unobserved variables differ between banks but are constant over time for the same bank. In fact, this effect has been introduced in the analysis by establishing a set of dummy variables to account for time. However, it could be that certain unobserved characteristics of the financial entities differ over time and may be relevant in explaining the undertaking of securitisation programs by these financial entities. In this case, we can control for this possibility by employing random effects. Again, the results after using a random effects logistic regression model (models 10 and 11) do not differ from those obtained previously with the base models. They coincide both in the explanatory variables and in their sign, although some loss of statistical significance is noted (see Table 10).

6. Conclusions

Securitisation is a financial operation by which a financial entity transforms a non-negotiable asset, or right to payment/income flow, into a fixed-income instrument that is homogeneous, standardised and consequently tradable on organised securities markets. Recently, securitisation programs in Europe have grown exponentially in volume, from 78.2 billion euros in 2000 to 711.1 billion euros in 2008. Spain is the second largest securitisation market in Europe in terms of volumes issued.

The goal of this work is to learn more about what has motivated Spanish financial entities to carry out programs of securitisation and thus meet a need for empirical findings to contribute to the limited existing literature. In addition, with respect to earlier studies, this research study has explored differences between the financial entities that securitise assets and those that securitise liabilities, which is an aspect scarcely touched upon in the previous literature.

The results obtained confirm the hypotheses that liquidity and the search for improvements in efficiency are the determining factors that have motivated Spanish banks to undertake securitisation programs in the period 2000-2007. The hypotheses of transfer of credit risk and arbitrage in regulatory capital are not confirmed by the logistic regression model.

A more detailed analysis, differentiating between programs of asset and liability securitisation, reveals that the objective of seeking new sources of financing is a key factor in both types of programs. In fact, Spanish banks have employed the securitisation of liabilities in the period analysed for funding purposes only, without any of the other variables analysed having played any role in this case. The securitisation of liabilities by means of CDO-type structures is utilised, generally, by medium-sized savings banks that are able to indirectly group together their credits into a common fund. In this way, they can reach the minimum volumes necessary to participate in these markets.

The use of securitisation as a mechanism in the search for liquidity and, therefore, as a source of additional financing, has increased from the beginning of the current financial crisis in August 2007, although in a way different from how it has been used up until then. Thus, more and more entities have been seen to underwrite their own securitisation programs in order to use them as a guarantee for obtaining resources in the auctions of the European Bank Central (ECB). Similarly, securitised bonds are being utilised by some financial entities to obtain liquidity through the Financial Assets Acquisition Fund (FAAF), created in 2008 by the Spanish government in order to generate the liquidity necessary to allow banks to continue lending to the private residential property sector. Both practices have partially replaced the issue of debt, or the interbank market itself, as sources of finance to enable the banks to grant loans.

The transfer of credit risk is not a relevant factor in the ABS programs over the period of time considered. Unlike what is happening in other financial systems, particularly in the USA, Spanish banks have been retaining an increasingly larger share of the risks associated with securitisation (the "originate-to-hold" as opposed to the "originate-to-distribute" model of securitisation). Thus, since the *Circular* 4/2004 of the Bank of Spain came into effect in 2005 (a regulation tightening the criteria for permitting securitised assets to be eliminated from the balance sheets of the financial entities and stipulating that, for this to be done, there should be a substantial transfer of all the risks and profits associated with the securitised assets), the volume of operations in which the assets have been taken off-balance sheet has been relatively small.

On the other hand, the results obtained in this study suggest that the performance-improvement variables cannot be ignored as motivating factors of asset securitisation. The Spanish financial entities have sought to use asset securitisation as a means of improving their efficiency ratios.

Finally, although the normative development of Basel II in Spain, culminating with *Circular* 3/2008 of the Bank of Spain entering into effect in June 2008, imposes a much more restrictive treatment for financial entities attempting to reduce their capital requirements using securitisation programs, it does not seem likely that this will affect the future development of the market; our study has found that this variable has not been a key factor in the past.

The results obtained for the Spanish market coincide, in general, with those reported by previous studies. Bannier and Hänsel (2008) find that a European bank with a higher credit risk exposure, lower liquidity and worse performance measures is more likely to securitise. However, according to Agostino and Mazzuca (2008) and Martin-Oliver and Saurina (2007), the only motivation found to be a determining factor in securitisation is the search for new sources of bank financing in the Italian and Spanish markets, respectively.

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Table 1: Types of Securitisation

<table>
<tr><td>According to the term of the securities issued</td><td>According to the characteristics of the underlying portfolio:

Asset-Backed Securities (ABS)
(backed by portfolios of homogeneous assets comprising exposures to a large number of obligors)</td><td>Based on the underlying asset:
- Residential Mortgage-Backed Securities (RMBS)
- Commercial Mortgage-Backed Securities (CMBS).
- Other ABS (auto, credit card, leases, loans, receivables, and other)</td></tr>
<tr><td rowspan="2">Long term</td><td rowspan="2">

Collateralised Debt Obligations (CDOs)
(backed by heterogeneous exposures to a limited number of names)</td><td>Based on the underlying asset:
- Collateralized loan obligations (CLOs)
- Collateralized bond obligations (CBOs)
- Structured finance CDOs (such as CDOs of ABS).</td></tr>
<tr><td>According to the aim of the transaction:
- Balance-sheet CDOs.
- Arbitrage CDOs.</td></tr>
<tr><td>Short term</td><td colspan="2">Asset-Backed Commercial Paper (ABCP)</td></tr>
</table>

Table 2: Composition of the sample.

Year / Bank Type	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Commercial Banks	16	13	15	12	14	18	16	13	*117*
Savings Banks	37	36	31	32	31	36	33	24	*260*
Credit Cooperatives	2	4	4	3	5	6	6	1	*31*
TOTAL	*55*	*53*	*50*	*47*	*50*	*60*	*55*	*38*	***408***

Table 3: Number (and percentage) of entities comprising the sample that have securitised assets.

Year / Bank Type	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Commercial Banks	7 (43.8%)	6 (46.2%)	7 (46.7%)	5 (41.7%)	8 (57.1%)	8 (44.4%)	12 (75.0%)	11 (84.6%)	*64 (54.7%)*
Savings Banks	8 (21.6%)	16 (44.4%)	20 (64.5%)	26 (81.3%)	27 (87.1%)	32 (88.9%)	30 (90.9%)	23 (95.8%)	*182 (70.0%)*
Credit Cooperatives	1 (50.0%)	1 (25.0%)	0 (0.0%)	2 (66.7%)	3 (60.0%)	4 (66.7%)	5 (83.3%)	1 (100.0%)	*17 (54.8%)*
TOTAL	*16 (29.1%)*	*23 (43.4%)*	*27 (54.0%)*	*33 (70.2%)*	*38 (76.0%)*	*44 (73.3%)*	*47 (85.5%)*	*35 (92.1%)*	***263 (64.5%)***

Table 4: Bank-specific variables used in previous studies (in chronological order).

	Sample	Database	Model used	Bank-specifics variables				
				Liquidity or funding	**Credit Risk**	**Equity or Regulatory Capital**	**Others characteristics (performance, cost…)**	**Control Variables**
Calomiris and Mason (2004)	USA banks (1996)	Faulkner and Gray´s Card Industry Directory / Nilson Report	Univariate / OLS regression/ Probit / Tobit	- Cash and government securities/ on-balance-sheet assets	- Total loans greater than 90 days past due or in nonaccrual status/total assets - Standard deviation of total loans greater than 90 days past due or in nonaccrual status/total assets - Insured deposits/total deposits	- Tier 1 and 2 capital/managed assets - Tier 1 and 2 capital/on-balance-sheet assets - Growth of tier 1 and 2 capital over past year (log difference)	No	No
Minton, Sanders and Strahan (2004)	USA financial companies with publicly traded stock (1993-2002)	Compustat / Securities Data Corporation	Univariate / Probit / Tobit	No	- Asset Risk (firm's stock return volatility) - Firm's debt rating (dummy) - Leverage (Capital-Asset Ratio)	No	- Return on Equity (ROE) - Issuer's tax payments	- Size (market capitalization) - Originator Type (dummy)
Martín-Oliver and Saurina (2007)	Spanish banks (1999-2006)	Bank of Spain / Spanish Nacional Securities Market Commission	Probit / Tobit	- Credit Growth (high, medium and low) (dummy) - Loan/Deposits - Interbank (relative weight of the interbank liabilities)	- Non-performing Loan Ratio - Non-performing Mortgage Ratio - Concentration of the Loan Portfolio (Herfindahl-Hirshman Index)	- Solvency Ratio (quotient between capital and risk weighted assets)	- Average cost of liabilities	- Size (log of its total assets) - Weight of the mortgage portfolio - Bank Type (dummy) - Year (dummy)

Uzun and Webb (2007)	USA banks (2001-2005)	Call Reports	Univariate / Logistic Regression	No	No	- Total equity capital - Tier 1 capital - Total risk-based capital ratio - Tier 1 leverage ratio	No	- Size - Leverage (Loan Ratio) - Grow
Agostino and Mazzuca (2008)	Italian banks (1999-2006)	Bankscope / Talete Creative Finance	Probit	- Interbank Ratio - Net Loans/ Total Assets - Liquid Assets / Dep & ST Funding - Historical Cost - Leverage (Total Assets/ Total Equity) - Market Instruments Funding Ratio - Listing in Financial Markets (dummy)	No	- Tier 1 Ratio - Total Capital Ratio	- Return on Equity (ROE) - Return on Assets (ROA) - Net fees and Commissions Ratio - Interest bearing assets Ratio	- Size - Number of securitisations in previous years - Year (dummy)
Bannier and Hänsel (2008)	European banks (1997-2004)	Bankscope / Quarterly CDO Deal List by Standard and Poor's / European Securitization Deal List by Computershare Fixed Income Services Limited	Univariate / Logit	- Liquidity (money lent to other banks / money borrowed from other banks) - Low liquidity (decentile of banks with lowest liquidity) (dummy) - Low liquidity * liquidity	- Risk (Credit Risk Provision/ Net Interest Income) - High risk (decentile of banks with highest risk) (dummy) - High risk * risk - High risk * low tier 1 (dummy, stock-listed firms only) - Quality (gross interest income / gross outstanding accounts)	- Tier 1 Ratio - Low Tier 1 (decentile of banks with lowest tier 1 capital) (dummy) - Low tier 1 * tier 1 - Equity share (equity / total assets)	- Return on Equity (ROE) - Cost-Income Ratio (CIR) - Low performance (decentile of banks with highest CIR) (dummy) - Low performance * CIR - Tax	- Size (log of its total assets) - Business Variable - Year (dummy) - Country(dummy) - Bank Type (dummy)

Table 5: Explanatory variables employed in the analysis.

Explanatory Variables	Expected Sign
A) Liquidity (or funding)	
(1) Interbank Ratio	(-)
(2) Net Loans/Deposits & S.T. funding	(+)
(3) Liquid Assets/Deposits & S.T. funding	(-)
B) Credit Risk	
(4) Loan Loss Reserve/Gross Loans	(+)
(5) Non-performing Loans/Gross Loans	(+)
C) Capital Regulatory	
(6) Capital Adequacy Ratio	(-)
(7) Equity/Total Assets	(-)
D) Performance	
(8) Return On Assets (ROA)	(+/-)
(9) Return On Equity (ROE)	(+/-)
(10) Cost to Income Ratio (CIR)	(+/-)
E) Others	
(11) Firm size	(+)
(12) Bank Type (dummy)	---
(13) Year (dummy)	---

Table 6: Descriptive statistics of the variables.

		N	Range	5% percentile	95% percentile	Median	Mean		Std. Deviation
							Statistic	Std. Error	
NOT SECURITISED	(1) INTERBANK RATIO	145	983.89	3.74	532.05	76.26	136.18	14.64	176.27
	(2) LOANS/D & ST	145	160.20	3.25	114.96	81.19	75.96	2.66	32.00
	(3) LIQUID A./D & ST	145	94.12	1.65	63.64	21.80	23.84	1.49	17.95
	(4) LL RESERVE/GROSS L.	145	3.89	0.45	3.50	1.89	1.95	0.06	0.78
	(5) NON-PERF. L. /GROSS L.	145	2.73	0.24	2.24	0.89	1.04	0.05	0.58
	(6) CAPITAL RATIO	145	28.70	8.23	21.34	12.10	12.82	0.37	4.40
	(7) EQUITY/ T.A.	145	22.58	2.44	11.83	7.45	7.68	0.29	3.54
	(8) ROA	145	4.80	0.23	1.86	0.88	0.92	0.05	0.64
	(9) ROE	145	29.32	4.44	20.47	12.82	12.92	0.40	4.78
	(10) CIR	145	83.36	23.38	75.47	57.39	55.82	1.20	14.43
	(11) SIZE (LN Assets)	145	11.09	13.70	18.29	15.61	15.71	0.13	1.56
SECURITISED	(1) INTERBANK RATIO	263	815.03	8.14	525.03	86.98	133.05	9.24	149.89
	(2) LOANS/D & ST	263	161.35	64.77	135.59	96.27	97.67	1.40	22.69
	(3) LIQUID A./D & ST	263	58.83	2.05	36.39	12.74	14.87	0.71	11.48
	(4) LL RESERVE/GROSS L.	263	3.63	1.48	2.84	1.94	2.00	0.03	0.41
	(5) NON-PERF. L. /GROSS L.	263	3.38	0.37	1.99	0.83	0.95	0.03	0.52
	(6) CAPITAL RATIO	263	13.90	9.10	14.20	11.60	11.64	0.10	1.67
	(7) EQUITY/ T.A.	263	20.55	4.93	10.54	7.15	7.57	0.13	2.10
	(8) ROA	263	3.40	0.52	1.55	0.84	0.86	0.02	0.37
	(9) ROE	263	28.57	6.86	18.67	11.48	12.22	0.25	3.98
	(10) CIR	263	64.59	42.22	69.92	58.69	57.94	0.51	8.26
	(11) SIZE (LN Assets)	263	12.84	9.51	18.61	15.98	15.58	0.15	2.42

Table 7: Analysis of Variance (ANOVA).

Variables		Sum of Squares	df	Mean Squares	F	Sig.
(1) INTERBANK RATIO	Between Groups	913.839	1	913.839	0.036	0.850
	Within Groups	1.036E+07	406	25517.957		
	Total	1.036E+07	407			
(2) LOANS/D & ST	Between Groups	44034.845	1	44034.845	63.322	0.000***
	Within Groups	282335.483	406	695.408		
	Total	326370.328	407			
(3) LIQUID A./D & ST	Between Groups	7513.045	1	7513.045	37.668	0.000***
	Within Groups	80978.505	406	199.454		
	Total	88491.550	407			
(4) LL RESERVE/GROSS L.	Between Groups	.288	1	0.288	0.884	0.348
	Within Groups	132.498	406	0.326		
	Total	132.786	407			
(5) NON-PERF. L. /GROSS L.	Between Groups	.766	1	0.766	2.615	0.107
	Within Groups	118.872	406	0.293		
	Total	119.638	407			
(6) CAPITAL RATIO	Between Groups	130.839	1	130.839	15.102	0.000***
	Within Groups	3517.553	406	8.664		
	Total	3648.393	407			
(7) EQUITY/ T.A.	Between Groups	1.072	1	1.072	0.147	0.702
	Within Groups	2961.978	406	7.296		
	Total	2963.050	407			
(8) ROA	Between Groups	0.398	1	0.398	1.690	0.194
	Within Groups	95.478	406	0.235		
	Total	95.876	407			
(9) ROE	Between Groups	45.667	1	45.667	2.493	0.115
	Within Groups	7438.296	406	18.321		
	Total	7483.963	407			
(10) CIR	Between Groups	421.492	1	421.492	3.576	0.059*
	Within Groups	47850.961	406	117.860		
	Total	48272.453	407			
(11) SIZE (LN Assets)	Between Groups	1.586	1	1.586	0.343	0.559
	Within Groups	1879.959	406	4.630		
	Total	1881.545	407			

*** Significance at the 1%-level.
** Significance at the 5%-level.
* Significance at the 10%-level.

Table 8: Determinants of asset securitisation for Spanish Banks (2000-2007).

Model 1

Variables	b	Std. Error	Wald	Exp(b)
(1) INTERBANK RATIO	-0.002**	0.001	5.354	0.998
(2) LOANS/D & ST	0.049***	0.010	22.798	1.050
(3) LIQUID A./D & ST	0.014	0.016	0.794	1.014
(4) LL RESERVE/GROSS L.	0.263	0.292	0.809	1.301
(5) NON-PERF. L. /GROSS L.	-0.519	0.320	2.628	0.595
(6) CAPITAL RATIO	-0.002	0.063	0.001	0.998
(7) EQUITY/ T.A.	-0.052	0.062	0.712	0.949
(9) ROE	0.113	0.047	5.783	1.120
(10) CIR	0.112***	0.019	33.425	1.119
(11) SIZE (LN Assets)	0.330***	0.122	7.326	1.391
(12a) COMMERCIAL B.	-0.058	0.602	0.009	0.944
(12b) SAVING B.	0.904*	0.519	3.036	2.469
Constant	-12.674***	2.717	21.752	0.000
Year dummy	Yes			
N securitise (N not securitise)	263 (145)			
Log likelihood	-357.046			
Likelihood ratio χ^2	173.942***			
Pseudo-R^2 (Nagelkerke)	0.477			

Notes: The dependent variable equals one if a financial entity completes a securitisation transaction and zero otherwise. *** Significance at the 1%-level. ** Significance at the 5%-level. * Significance at the 10%-level.

Table 9: Determinants of asset securitisation according to the characteristics of the underlying portfolio (2000-2007)

	Model 2[1] (ABS)		Model 3[2] (Liabilities CDO)	
Variables	**b**	**Exp(b)**	**b**	**Exp(b)**
(1) INTERBANK RATIO	-0.001 (0.001)	0.999	-0.003*** (0.001)	0.997
(2) LOANS/D & ST	0.037*** (0.008)	1.038	0.036*** (0.010)	1.036
(3) LIQUID A./D & ST	0.003 (0.015)	1.003	0.015 (0.022)	1.015
(4) LL RESERVE/GROSS L.	0.209 (0.291)	1.232	0.178 (0.406)	1.195
(5) NON-PERF. L. /GROSS L.	-0.461 (0.294)	0.631	-0.128 (0.407)	0.880
(6) CAPITAL RATIO	0.014 (0.057)	1.015	-0.053 (0.087)	0.948
(7) EQUITY/ T.A.	-0.073 (0.060)	0.929	0.033 (0.080)	1.034
(9) ROE	0.062 (0.043)	1.064	0.131 (0.050)	1.140
(10) CIR	0.076*** (0.017)	1.079	0.040 (0.022)	1.041
(11) SIZE (LN Assets)	0.458*** (0.110)	1.581	-0.544*** (0.157)	0.580
(12a) COMMERCIAL B.	-0.450 (0.540)	0.637	1.322 (1.184)	3.750
(12b) SAVING B.	-1.158** (0.460)	0.314	5.119*** (1.130)	167.243
Constant	-9.164*** (2.241)	0.000	-6.353* (3.301)	0.002
Year dummy	Yes		Yes	
N securitise (N not securitise)	185 (223)		150 (258)	
Log likelihood	-433.670		-285.675	
Likelihood ratio χ^2	128.394***		251.001***	
Pseudo-R^2 (Nagelkerke)	0.361		0.628	

Notes: [1]The dependent variable equals one if a financial entity completes an ABS-transaction and zero otherwise. [2]The dependent variable equals one if a financial entity completes a Liabilities CDO-transaction (mainly CDO of *cédulas hipotecarias*) and zero otherwise. The Standard Error is reported in parentheses. *** Significance at the 1%-level. ** Significance at the 5%-level. * Significance at the 10%-level.

Table 10: Analyses of robustness.

	ABS[1]				Liabilities CDO[2]			
Variables	**Model 4[3]**	**Model 6[4]**	**Model 8[5]**	**Model 10[6]**	**Model 5[3]**	**Model 7[4]**	**Model 9[5]**	**Model 11[6]**
(1) INTERBANK RATIO	0.000	0.000	---	-0.002	-0.003***	-0.003***	-0.002***	-0.002*
	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(2) LOANS/D & ST	0.030***	0.034***	0.039***	0.031***	0.040***	0.036***	0.024***	0.046***
	(0.008)	(0.009)	(0.006)	(0.008)	(0.010)	(0.010)	(0.006)	(0.017)
(3) LIQUID A./D & ST	0.003	0.013	---	0.012	0.012	0.013	---	0.017
	(0.015)	(0.016)		(0.014)	(0.022)	(0.022)		(0.022)
(4) LL RESERVE/GROSS L.	-0.300	0.089	---	-0.259	0.332	0.196	---	0.143
	(0.264)	(0.297)		(0.268)	(0.361)	(0.419)		(0.387)
(5) NON-PERF. L. /GROSS L.	---	-0.512	---	-0.491	---	-0.109	---	-0.118
		(0.295)		(0.294)		(0.406)		(0.403)
(5) LOAN L. PROV. /NET INT. INC.	0.062	---	---	---	-0.060	---	---	---
	(0.022)				(0.029)			
(6) CAPITAL RATIO	0.037	---	---	0.037	-0.073	---	---	-0.102
	(0.055)			(0.054)	(0.089)			(0.105)
(6) TIER 1	---	-0.107	---	---	---	-0.019	---	---
		(0.065)				(0.081)		
(7) EQUITY/ T.A.	-0.056	0.007	-0.091**	-0.068	0.034	0.024	---	0.074
	(0.060)	(0.067)	(0.045)	(0.059)	(0.080)	(0.091)		(0.088)
(9) ROE	0.087	0.057	---	0.148	0.125	0.133	---	0.012
	(0.044)	(0.043)		(0.043)	(0.051)	(0.050)		(0.051)
(10) CIR	0.076***	0.069***	0.049***	0.075**	0.045	0.040	---	0.023
	(0.017)	(0.017)	(0.012)	(0.017)	(0.021)	(0.022)		(0.021)
(11) SIZE (LN Assets)	0.412***	0.395***	---	0.418***	-0.467**	-0.543***	---	-0.496***
	(0.111)	(0.115)		(0.110)	(0.161)	(0.167)		(0.192)
(12a) COMMERCIAL B.	-0.575	-0.582	0.967***	-0.393	1.367	1.346	---	1.311
	(0.543)	(0.547)	(0.269)	(0.541)	(1.178)	(1.183)		(1.181)
(12b) SAVING B.	-1.229***	-1.247***	---	-1.192**	5.211***	5.086***	3.569***	5.249***
	(0.465)	(0.463)		(0.464)	(1.113)	(1.130)	(0.399)	(1.129)
Constant	-8.914***	-7.118***	-6.100***	-9.810***	-6.776**	-6.830**	-4.391***	-6.950**
	(2.262)	(2.343)	(1.114)	(2.104)	(3.248)	(3.360)	(0.773)	(3.007)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N securitise (N not securitise)	185 (223)				150 (258)			
Log likelihood	-428.178	-430.762	-490.430	-429.600	-281.307	-286.008	-314.711	-283.918
Likelihood ratio χ^2	133.886***	131.301***	71.634***	132.464***	255.369***	250.669***	221.965***	252.758***
Pseudo-R^2 (Nagelkerke)	0.374	0.368	0.215	0.371	0.636	0.627	0.574	0.631

Notes: [1]The dependent variable equals one if a financial entity completes an ABS-transaction and zero otherwise. [2]The dependent variable equals one if a financial entity completes a Liabilities CDO-transaction (mainly CDOs of *cédulas hipotecarias*) and zero otherwise. [3]Models 4 and 5 include the Loan Loss Provisions/Net Interest Income ratio, in place of the Non-performing Loans/Gross Loans ratio. The rest of the variables remain the same. [4]Models 6 and 7 consider the Tier 1 ratio in place of the Capital ratio. The rest of the variables remain the same. [5]Models 8 and 9 employ a forward conditional stepwise method for the selection of variables. [6]Models 10 and 11 have been estimated using a random effects logistic regression model. The Standard Error is reported in parentheses. *** Significance at the 1% level. ** Significance at the 5% level. * Significance at the 10% level.