

**The effects of securitization on banks' performance.  
Evidence from Italy**

**FRANCESCA BATTAGLIA**

Università di Napoli "Parthenope", francesca.battaglia@uniparthenope.it

**MARIA MAZZUCA**

Università della Calabria, maria.mazzuca@unical.it

## 1. Introduction

During the last decade credit securitization has impressively developed in Italy. Theory and empirical literature have investigated many issues related to this topic, such as its capacity to contribute to achieve capital arbitrage (Calomiris and Mason, 2004) or its efficacy as a risk management technique (Cantor and Rouyer, 2000). Notwithstanding, not only many questions are still open but also we notice that Italian market has not been sufficiently studied. Furthermore, in recent months, the interest of academics, practitioners and regulators towards this financial technique has increased due to the financial crisis (started in subprime mortgages sector in United States). Already in these few considerations, it can be found the potential for this paper that is focused on the effects of securitizations on Italian bank's performance. This study aims to deeper investigate the real value and consequences of credit securitization. We believe that yet it is not clear the contribution that this technique provides not only in macroeconomic terms, but also in the microeconomic ones, that are most closely observed in this study. Our findings could have huge implications for banks management as well as for regulators.

This paper aims to test whether securitization leads to beneficial effects for the originator bank by increasing its performance, measured in terms of profitability and risk. We intend to answer to the following research questions:

- 1) whether the securitization leads to wealth effects for the bank's profitability (and consequently it can create value, not only for stockholders);
- 2) which effects the securitization produces in terms of banks' risk.

The idea that in analyzing the performance of a bank (as well as of any other company) we can not focus solely on profitability is largely shared by the regulators (ECB, 2010). In this sense, precisely in relation to the issues raised by the financial crisis, the scientific debate is about the concept of sustainable profitability. From this discussion, we believe that two main instances arise. The first concerns the opportunity to find new indicators to capture the different aspects/dynamics of the bank profitability. Among these profiles, a leading role is that regarding the risk, because the bank's performance valuation can not ignore the bank's risk profile. The second instance is instead linked to the need not to limit the investigation to the accounting-based measures of profitability, but to expand the use of market-based measures. Our analysis framework and the different performance measures used in this study are consistent with the above discussed instances.

We analyze the securitizing Italian banks from 2000 (after the introduction of the Italian Law on Loans securitization in 1999) to 2009. To test our research hypotheses, using different specifications and estimation methods, we adopt a multiple regression model, in which performance indicators are, in turn, linked to a set of regressors including a securitization dummy, a previous securitization dummy and a vector of control variables. We study the consequences of securitization on the profitability and the risk profile of the originators, both measured by traditional and more innovative indexes. To test the robustness of our results, we develop different estimates, by considering alternative variables and by using an ordered probit mode.

Early studies found different rationales for securitization positive effects for banks (as well as for companies operating in other sectors). Banks could use securitization to transfer/reduce risk, to free up equity or reducing capital requirements, to increase their portfolio diversification or their liquidity, to enhance their loans portfolio (Greenbaum and Thakor, 1987; Pavel and Phillis, 1987; Donahoo and Shaffer, 1991; Wolfe, 2000; DeMarzo, 2005; Agostino and Mazzuca, 2010). Empirical literature generally agree on the positive effects of securitization on banks profitability. By using the event study methodology, these wealth effects are signaled by the existence of abnormal returns as a consequence of securitization announcements (Lockwood et al., 1996; Thomas, 1999; Martinez-Solano et al., 2009). Lockwood et al. (1996), observing a sample of 294 public offering of securitized assets in U.S. during the period 1984-1992, focus on the wealth effects of announcements of asset securitization. By using the event study methodology, the authors demonstrate that the effects of the announcements are industry specific. When banks are considered, the study shows that banks realized wealth loss at the time of ABS announcement. Furthermore, they demonstrate that the wealth change is positively related to financial slack for banks and that strong (high financial slack) banks experienced significant wealth gain, whereas weak (low financial slack) banks experienced significant wealth loss. Thomas (1999) studies the wealth change of 236 securitizations carried out in U.S. during the period 1991-2006. The author analyses the abnormal returns and finds that securitization is wealth creating for stockholders, whereas is not wealth destroying for bondholders. These wealth effects are revealed to be larger for manufacturers than for banks and finance companies. Martinez-Solano et al. (2009) examine the reactions of the Spanish stock market to the announcement of securitization by listed banks during the period 1993-2004. Their results show the existence of significant excess returns on the day immediately following the notice of a securitization deal; results are robust to different tests conducted using different intervals around the event date. These findings are consistent with the idea that investors anticipate the potential benefits of the securitization in terms of free up equity, which allows banks to improve their profitability. Furthermore, consistently with the hypothesis of

Agostino and Mazzuca (2010), the excess returns are positively related to the number of previous securitizations (reputational effect) of the bank in this field. More recently, Casu et al. (2009) use a different approach to study the same problem. Using pre-crisis data and focusing on the period 2002-2007, the authors study the effects of securitization on U.S. bank holding companies employing a propensity score matching approach to compare the ex post (securitization) performance of securitizers banks to the performance of a counterfactual group of equivalent, but non-securitizers, banks. As indicators of banks performance the authors use the cost of funding (measured as interest expense/liabilities), some risk measures (such as non performing loans ratio or loan loss provision ratio), some operating performance measures (such as ROA or net interest margin). They do not provide evidence that securitization has a beneficial impact upon bank performance.

The relation between securitization and risk is not obvious. Via securitization banks should pass outside part of the risk embedded in their portfolios of assets. In this sense the ex post risk of the originating banks should be reduced. On the other hand, the ex post risk of the bank depends on the use of the securitization liquidity. In fact, the ex post risk of the bank does not decrease if the originating bank invests this liquidity in risky/riskier assets. The same applies if banks use the proceeds to expand their loans business, thereby incurring more systemic risk (Franke and Krahenen, 2005). Furthermore, we must consider the technical and the economic goals that in turn drive securitization activities by banks. For instance, it is not said that banks tend to transfer their riskier activities. In contrast, especially under the Basel 1 rules, banks had incentives to transfer outside the less risky assets while maintaining in portfolio the riskier ones in order to achieve regulatory capital arbitrage (Passmore et al., 2001; Calem and LaCour, 2003; Ambrose et al., 2005; Calomiris and Mason, 2004). The empirical studies analysing the effects of securitization on banks' risk mainly focus on two aspects, the ex post individual (micro) risk of the originating bank and the systemic risk<sup>1</sup>. Dionne and Harchaoui (2003) focus on Canadian financial sector and conclude that securitization has a negative effect on capital ratios and that exists a positive link between bank's risk and securitization. Also Uzun and Webb (2007) findings go in the same direction. The conclusions of the previous studies are coherent with the hypothesis that explains the securitization's determinants mainly with the possibility of achieving a regulatory capital arbitrage.

---

<sup>1</sup> One of the first theoretical work focused on this topic is the study by Santomero and Trester (1998). They analyse the relationship between financial innovation (intended as loan sales and securitization) and risk in banks. Risk is studied from two different perspectives, as an increase in the level of risky lending and as an increase in the vulnerability of banks to instability and failure. They demonstrate that securitization helps to reduce the vulnerability of banks against liquidity crisis, due to the reduced illiquidity of their asset portfolio. On the other hand they demonstrate that securitization encourages banks to take greater risk positions (loan growth), thereby increasing their risk of insolvency.

More recently, the attention is mainly focused on systemic risk because of the negative effects of the financial crisis and the still unclear consequences of securitization for financial stability. Hansel and Krahen (2007), by analysing the European collateralized debt obligation, find that credit risk transfer activity enhances the systemic risk (equity beta) of issuing bank and that overall credit securitization increases the bank's risk appetite. Uhde and Michalak (2010) study securitization and systemic risk in European banking sector. Using a sample of stock listed banks in Western Europe plus Switzerland over the period 1997-2007, find that securitization has a negative impact on the banks' financial soundness, a positive impact on leverage and return volatility, a negative effect on profitability. Nijiskens and Wagner (2011) construct two separate dataset, one for CLO and another for CDS banks, and in total they analyse the two sub-samples (respectively, 35 CLO banks and 38 CDS banks around the world) during the period 1997-2006. They estimate the relationship between credit risk transfer activities (CLO issues and CDS trading) by banks and systemic risk measured by issuer/trading banks' beta (using an augmented CAPM). Their results show that after their first use of CLOs and CDSs the share price betas of issuer/trading banks increases significantly. Next, the authors separate betas into a volatility and a market correlation component to study whether the increase in risk is due to an individual component or a systemic component. They find that the increase in beta is due to the correlation while individual risk decreases.

Our study contributes to the literature on the effects of securitization for banks in several ways. First, despite the importance of the Italian securitization market, there is a research void on it. To date, Agostino and Mazzuca (2010) are the only authors who have analysed the securitization determinants in Italian market. The other empirical studies, focused on the drivers and/or motivations for securitization, concern the U.S. market or, more recently, Europe, while they are still very few studies focused on individual countries in this important region (Martinez-Solano et al., 2009, and Cardone-Riportella et al., 2010, both considering the Spanish market). In the light of these considerations, we believe it is interesting to consider other geographical contexts with differently developed capital markets, different banking sector structures and, in some cases, different legislation and regulation systems. Second, to develop our analysis, we use an original and updated dataset. Furthermore, unlike previous studies, our analysis covers both a pre-crisis period as well as a crisis period. We believe that highlighting any differences and specificities among different economic/financial phases and also to capture the influence of financial crisis on bank's performance represents an important research opportunity. Third, we apply an original methodology to test the effects of securitization: on one hand, we adopt the z-score as performance measure and on the other hand, we apply the (ordered) probit methodology as robustness check of our results.

Consistently with the great part of the previous literature, we expect securitization having a positive impact on originator bank's profitability. With regard to the effects of securitization on bank's risk, our starting hypothesis suggests that this is still an empirical open question and, as a consequence, we are not sure about what results we have to expect.

Previewing our results, when Roe is considered, the securitization variables have an unexpected negative influence on this profitability measure. These results are not confirmed when all the other performance measures are considered, because the empirical research findings show that securitization is not significant in explaining both the dynamics of the risk profile and of the Z-score of the sample banks.

The remainder of the paper is organised as follows. In Section 2, we describe our sample and data. In Section 3, we discuss the methodology used. In Section 4, we present and discuss the results of the empirical analysis. Finally, in Section 4, we summarize and conclude.

## **2. Data**

To test the securitization effects on banks performance, we first need to select all the banks having placed at least one cash securitization<sup>2</sup>, during the period we considered (2000-2009). To obtain this information we employ the Talete Creative Finance database, providing information on all the cash securitizations carried out from 1999 onwards. From this database we draw a list of deals solely originated from banks.

(insert Table 1)

As far as the model variables are concerned (performance measures/dependent variables and factors influencing performance, plus securitization), we mostly employ micro-data drawn from banks' financial statements (balance sheets and income statements). Additionally, we employ some non-accounting information, such as the status of the bank on the official listing and the measure of

---

<sup>2</sup> We do not study synthetic securitization because during the period under consideration the number of synthetic deals was rather limited among Italian banks. Notwithstanding, we do not exclude that future research could adapt our analysis framework also to study the synthetic securitization focusing on the effects on banks risk. Furthermore, we do not consider on-balance-sheet securitizations, i.e., covered bonds, because they were not employed in Italy during the period here considered.

capital for regulatory purposes. All these data are drawn from the Bankscope-Bureau van Dijk database.

Our sample includes all commercial banks with headquarters (including the registered office) in Italy for which the data needed to estimate the econometric model were available. More precisely, our sample banks are all the intermediaries present in the supervisory register of the Bank of Italy (according to the article No. 106 of TUB, the Italian Banking Law) and classified as commercial banks (and incorporated as limited liability companies) or savings banks (*banche popolari/casse di risparmio*). Our final sample consists of 49 banks (Table 2).

(insert Table 2)

Cooperative credit banks (BCCs) are not included in the sample because of their special nature. In fact, cooperative banks behaviour is special in terms of both activity and size and a comparative analysis between them and the other banks would incur the risk of providing biased results. Furthermore, in Italy these banks do not engage in securitization as a single originator; rather, they participate in multi-originator transactions (except in one case). Presumably, this choice depends on the fact that smaller institutions tend to benefit from jointly pooling assets; for example, they may obtain a better rating because of the added diversification (Martin-Oliver and Saurina, 2007). Because the model we estimate is applicable only to separate individual banks, it would be difficult to apply our research methodology to the Italian cooperative banks. For the same reason, we do not consider the other multi-lender transactions.

### **3. Methodology**

In the present work, we examine two research hypotheses: 1) whether the securitization leads to wealth effects for the bank's profitability; 2) which effects the securitization produces in terms of banks' risk.

#### *Variables*

Our basic idea is that performance can be qualified both by profitability and risk. The idea that risk profile has to be considered together with profitability in order to evaluate the bank's performance

is supported, among others, by the actual debate having place among regulators (European Central Bank, 2010). Also the more recent empirical literature focused on securitization effects has emphasized how important are the consequences of the credit securitization for originator bank's risk, also in light of the weakness demonstrated by the accounting-based measures (Casu et al., 2009; Uhde and Michalak, 2010). As a consequence, our analysis framework includes different performance measures (Table 3).

(insert Table 3)

To capture the effects of securitization on bank's performance focusing on profitability we use two different accounting-based indicators, Roe and Roa. In spite of its numerous limits, Roe is still considered as one of the best synthetic performance indicator, for industrial firms as well as for banks' profitability, and is widely used in literature (Berger et al., 2005; Altunbas, 2004)<sup>3</sup>. We use Roa to test the robustness of the results obtained in the estimates of Roe.

Following Casu et al. (2009), to capture the effects of securitization on bank's performance focusing on risk profile we use the impaired loans ratio. This index is calculated as the ratio of the impaired loans to gross loans and it is able to signal the bank's portfolio quality.

Finally, in order to try to capture the effects on both profitability and risk, we use a risk-adjusted performance measure, the so called Z-score. Following De Nicolò (2000), this index is calculated as the mean of Roa plus time average of the market capital-to-asset ratio on the standard deviation of Roa (mean of Roa is calculated based on the values of the last 3 years).

With reference to the independent variables, in our model we consider different groups of regressors. First, we include the securitization (dummies) variables. To specifically consider the effects of securitization we add a securitization dummy (*SEC*), coded 1 if the specific bank securitizes in the considered year and 0 otherwise. Since we suppose that securitization begins to produce its effects in a reasonably short period of time, we lag this variable one year (the same applies to all other independent variables). The expected relation between this regressor and the bank's profitability is positive while the expected relation between this regressor and the risk index still represents an open empirical question. The other securitization regressor (*PREV\_SEC*) accounts

---

<sup>3</sup> Differently, Spong and Sullivan (2007) use a profit efficiency index – the estimated ability of one bank to generate profits relative to other banks – as a measure of bank performance. Yet, Demirguc-Kunt and Huizinga (2000) consider two measures of bank performance: bank profitability (measured as profits divided by assets), and bank interest margin (measured as net interest income divided by assets). Barth et al. (2007) uses the before tax profit divided by total assets as measure of bank profitability.

for the previous securitizations developed by the considered bank. According to Agostino and Mazzuca (2010), the underlying assumption is that a consolidated expertise may represent an incentive to use the securitization channel once again. The expected relation between this regressor and the performance measures is positive.

Since profitability and risk could be affected by factors different than securitization, we include some other variables in the model. The second group of regressors includes those variables typically considered able to affect the bank's profitability. In detail, we consider a number of accounting-based variables: the loans ratio (*LOANS\_RATIO*), the overheads ratio (*OVERH\_RATIO*), the liquidity ratio (*LIQUIDITY*), the leverage (*LEV*), the loan loss provision ratio (*LLPNIR*). The sign of the expected relation between these variables and the performance indexes varies from one regressor to another, and it also depends on the performance indicator that in turn is considered.

Finally, we add other control variables: the bank's size (*SIZE*), the Tier1 ratio (*TIER1*), the status of the bank on the official stock exchange (*LISTING*), the presence of the financial crisis (*CRISIS*), and the year dummy (*YEAR*). Referring to the first control variable, the higher the bank's size, the greater should be the bank's value and performance. This effect could have different reasons. For example, it could be due to the fact that large banks lend more and to different (less difficult) lenders than small banks (Berger and Udell, 1996; Peek and Rosengren, 1998; Strahan and Weston, 1998; Akhavein et al., 2001, Berger et al., 2001; Berger et al, 2004; Cole et al, 2004; DeYoung et al., 2004; Petersen, 2004) or that they better use the technological progress (Berger, 2003). Furthermore, it could be due to the presence of scale economies (Berger and Mester, 1997; Hughes et al., 2001; Bossone and Lee, 2004). Thus, when we consider the bank's size the expected sign is positive. The relation with Tier1 is an open empirical question and is strongly related to the performance index used for the empirical analysis. The dummy variable controlling for the status of the sample bank on the official stock exchange equals to 1 if the bank is listed and 0 otherwise. In literature it is generally accepted the fact that the level and the quality of disclosure is higher in the case of listed banks (related to that of non-listed banks). Because of this higher level of disclosure and of the existence of the market discipline, listed banks should enjoy a lower cost of funding related to that of non-listed ones. This occurrence should have a positive effect on banks' performance (Hirtle, 2007; Kwan, 2004) and hence the expected relation between this control variable and the performance measures is positive. Following Atunbas (2010), to test the effects of the crisis we add a dummy variable coded 1 during the years 2007-2009 and 0 during the period 2000-2006. Finally, to control for potential cycle effects, common to all banks but varying by year,

we include time fixed-effects (i.e. a set of dummy variables, each of them coded 1 in a given year and zero otherwise)<sup>4</sup>.

### *Empirical analysis*

To test our research questions we adopt the following multiple regression model:

$$y_{it} = \beta x'_{i,(t-1)} + \varepsilon_{it} \quad (1)$$

where the dependent variable – in turn represented by banks' plain profitability measures, a risk-adjusted performance measure and a risk indicator – is a function of different groups of regressors (already discussed) including some control variables – all lagged one year. Furthermore, all bank-specific characteristics refer to (t-1) in order to avoid endogeneity bias.

Table 4 summarises some relevant statistical information. To prevent extreme values from biasing the results of our study, without losing observations, variables are winsorised at 5%<sup>5</sup>.

(insert Table 4)

For each dependent variables, at first we verify the existence of individual fixed or random effects throughout the GLS estimation of the random effects model (RE)<sup>6</sup> and then with the Hausman test<sup>7</sup>, where the null hypothesis is that the preferred model is the RE one instead of the fixed effects model (FE).

As second step, to control for potential cycle effects, common to all banks but varying by year, we include time fixed-effects<sup>8</sup> by adding to the model, basing on the results of the Hausman test, a set of yearly dummy variables, each of them coded 1 in a given year and zero otherwise and by testing their significance with the ANOVA F.

---

<sup>4</sup> The liquidity ratio variable, the leverage ratio variable, the size variable, and the listing variable resulted statistically significant in the study by Agostino and Mazzuca (2010) focused on the banks' securitization drivers in Italian market during the period 1999-2006.

Since our sample is composed only by Italian banks we did not control for macroeconomic variables.

<sup>5</sup> For other contributions that adopt the same method, see Barth et al. (2006), Muiño Vázquez and Trombetta (2009).

<sup>6</sup> If effects are fixed, then the pooled OLS and RE estimators are inconsistent, and instead the FE estimator needs to be used.

<sup>7</sup> Firstly, the Hausman test requires the GLS estimation.

<sup>8</sup> For this aim, we improve the F test. The Anova F is a joint test that all the regressors are jointly uninformative.

Because many of our variables have large positive and negative outliers, we winsorise them at 5%. Winsoring at 5% involves assigning to outliers beyond the 5th and 95th percentiles a value equal to the value of the 5th or 95th percentile in order to limit the influence of outliers on the regression.

In all cases, the observations are clustered at the bank level. In fact, because in our sample the same bank may be present in different years, it seems appropriate to allow the errors to be correlated for the same intermediary over time. Moreover, by doing so, we obtain standard errors robust to heteroscedasticity.

## 4. Results

### *Profitability results*

Table 5 reports the results obtained by estimating model (1) and the dependent variables are represented by the Roe (first column) and Roa (second column).

(insert Table 5)

The first column of Table 5 contains the results obtained when we test the relationship between Roe (dependent variable) and securitization. The variables statistically significant are the leverage variable (*LEV*), the credit risk variable (*LLPNIR*), the securitization activity variable (*SEC*), the previous securitization variable (*PREV\_SEC*) and the financial crisis variable (*CRISIS*).

The securitization variable is significant at 10% level and the sign of the coefficient is negative. This sign is unexpected as the great part of the previous studies analysing the relationship between profitability and securitization demonstrate that the latter produce a wealth effects on originators banks. Differently from Lockwood et al. (1996), Thomas (1999) and Martinez-Solano et al. (2009), our results seem to show that securitization can influence the bank performance, when it is measured by Roe, in a negative way. These results are consistent with those obtained by Casu et al. (2009), that do not provide evidence that securitizers increase their profitability (in the cited study profitability is measured using different operating measures such as Roa, Roe, net interest margin, and so on). These results can have different explanations. For example, we can say that banks securitize in order to reach goals different from the improving of their performance. This conclusion is confirmed by the analysis made by Agostino and Mazzuca (2010) and by Martin-Oliver and

Saurina (2007), respectively focused on the Italian and Spanish markets; both studies, analysing the securitization drivers, demonstrate that the main determinant of securitization is represented by the opportunity of increasing liquidity and hence also the possibility of diversifying the originators' sources of funding. A further explanation could be related to the use of the liquidity coming from securitizations, which could be used for different purposes (not consistent with the increase of bank's profitability), such as the reduction of leverage or the restructuring of the assets portfolio in order to make it more liquid. From this point of view, in future it could be interesting to develop some studies focused on securitizing banks throughout a comparative analysis of the ex-ante and ex-post securitization originators' situation. This type of analysis could help providing answers to the questions raised by the results of our analysis.

Again, with reference to the variables related to securitization, this first regression shows that having already carried out at least one securitization in the previous years is a relevant feature. In fact, the *PREV\_SEC* dummy is statistically significant at 10% with negative sign, consistent with the sign taken by the securitization dummy. Therefore, we can apply to this variable the discussion already made.

Another highly significant variable is represented by the leverage, that assumes a positive sign. This result can be justified if we considered that the analysed variable is built up by the ratio between total assets and equity. Among the variables related to the specific banks' characteristics, *LLPNIR*, the variable taking into consideration the credit risk (portfolio quality), is highly significant. As expected, its sign is negative. Finally, also the crisis dummy variable is significant at 10%: its negative sign, consistent with our expectations, shows the negative impact of the financial turmoil on *Roe*<sup>9</sup>.

The second column of Table 5 reports the regression results obtained when we consider *Roa* as performance measure (dependent variable). In this case both the securitization variables (*SEC* and *PREV\_SEC*) loose significance, even though their coefficients confirm the negative sign. Consistently with the analysis on *Roe*, the empirical evidence obtained so far suggests that securitization is not able to produce positive significant effect on the profitability of the banks. Again, we could argue that banks securitise for different reasons beyond that referred to the increasing of their profitability.

---

<sup>9</sup> All these results are confirmed if we drop the crisis dummy from our regressions. These estimates are available on request.

Also these estimates demonstrate the importance of the credit risk variable (*LLPNIR*), significant at 5% with negative sign, while it loses significance the leverage variable (*LEV*). Finally, the crisis variable (*CRISIS*) is slightly significant with the expected negative sign<sup>10</sup>.

### *Risk results*

Consistently with the idea that performance has different dimensions and with the objective of this study to build an original framework in order to observe the so called sustainable performance of the banks, we study the securitization effects also considering a portfolio (quality) risk measure.

(insert Table 6)

The results obtained do not provide evidence that securitization produces either positive or negative effects on the credit risk profile of the originator bank. Table 6 reports the results of the regression in which the risk measure/dependent variable is represented by the impaired loans ratio (*IMP\_LGL*). In this case, none of the securitization dummies (*SEC* and *PREV\_SEC*) are statistically significant, while the positive sign of the securitization variable seems to signal the negative influence of securitization on originator bank's risk.

The results of this regression confirm the strongly positive influence of the financial turmoil on bank's risk – the crisis dummy variable is significant at 1% with positive sign. Consistently with Altunbas et al. (2010), our findings underline that securitizing banks increase their risk profile during the period of crisis<sup>11</sup>.

Furthermore, it seems of a certain importance the status of the bank on the official stock exchange; perhaps unexpectedly, the sign of the considered variable (*LISTING*) is positive while the significance is at 5%. The importance of this variable, that shows an unexpected sign, could signal the opportunity to further consider the listed banks separately. Finally, the size variable (*SIZE*) is marginally significant with an unexpected negative sign.

### *Z-score*

---

<sup>10</sup> Also in the case of ROA, if we implement a model by excluding the crisis dummy variable, all the previous results are confirmed.

<sup>11</sup> Actually, Altunbas et al. (2010) analyze the probability of default. "In the specification, we included, therefore, a bank-specific ratio of securitization activity to assess whether banks that were more active in the securitization market experienced a higher increase in their default probability during the crisis. The results show that banks that securitized increased their default probability during the period of crisis, even if this effect is only marginally significant." (Altunbas et al., 2010, p. 15).

Finally, in order to build up a consistent framework for the analysis of the banks' performance, we implement model (1) by considering a risk-adjusted performance measure as our dependent variable. In particular, following De Nicolò (2000), we adopt the Z-score measure.

(insert Table 7)

Table 7 reports the results of the relation between Z-score and securitization. These findings confirm the absence of significance of the securitization variables (*SEC* and *PREV\_SEC*). However, also in this case, the negative sign of the securitization variable seems to confirm the negative influence of securitization on bank's performance. Contrary to the findings of the other regressions, the sign of the previous securitization variable (*PREV\_SEC*) is positive, while it is still not significant.

Also the results of this regression show the importance of the financial turmoil, as the crisis dummy variable is strongly significant with the expected negative sign. Finally, the listing dummy variable is significant at 5% with negative sign. Since this result is consistent with those obtained when the dependent variable used is the credit risk index, it can be argued that the negative influence of the listing status of the banks on performance is due to their higher risk profile. Again, this evidence could be interpreted as a call for a further separate research focused on listed banks.

#### **4.1 Further analysis**

In order to deeper investigate the effects of the securitization on originator banks, we develop the analysis by using a different model. In particular, we test the relationship between bank's performance and securitization using an ordered probit model<sup>12</sup>.

First of all, we underline that the ordered probit-type regression has been used only for the Roe. The purpose of using a probit model is twofold. First, to verify the inferences drawn from the multiple regression, that is to verify if our results are insensitive to the choice of the modeling technique, and second to provide additional evidence employing an ordinal dependent variable.

In detail, we adopt the following ordered probit model (oprobit):

---

<sup>12</sup> For other contributions that adopt the binary and the ordered probit models, see Altunbas et al. (2010), Asimakopoulos and Athanasoglou (2009) and Berger et al.(2005).

$$\Pr(y_i = j) = \Theta(\beta_1 x_{1,i,(t-1)} + \beta_2 x_{2,i,(t-1)} + \beta_3 x_{3,i,(t-1)}) \quad (2)$$

in which the ordered outcomes are modelled to arise sequentially as the latent variable,  $y^*$ , crosses progressively higher thresholds<sup>13</sup>.

Choosing the logit model (i.e. the logistic distribution function) would not affect our results. In general, probit (and logit) models may be illustrated in terms of an underlying latent variable process. In our case, we can assume the existence of a latent propensity of the bank  $i$  to realize a performance (measured by the Roe) belonging to a certain class  $y^*$  and generated by the following process:  $y_i^* = x_i' \beta + u_i$ , where the error term is distributed as a normal, with zero mean and variance  $\sigma^2$ . We split the dependent variable into four quartiles ( $j_i$ )<sup>14</sup> and we code it alternatively 1, 2, 3 or 4, when it belongs to the first, the second, the third and the fourth quartile, respectively:

$$\begin{aligned} y_i &= 1 \text{ if } y_i^* < j_1 \\ y_i &= 2 \text{ if } j_1 \leq y_i^* < j_2 \\ y_i &= 3 \text{ if } j_2 \leq y_i^* < j_3 \\ y_i &= 4 \text{ if } j_3 \leq y_i^* \leq j_4 \end{aligned}$$

Now, we have implemented the ordered probit model only for Roe, because it represents the most common performance indicator; in addition, with respect to the previous estimates, it's the only measure showing the (negative) significance of the dummy variables related to securitization.

Table 8 shows the results of the ordered probit model. In the first column we report the findings (coefficients) obtained when all the variables are considered – the same regressors used when the multiple regression model is estimated –, while in the second columns we show the results obtained when we run the model without the crisis variable (*CRISIS*). Contrary to the previous findings, these results do not provide evidence of the significance and of the sign of any of the securitization variables (*SEC* and *PREV\_SEC*). In the case of Roe, it seems that the relationship between this profitability measure and the securitization needs to be further investigated. For example, following Asimakopoulos and Athanasoglou (2009), to test that the estimates belonging to the ordered probit

---

<sup>13</sup> We decide to adopt an ordered probit model because it allows us to analyse the performance of the bank  $i$ , in terms of probability, with reference to various discrete performance categories, ordered in an increasing way.

<sup>14</sup> The  $j_i$  are the cut points that indicate the discrete categories in which the latent variable falls.

model do not depend on the categories in which we subdivided the dependent variable, we could use a binary probit, coded 1 if the bank's performance is above the sample median and zero otherwise. Table 9 displays the frequency distribution of the dependent variables with respect to each quartile.

(Insert Table 9)

We underline that the choice between the pooled ordered probit model and the random-effects (RE) one<sup>15</sup> has been made after the results of the likelihood-ratio test (LR) that leads us to reject the null hypothesis ( $H_0 : \rho = 0$ ;  $H_a: \rho \neq 0$ ) and, in this way, to use the RE model.

In the ordered probit model the sign of the regression parameters,  $\beta$ , can be immediately interpreted as determining whether the latent variable,  $y^*$ , increases with the regressor. If  $\beta_j$  is positive, then an increase in  $x_{ij}$  necessarily decreases the probability of being in the lowest category ( $y_i = 1$ ) and increase the probability of being in the highest category ( $y_i = 4$ ).

The results obtained when we run the ordered probit model show a strong significance of the credit risk variable (*LLPNIR*) with the expected negative sign, and also a slow significance of the overheads ratio (*OVERH\_RATIO*) with negative sign. Finally, these findings do not provide evidence of the importance of the crisis variable. All the discussed results are confirmed when we test the model not considering the crisis variable (second column).

## 5. Conclusions

In the present study we analyse the effects of securitization on the performance of the Italian banks during the period 2000-2009. To study this phenomenon, we implement an analysis framework to better investigate the bank's performance in which we consider not only some operating profitability measures (Roe and Roa) but also a credit risk measure (impaired loan ratio) and a risk adjusted performance measure (Z-score).

Our results are mixed but all the empirical findings confirm that securitization does not produce (as in some case we would expect) positive effects on the originator banks' performance. Furthermore,

---

<sup>15</sup> The pooled oprobit assumes that the latent variable error term is identically and independently distributed (i.i.d.). In the random-effects case, the latent variable error term is made of two components: an idiosyncratic part, which is i.i.d., and a specific effect  $\alpha_i$ , constant over time for each individual and randomly drawn from a normal distribution. Because of the  $\alpha_i$ 's, the error terms will be correlated within units.

all the estimates provide evidence of the significant negative influence of the crisis on all the performance indexes considered in the present study.

By using a multiple regression model, first we test the relationship between Roe (and, successively, as a robustness test, Roa) and securitization, also controlling for different bank's characteristics, for crisis effects and for time-effects. Contrary to the findings of Lockwood et al. (1996), Thomas (1999) e Martinez-Solano et al. (2009), the results show the negative and slightly significant of the securitization. This is confirmed also for the previous securitization variable. These findings are consistent with the liquidity hypothesis according to which banks securitize to increase their funding ability (Agostino and Mazzuca, 2010; Martin-Oliver and Saurina, 2007). When the Roa is considered as dependent variable, the securitization is not significant anymore, even though the coefficient of the securitization variable confirms the negative sign.

Second, we test the effects of securitization on the originator bank's risk profile. The results obtained do not provide evidence that securitization is able to produce either positive or negative effects on the credit risk profile of the securitizers.

Third, we test the effects of securitization on the Z-score performance measure. These findings confirm the absence of significance of the securitization variable, while again its negative sign seems to signal the negative influence of securitization on bank's performance.

Finally, we further investigate the relationship between credit securitization and Roe by running a different model, the ordered probit model. These results provide evidence of the absence of significance of the securitization variables.

The criticism which emerged following the financial crisis of 2007 demonstrates that credit securitization could be very dangerous for the increase of systemic risk. Furthermore, it argues that the borrowing capacity of banks, artificially increased by securitization, may contribute to cause bubbles and speculations, harmful to finance and real economy. In this study we demonstrate that even the microeconomic effects of securitization are doubtful.

The partially unexpected results of our empirical analysis raise one main question. We would wonder why banks should continue to securitize. An answer might consist in the possibility of increasing/diversifying the funding modes; this answer is consistent with the liquidity hypothesis (Agostino and Mazzuca, 2010; Martin-Oliver and Saurina, 2007). Again, however, it would be wondered if this ability to artificially increasing bank's funding would benefit the financial and real

economy or could have some unintended consequences. This last question as well as the necessity of containing bank's risk could be of interest to regulators.

Furthermore, when we pay attention to the influence of the other variables on the performance of sample banks, some doubts arise when the attention is focused on the unexpected and negative influence on the observed bank's performance of the status of the bank on the official stock exchange. In fact, the listing variable seems to produce significant and negative effect on bank's performance (increasing in risk profile and decreasing in Z-score). A possible explanation is that investors active in financial markets are more sensible and hence more reactive to the banks performance than the other stakeholders - those investing in non-listed banks. However, the evidence signalled by our results could indicate the opportunity to further consider the listed banks separately and calls for further investigation. In this sense, an interesting line of research could be aimed at further enriching the framework for the analysis of the performance of banks. In fact, in the case of the listed banks it would be possible to use market-based performance measures such as the Tobins's Q (De Nicolò, 2000)

The major limitation of the study is related to the geographic area that it considers. Again focusing on the effects of securitization, future research could extend the sample to the inclusion of the European banks in order to identify possible differences with respect to the Italian banks. Another potential line of research could focus on the periods subsequent to the financial crisis in order to study whether the effects of securitization tend to change during and after a crisis. Finally, future research could consider also the synthetic (non-cash) securitizations, driven by factors different than funding needs, such as the need to transfer the (credit) risk outside the bank.

## References

- AKHAVEIN J., FRAME W. S., WHITE L.J., 2001. The diffusion of financial innovations: an examination of the adoption of small business credit scoring by large banking organizations. Federal Reserve Bank of Atlanta. Working Paper no. 2001-9.
- ALTUNBAS, Y., GAMBACORTA, G., MARQUES-IBANEZ, D., 2010. Does Monetary Policy Affect Bank Risk-Taking? BIS Working Paper, No. 298, March.
- ALTUNBAS, Y., MARQUÉS IBÁÑEZ, D., 2004. Mergers And Acquisitions And Bank Performance In Europe The Role Of Strategic Similarities. Working Paper Series, European Central Bank, NO. 398/OCTOBER.
- AMBROSE, B. W., LACOUR-LITTLE, M., SANDERS, A. B., 2005. Does regulatory capital arbitrage or asymmetric information drive securitization?, *Journal of Financial Services Research* 28 (1-3), 113-133.

- ASIMAKOPOULOS, I., ATHANASOGLU, P., 2009. Revisiting the Merger and Acquisition Performance of European Banks, Working Papers 100, Bank of Greece.
- BARTH, J.R., BERTUS, M., HAI, J., PHUMIWASANA, T., 2007. A Theoretical and Empirical Assessment of Bank Risk-Shifting Behavior, Electronic copy of this paper is available at: <http://ssrn.com/abstract=962751>, January.
- BARTH, M.E., W.R. LANDSMAN, M. LANG, AND C.D. WILLIAMS. 2006. Accounting Quality: International Accounting Standards and US GAAP. <http://ssrn.com/abstract=897241> (SSRN; accessed December 2009).
- BERGER A.N., HASAN I., KLAPPER L.F., 2004. Further evidence on the link between finance and growth: an international analysis of community banking and economic performance. *Journal of Financial Services Research* 25(2/3), 169-202.
- BERGER A.N., MESTER L. J., 1997. Inside the black box: what explains differences in the efficiencies of financial institutions? *Journal of Banking and Finance* 21, 895-947.
- BERGER A.N., UDELL G.F., 1996. Universal Banking and the Future of Small Business, in Saunders A., Walter I. (eds.). *Financial system design: the case for Universal Banking*. Irwin, Burr Ridge, IL, pp.559-627.
- BERGER, A. N., CLARKE, G.R.G., CULL, R., KLAPPER, L., UDELL, G. F., 2005. Corporate Governance and Bank Performance: A Joint Analysis of the Static, Selection, and Dynamic Effects of Domestic, Foreign, and State Ownership. World Bank Policy Research Working Paper 3632, June.
- BOSSONE B., LEE J., 2004. In finance, size matters: the “systemic scale economies” hypothesis, *IMF Staff Papers* 51, 19-46.
- CALEM, P. S., LACOUR-LITTLE, M., 2004. Risk-based capital requirements for mortgage loans. *The Journal of Banking and Finance* 28 (3), 647-672.
- CALOMIRIS, C. W., MASON, J., 2004. Credit card securitization and regulatory arbitrage, *Journal of Financial Services Research* 26:1, 5-27.
- CANTOR R., ROUYER S., 2000. Another perspective on credit risk transfer and securitization. *The Journal of Risk Finance* 1 (2), 1-11.
- CARDONE-RIPORTELLA, C., SAMANIEGO-MEDINA, R., TRUJILLO-PONCE, A., 2010. What drives bank securitization? The Spanish experience. *Journal of Banking & Finance* 34(11), 2639–2651.
- CASU B., SARKISYAN A., CLARE A., THOMAS S., 2009. *Securitization and bank performance*. Cass Business School, City University, London.
- COLE R.A., GOLDBERG L.G., WHITE L.J., 2004. Cookie cutter vs. Character: the micro structure of small business lending by large and small banks. *Journal of Financial and Quantitative Analysis* 39(2), 227-251.
- DE NICOLÒ, G., 2000. Size, Charter Value and Risk in Banking: an international Perspective. Board of Governors of the Federal reserve System, *International Finance Discussion Paper*, Number 689.
- DEMARZO, P. M., 2005. The pooling and tranching of securities: a model of informed intermediation. *The Review of Financial Studies* 18(1).
- DEMIRGIU-KUNT, A., HUIZINGA, H., 2000. *Financial Structure and bank profitability*, The World Bank Development Research Group Finance, Policy Research Working Paper 2430.
- DEYOUNG R., HUNTER W.C., UDELL G.F., 2004. The past, present and future for community banks. *Journal of Financial Services Research* 25(2/3), 85-134.
- DIONNE G., HARCHAOU T. M., 2003. Bank’s capital, securitization and credit risk: an empirical evidence for Canada. Working paper, January.

- DONAHOO K.K., SHAFFER S., 1991. Capital Requirements and the Securitization Decision. *Quarterly Review of Economics and Business*, 31.
- EUROPEAN CENTRAL BANK, 2010. Beyond ROE – How to measure bank performance. Appendix to the report on EU banking structures, September.
- FRANKE, G., KRAHNEN, J. P., 2005. Default Risk Sharing Between Banks and Markets: The Contribution of Collateralized Debt Obligations. NBER Working Papers 11741, National Bureau of Economic Research, Inc..
- GREENBAUM, S. I., THAKOR, A. V., 1987. Bank funding modes. Securitization versus deposits, *Journal of Banking and Finance* 11, 379-401.
- HANSEL D. N., KRAHNEN, J-P., 2007. Does securitization reduce bank risk? Evidence from the European CDO market. Finance Department, Goethe University Frankfurt, March 20.
- HEUSON, A., PASSMORE, W., SPARKS, R., 2001. Credit scoring and mortgage securitization: implications for mortgage rates and credit availability, *Journal of Real estate Finance and Economics* 23:3, 337-636.
- HIGGINS, E.J., MASON, J. R., 2004. What is the value of recourse to asset-backed securities? A clinical study of credit card banks, *Journal of Banking and Finance* 28, 875-899.
- HIRTLE, B., 2007. Public Disclosure, Risk, and Performance at Bank Holding Companies. Federal Reserve Bank of New York Staff Reports, no. 293, July.
- HUGHES J.P, MESTER L. J., MOON C, 2001. Are scale economies in banking elusive or illusive? Evidence obtained by incorporating capital structure and risk-taking into models of bank production checking accounts and bank monitoring. *Journal of Banking and Finance* 25, 2169-2208.
- KENNETH R. SPONG AND RICHARD J. SULLIVAN, 2007. Corporate Governance and Bank Performance, Electronic copy of this paper is available at [papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1011068](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1011068).
- KWAN, S., 2004. Testing the Strong-Form of Market Discipline: The Effects of Public Market Signals on Bank Risk Federal Reserve Bank Of San Francisco, Working Paper Series, 2004-19.
- LOCKWOOD, L. J., RUTHERFORD, R.C., HERRERA, M. J., 1996. Wealth effects of assets securitization. *Journal of Banking and Finance* 20, 151-164.
- MARTÍNEZ-SOLANO, P., YAGÜE-GUIRAO, J., LÓPEZ-MARTÍNEZ, F., 2009. Asset securitization: effects on value of banking institutions. *The European Journal of Finance*, 15:2, 119-136.
- MARTIN-OLIVER, A., AND SAURINA J. 2007. Why do banks securitize assets? Banco de Espana.
- MUIÑO VÁZQUEZ, F., TROMBETTA M., 2009. Does graph disclosure bias reduce the cost of equity capital? *Accounting and Business Research* 39, no. 2: 83–102.
- NIJISKENS, R., WAGNER, W., 2011. Credit risk transfer activities and systemic risk: How banks became less risky individually but posed greater risks to the financial system at the same time. *Journal of Banking and Finance* 35 (??), 1391-1398.
- PASSMORE, S. W., SPARKS, R., 2004. Putting the squeeze on the market for lemons: government-sponsored mortgage securitization. *Journal of Real Estate Finance and Economics* 13(1), 27-44.
- PEEK J, ROSENGREN E. S., 1998. Bank consolidation and small business lending: it's not just size that matters. *Journal of Banking and Finance* 22, 799-820.
- PETERSEN M., 2004. Information: hard and soft. Working paper, Kellogg Graduate School of Management, Northwestern University.

SANTOMERO A. M., TRESTER J.J. (1998). Financial innovation and bank risk taking. *Journal of Economic Behaviour & Organization* 35, 25-37.

STRAHAN P.E., WESTON J.P., 1998. Small business lending and the changing structure of the banking industry. *Journal of Banking and Finance* 22, 821-845.

THOMAS H., 1999. A preliminar look at gains from asset securitization. *Journal of Financial Intermediation Markets, Institution and Money* 9, 321-333.

UDHE, A., MICHALAK, T.C., 2010. Securitization and systemic risk in European banking: empirical evidence. *Journal of Banking and Finance* 34(12), 3061-3077.

UZUN H., WEBB E., 2007. Securitization and risk: empirical evidence on US banks. *The Journal of Risk Finance* 8(1), 11:23.

WOLFE, S., 2000. Structural effects of asset-backed securitization. *The European Journal of Finance* 6, 353-369.

WOOLDRIDGE, J.M.(2002). *Econometric analysis of cross section and panel data*, MIT Press.

**Table 1. Originator banks and transactions characteristics (2000–2009).**

	<b>Originator bank</b>	<b>Date of issuance</b>	<b>Underlying asset</b>
1	Banca 121	2000-03-20	CBO
2	Cassa di Risparmio di Chieti Spa	2000-03-22	NPLs
3	Banco di Sicilia Spa	2000-03-30	NPLs
4	Capitalia-Banca di Roma	2000-04-20	NPLs
5	Capitalia-Banca di Roma	2000-05-26	CBO
6	Banca Popolare di Bergamo - Credito Varesino Scrl	2000-06-20	RMBSs
7	Hypo Alpe Adria Bank Spa	2000-07-13	LRs
8	Cariplo	2000-07-28	RMBSs
9	Banca Popolare di Bari Scrl	2000-07-31	NPLs
10	Banca Italease Spa	2000-08-09	LRs
11	Banca Agricola Mantovana Spa	2000-10-19	CBO
12	Banca Antonveneta	2000-12-11	CBO
13	Banca 121 Spa	2000-12-15	CBO
14	Banca Monte dei Paschi di Siena Spa	2000-12-19	RMBSs
15	Banca Popolare dell'Etruria e del Lazio	2000-12-22	NPLs
16	Banca Popolare di Puglia e Basilicata Scrl	2001-01-19	NPLs
17	Banca Popolare di Bergamo - Credito Varesino Scrl	2001-01-31	RMBSs
18	Banca delle Marche Spa	2001-03-08	CBO
19	Banca Italease Spa	2001-03-10	LRs
20	Banca Popolare di Vicenza Scrl	2001-03-20	RMBSs
21	Banca CARIGE	2001-03-27	NPLs
22	Credito Emiliano Spa	2001-03-29	NPLs
23	Fineco bank	2001-04-12	PLs/CCs
24	Banca Sella Spa	2001-04-19	RMBSs
25	Banca Monte dei Paschi di Siena Spa	2001-05-04	CBO
26	Banca Agrileasing Spa	2001-05-16	LRs
27	Banca Monte dei Paschi di Siena Spa	2001-05-21	NPLs
28	Banca Apulia Spa	2001-05-24	RMBSs
29	Finagen Spa	2001-06-12	LRs
30	Intesa SanPaolo	2001-06-18	NPLs
31	Banca Popolare di Milano Scrl	2001-07-20	RMBSs
32	Banca Monte dei Paschi di Siena Spa	2001-08-08	NPLs
33	Credito Fondiario Spa	2001-08-08	GCs
34	Banca Nazionale del Lavoro Spa	2001-08-27	NPLs
35	Banca Antonveneta	2001-10-10	NPLs
36	Banca Popolare di Spoleto Spa	2001-10-16	CBO
37	Banca Toscana Spa	2001-10-19	NPLs
38	Banca Monte dei Paschi di Siena Spa	2001-10-19	RMBSs
39	Credito Fondiario Spa (ex credito fondiario e industriale)	2001-10-30	NPLs
40	Fineco Bank (Fin-Eco Banca ICQ Spa)	2001-10-31	PLs/CCs
41	Banca 121 Spa	2001-11-19	RMBSs
42	Banca Nazionale del Lavoro Spa	2001-12-01	NPLs
43	Banca Agricola Mantovana Spa	2001-12-10	RMBSs
44	Banco di Brescia San Paolo Cab Spa	2001-12-13	RMBSs
45	Banca Italease Spa	2001-12-14	LRs

46	Banca Antonveneta	2001-12-14	NPLs
47	Banca Popolare di Spoleto Spa	2001-12-21	NPLs
48	Banca Popolare di Vicenza Scarl	2002-02-18	RMBSs
49	Banco di Sicilia Spa	2002-03-15	NPLs
50	Banca CARIGE	2002-03-15	RMBSs
51	Fineco bank	2002-03-20	RMBSs
52	Banca Popolare dell'Etruria e del Lazio	2002-03-22	RMBSs
53	UGF Banca Spa	2002-03-22	RMBSs
54	Banca Antonveneta	2002-04-15	RMBSs
55	Banca Italease Spa	2002-04-17	LRs
56	Meliorbanca Spa	2002-06-24	GCs
57	Banca Agrileasing Spa	2002-07-19	LRs
58	Veneto Banca Scrl	2002-07-25	RMBSs
59	Cassa di Risparmio di Firenze Spa	2002-11-26	RMBSs
60	Hypo Alpe Adria Bank Spa	2002-12-19	LRs
61	Banca Popolare di Intra Scrl	2002-12-20	RMBSs
62	Banca Popolare di Vicenza Scarl	2003-02-10	RMBSs
63	Banca Antonveneta	2003-02-21	RMBSs
64	Intesa SanPaolo	2003-02-24	RMBSs
65	Banca Agricola Mantovana Spa	2003-03-11	RMBSs
66	Banca Popolare dell'Emilia Romagna Scarl	2003-03-13	NPLs
67	Banca delle Marche Spa	2003-03-26	RMBSs
68	UGF Banca Spa	2003-04-17	RMBSs
69	Banca Popolare di Lodi Scrl	2003-04-23	NPLs
70	Banca Nazionale del Lavoro Spa	2003-04-24	RMBSs
71	Fineco Bank	2003-06-10	PLs/CCs
72	Banca Apulia Spa	2003-07-31	RMBSs
73	Findomestic Banca Spa	2003-12-09	PLs/CCs
74	Meliorbanca Spa	2003-12-23	RMBSs
75	Banca Popolare di Spoleto Spa	2004-04-07	RMBSs
76	Unicredit Banca d'Impresa Spa	2004-04-07	CLO
77	Banca Nazionale del Lavoro Spa	2004-04-07	RMBSs
78	Dexia Crediop Spa	2004-05-25	CLO
79	Banca Italease Spa	2004-06-11	LRs
80	Istituto Bancario del Lavoro Spa	2004-06-16	PLs/CCs
81	Banca CARIGE	2004-07-19	RMBSs
82	Sedicibanca spa	2004-07-28	CMBSs
83	Banca Apulia Spa	2004-10-20	RMBSs
84	Meliorbanca Spa	2004-12-01	RMBSs
85	Unicredit Banca d'Impresa Spa	2004-12-06	CLO
86	FinecoBank Spa	2005-03-18	RMBSs
87	Banca Italease Spa	2005-03-18	LRs
88	UGF Banca Spa	2005-04-11	RMBSs
89	Unicredit banca Spa	2005-04-22	RMBSs
90	Banca Sella Spa	2005-10-13	RMBSs
91	Banca Nazionale del Lavoro Spa	2005-10-27	RMBSs
92	Dexia Crediop Spa	2005-11-21	CLO

93	Meliorbanca Spa	2005-12-12	RMBSs
94	Cassa di Risparmio di Asti SpA	2005-12-15	RMBSs
95	Banca Italease Spa	2005-12-22	LRs
96	Banca Nazionale del Lavoro Spa	2006-02-10	RMBSs
97	UGF Banca Spa	2006-05-19	RMBSs
98	Banca Popolare di Milano Scarl	2006-06-21	RMBSs
99	Unicredit Banca Spa	2006-06-30	RMBSs
100	Veneto Banca Scrl	2006-07-28	RMBSs
101	Banca Nazionale del Lavoro Spa	2006-09-26	RMBSs
102	Banca delle Marche Spa	2006-10-13	RMBSs
103	Banca Agrileasing Spa	2006-10-24	LRs
104	UniCredit Banca per la Casa Spa	2006-11-09	RMBSs
105	Banca Apulia Spa	2006-12-07	RMBSs
106	Banca Popolare dell'Alto Adige	2006-12-07	RMBSs
107	Meliorbanca Spa - Systema	2006-12-18	RMBSs
108	Santander Consumer Bank Spa	2007-01-26	PLs/CCs
109	Intesa SanPaolo	2007-03-26	RMBSs
110	Banco Popolare -Banca Popolare di Verona e Novara	2007-04-04	RMBSs
111	Capitalia-Banca di Roma	2007-04-26	RMBSs
112	Banca Popolare dell'Etruria e del Lazio	2007-04-30	RMBSs
113	Unicredit Banca Spa	2007-05-21	RMBSs
114	Deutsche Bank Mutui Italia SpA	2007-07-04	RMBSs
115	Banca Infrastrutture Innovazione e Sviluppo Spa	2007-12-06	CBO
116	Banca Agrileasing Spa	2007-12-10	LRs
117	BIPOP - Carire Spa	2007-12-16	RMBSs
118	Banca Monte dei Paschi di Siena Spa	2007-12-20	RMBSs
119	Deutsche Bank Mutui Italia SpA	2007-12-20	RMBSs
120	Banca Popolare di Puglia e Basilicata Scarl	2008	RMBSs
121	Santander Consumer Bank Spa	2008-03-11	PLs/CCs
122	Banca Sella Spa	2008-04-22	RMBSs
123	Banca Monte dei Paschi di Siena Spa	2008-04-27	RMBSs
124	UGF Banca Spa	2008-05-20	RMBSs
125	Cassa di Risparmio di Asti SpA	2008-05-23	RMBSs
126	Banca Nazionale del Lavoro Spa	2008-05-29	RMBSs
127	TERCAS Cassa di Risparmio della Provincia di Teramo SpA	2008-06-04	RMBSs
128	Meliorbanca Spa	2008-06-16	RMBSs
129	Banca 24-7 Spa	2008-06-23	RMBSs
130	Banca delle Marche Spa	2008-07-08	RMBSs
131	TERCAS Cassa di Risparmio della Provincia di Teramo SpA	2008-07-08	CMBSs
132	Banca IMI Spa	2008-07-29	CBO
133	Banca Agrileasing Spa	2008-07-30	LRs
134	Banca Apulia Spa	2008-07-31	RMBSs
135	Intesa Sanpaolo Spa	2008-08-04	RMBSs
136	Banca 24-7 Spa	2008-09-26	PLs/CCs
137	Banca Ifis Spa	2008-10-21	TRs
138	UniCredit Banca per la Casa Spa	2008-11-13	RMBSs
139	Cassa di Risparmio di Cento S.p.A.	2008-11-14	RMBSs

140	Banca Italease Spa	2008-11-14	RMBSs
141	Banca Popolare dell'Alto Adige Scpa	2008-12-04	RMBSs
142	Banca 24-7 Spa	2008-12-10	PLs/CCs
143	Credito Emiliano Spa	2008-12-15	RMBSs
144	Intesa Sanpaolo Spa	2008-12-18	RMBSs
145	Findomestic Banca Spa	2008-12-22	PLs/CCs
146	Santander Consumer Bank Spa	2008-12-22	PLs/CCs
147	Banca Carige Spa	2008-12-23	RMBSs
148	Banca Infrastrutture Innovazione e Sviluppo Spa	2008-12-23	CBO
149	Intesa Sanpaolo Spa	2008-12-31	RMBSs
150	Banca Sella Spa	2009-01-29	RMBSs
151	Banca popolare dell'Etruria e del Lazio e del Lazio	2009-02-02	RMBSs
152	Banco di Brescia Spa	2009-02-27	CMBSs
153	Dexia Crediop Spa	2009-02-27	CBO
154	Dexia Crediop Spa	2009-02-27	CLO
155	Banca Popolare di Milano Scarl	2009-03-26	CMBSs
156	Banca Monte dei Paschi di Siena Spa	2009-04-24	RMBSs
157	Hypo Alpe Adria Bank Spa	2009-04-29	LRs
158	Banca Ifis Spa	2009-05-29	TRs
159	UGF Banca Spa	2009-07-01	PLs/CCs
160	Intesa Sanpaolo Spa	2009-07-20	RMBSs
161	Banca delle Marche Spa	2009-07-24	RMBSs
162	Cassa di Risparmio di Bolzano Spa	2009-07-28	RMBSs
163	Credito Fondiario Spa	2009-07-30	RMBSs
164	Banca Popolare di Bari Scpa	2009-07-30	RMBSs
165	Banca Monte dei Paschi di Siena Spa	2009-08-07	RMBSs
166	Banca Popolare dell'Emilia Romagna Scarl	2009-08-07	RMBSs
167	Banca Monte Parma Spa	2009-08-11	RMBSs
168	UniCredit Family Financing Bank Spa	2009-08-11	RMBSs
169	Cassa di Risparmio di Volterra Spa	2009-10-14	RMBSs
170	Cassa di Risparmio di Parma e Piacenza Spa	2009-11-11	RMBSs
171	Banca Nazionale del Lavoro Spa	2009-11-26	RMBSs
172	Banca Agrileasing Spa	2009-12-22	LRs
173	Banca Popolare di Puglia e Basilicata Scpa	2009-12-23	RMBSs
174	Santander Consumer Bank Spa	2009-12-23	PLs/CCs

Notes: CBO stands for collateralised bond obligations; CLOs for collateralised loan obligations; GCs for government credit; NPLs for non-performing loans; LRs for leasing receivables; PLs/CCs for performing loans/credit cards; RMBSs for residential mortgage-backed securities.

**Table 2. Final sample**

<b>Originator bank</b>	<b>listed</b>
1 16Banca	
2 Banca Antonveneta	X
3 B@nca 24-7	
4 Banca Agricola Mantovana	X
5 Banca Agrileasing	
6 Banca Carige	X
7 Banca delle Marche	
8 Banca Ifis	X
9 Banca IMI	
10 Banca Italease	X
11 Banca Monte dei Paschi di Siena	X
12 Banca Nazionale del Lavoro	X
13 Banca popolare dell'Emilia Romagna	X
14 Banca popolare dell'Etruria e del Lazio	X
15 Banca Popolare di Bari	
16 Banca Popolare di Bergamo-Credito Varesino	X
17 Banca Popolare di Intra	X
18 Banca popolare di Milano	X
19 Banca Popolare di Puglia e Basilicata	
20 Banca Popolare di Spoleto	X
21 Banca Popolare di Vicenza	
22 Banca Popolare Italiana - Banca Popolare di Lodi	X
23 Banca Sella Holding	
24 Banca TERCAS-Cassa di risparmio della provincia di Teramo	
25 Banca Toscana	X
26 BancApulia	
27 Banco di Brescia	
28 Banco di Sicilia	
29 Capitalia	X
30 Cassa di risparmio della provincia di Chieti SpA - CARICHIETI	
31 Cassa di risparmio di Asti	
32 Cassa di Risparmio di Cento	
33 CREDEM-Credito Emiliano	X
34 Deutsche Bank Mutui	
35 Findomestic Banca	
36 Fineco	X
37 Fonspa Bank-Credito Fondiario	X
38 Dexia CREDIOP	
39 Hypo Alpe-Adria-Bank Italia	
40 Intesa Sanpaolo	X
41 Meliorbanca	X
42 Santander Consumer Bank	
43 Suedtiroler Volksbank-Banca Popolare dell'Alto Adige Societa Cooperativa Per Azioni	
44 UGF Banca	
45 UniCredit Banca per la Casa	
46 UniCredit Corporate Banking	
47 UniCredit Family Financing Bank	
48 UniCredit	X
49 Veneto Banca	

**Table 3. Variables**

	Variables	Name	Nature and composition
<b>PROFITABILITY MEASURES</b>	ROE	ROE	Accounting-based. Composition: Return on (average) equity
	ROA (test)	ROA	Accounting-based. Composition: Return on (average) assets
<b>RISK-ADJUSTED PROFITABILITY MEASURE</b>	Z-SCORE	Z-score	Accounting-based. Composition: (mean of ROA+time average of the market capital-to-asset ratio)/standard deviation of ROA. Mean of ROA is calculated based on the values of the last 3 years
<b>RISK MEASURE</b>	IMPAIRED LOANS	LOANS/GROSS IMP_LGL	Accounting-based. Composition: impaired loans/gross loans
<b>INDEPENDENT VARIABLES</b>	LOANS/ASSETS	LOANS_RATIO	total loans/total assets
	OPERATING PROFIT/OPERATING INCOME	OVERH_RATIO	(net interest revenue+other operating+/-overheads)/(net interest revenue+other op.income)
	LIQUIDITY RATIO*	LIQUIDITY	liquid assets/customers & short term funding
	LEVERAGE*	LEV	total assets/equity
	SIZE*	SIZE	ln total assets
	TIER 1	TIER1	tier 1
	LOAN LOSS PROVISION/NET INTEREST REVENUE	LLPNIR	loan loss provision/net interest revenue
	LISTING*	LISTING	dummy=1 listed bank; dummy=0 non listed bank
	SECURITIZATION	SEC	dummy=1 securitizing bank; dummy=0 non securitizing bank
	PREVIOUS SECURITIZATION	PREV_SEC	dummy=1 at least 1 previous securitization; dummy=0 none previous securitization
	FINANCIAL CRISIS	CRISIS	dummy = 1 for years from 2007-2010; dummy=0 for years 2000-2006
	YEAR	YEAR	dummy for each considered year

\*Variables statistically significant in the results reported by Agostino and Mazzuca (2010)

**Table 4. Summary statistics.**

<b>Variable</b>	<b>OBS</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Roa	450	0.570005	0.447343	-0.358	1.533
Roe	455	7.777455	6.17561	-5.53	21.00996
Z_score	387	81.56024	89.38504	4.068841	341.638
llpnir	451	20.76535	17.99388	0	74.1
imp_lgl	417	3.504574	3.457551	0.09	13.87
overh_ratio	455	1.637731	0.186879	1.301685	2.029351
loans_ratio	450	0.684448	0.184066	0.255367	0.955712
tier1_ratio	435	9.869195	4.076828	5.4	21.6
liquidity	428	32.24435	23.70344	1.23	87.8
lev	454	0.148392	0.061393	0.068947	0.305344
size	455	15.86279	1.501938	12.69189	18.5363
listing	500	0.348	0.476813	0	1
sec	500	0.274	0.446456	0	1
prev_sec	500	0.632	0.482744	0	1
crisis	500	0.3	0.458717	0	1

Notes: sec is a dummy coded 1 if a bank places at least one securitisation in a year, zero otherwise; prev\_sec is a dummy coded 1 if a bank places at least one securitization in the period before the analysed year, zero otherwise; SIZE is measured as ln of total assets; the other variables are described in Table 3. Continuous variables are winsorised at 5%.

**Table 5. Multiple regression model: random effects (RE) and fixed effects (FE) estimates**

Variables	(1) Dependent variable ROE (RE)	(2) Dependent variable ROA (FE)
loans_ratio	-0.114 (0.121)	-0.185 (0.134)
overh_ratio	-0.0616 (0.0609)	0.0277 (0.0695)
liquidity	-0.0663 (0.107)	-0.0595 (0.109)
lev	0.234*** (0.0733)	0.0464 (0.108)
size	-0.0320 (0.0880)	-0.318 (0.256)
tier1_ratio	0.00430 (0.0641)	-0.0517 (0.0684)
llpnir	-0.201*** (0.0478)	-0.120** (0.0486)
listing	-0.0156 (0.150)	0.0922 (0.230)
sec	-0.168* (0.0979)	-0.0260 (0.0965)
prev_sec	-0.258* (0.140)	-0.164 (0.152)
crisis	-0.381* (0.222)	-0.461* (0.251)
Constant	0.0641 (0.170)	-0.0215 (0.187)
Observations	363	359
R-squared (overall)		0.203
Number of banks	49	49

Dependent variables: ROE (column 1), ROA (column 2).

Notes: (a) Robust standard errors in parentheses; (b) all explanatory variables are lagged 1 year, except the listing dummy, the securitization dummy, the previous securitization dummy and the crisis dummy; (c) all variables, except the dummy ones, are standardized; (d) time-fixed effects are included in all estimations; (e) all variables are winsorised at 5%; (f) in the Stata software no  $R^2$  at all is displayed if the RE estimation is performed using maximum-likelihood, while in the FE model the  $R^2$  overall corresponds to the usual  $R^2$  of OLS regression (Wooldridge, 2002); (g) size is measured as the natural logarithm of total assets. \* Significant at 10%. \*\* Significant at 5%. \*\*\* Significant at 1%.

**Table 6. Multiple regression model: fixed effects model estimates**

VARIABLES	FE
loans_ratio	0.119 (0.134)
overh_ratio	0.0611 (0.0679)
liquidity	-0.103 (0.106)
lev	-0.0258 (0.110)
size	0.478* (0.255)
tier1_ratio	0.0228 (0.0696)
listing	0.540** (0.214)
sec	0.0650 (0.0909)
prev_sec	-0.0547 (0.147)
crisis	1.135*** (0.187)
Constant	-0.577*** (0.175)
Observations	341
R-squared	0.409
Number of banks	49

Dependent variable: *imp\_lgl*

Notes: (a) Robust standard errors in parentheses; (b) all explanatory variables are lagged 1 year, except the listing dummy, the securitization dummy, the previous securitization dummy and the crisis dummy; (c) all variables, except the dummy ones, are standardized; (d) time-fixed effects are included in all estimations; (e) in column (1) and (2) explanatory variables are winsorised at 5%; (f) in the FE model the  $R^2$  overall corresponds to the usual  $R^2$  of OLS regression (Wooldridge, 2002); (g) size is measured as the natural logarithm of total assets.

\* Significant at 10%. \*\* Significant at 5%. \*\*\* Significant at 1%.

**Table 7. Multiple regression model: random effects model estimates**

VARIABLES	(1) Wins 5% (LLPNIR)	(2) Wins 5%
llpnir	-0.0478 (0.0540)	
loans_ratio	0.0611 (0.141)	0.0700 (0.136)
overh_ratio	-0.0122 (0.0725)	-0.0115 (0.0725)
liquidity	0.0697 (0.124)	0.0843 (0.119)
size	-0.0196 (0.108)	-0.0243 (0.110)
tier1_ratio	-0.0538 (0.0714)	-0.0592 (0.0713)
listing	-0.382** (0.178)	-0.396** (0.179)
sec	-0.165 (0.109)	-0.164 (0.108)
prev_sec	0.0374 (0.161)	0.0323 (0.160)
crisis	-0.847*** (0.209)	-0.846*** (0.207)
Constant	0.474** (0.211)	0.462** (0.211)
Observations	352	353
Number of banks	49	49

Dependent variable: Z-score

Notes: (a) Robust standard errors in parentheses; (b) all explanatory variables are lagged 1 year, except the listing dummy, the securitization dummy, the previous securitization dummy and the crisis dummy; (c) all variables, except the dummy ones, are standardized; (d) time-fixed effects are included in all estimations; (e) in column (1) and (3) explanatory variables are winsorised at 5%; (f) in the Stata software no R<sup>2</sup> at all is displayed if the RE estimation is performed using maximum-likelihood.; (g) size is measured as the natural logarithm of total assets; (h) \* Significant at 10%. \*\* Significant at 5%. \*\*\* Significant at 1%.

**Table 8. Coefficients of the ordered probit model: random effects model estimates**

VARIABLES	(1) Wins 5% (crisis)	(2) Wins 5%
llpnir	-0.265*** (0.0719)	-0.264*** (0.0718)
loans_ratio	0.279 (0.172)	0.277 (0.172)
overh_ratio	-0.151* (0.0877)	-0.150* (0.0876)
liquidity	0.250 (0.155)	0.249 (0.155)
lev	0.140 (0.0978)	0.141 (0.0977)
size	0.0431 (0.112)	0.0431 (0.112)
tier1_ratio	0.0225 (0.0949)	0.0241 (0.0947)
listing	0.00535 (0.196)	0.00601 (0.195)
sec	0.00683 (0.145)	0.00805 (0.145)
prev_sec	0.179 (0.193)	0.178 (0.192)
crisis	-0.0812 (0.267)	

Dependent variable: Roe

Notes: (a) Robust standard errors in parentheses; (b) all variables are lagged 1 year, except the listing dummy, the securitization dummy, the previous securitization dummy and the crisis dummy; (c) time-fixed effects are included in all estimations; (d) explanatory variables are winsorised at 5%; (f) size is measured as the natural logarithm of total assets.

Significant at 10%. \*\* Significant at 5%. \*\*\* Significant at 1%.

**Table 9. Frequency distribution of the dependent variable**

<b>Roe_class</b>	<b>Freq.</b>	<b>Percent</b>	<b>Cum.</b>
1	113	24.84	24.84
2	111	24.80	49.23
3	113	24.84	74.07
4	118	25.93	100