

Mortgage-backed securitization and SME lending during the financial and economic crisis: Evidence from the Italian cooperative banking system

Abstract

I investigate the determinants of the securitization activities of Italian cooperative banks during the financial and economic crisis (2007-2014) and the impact of securitization on the supply of loans to SMEs. The less deposit-funded, less profitable and less capitalized cooperative banks are, the more likely they are to securitize and the more likely it is that they will securitize to a larger extent. Furthermore, I find that securitization has not directly affected the supply of new SME loans. However, there is strong evidence of a risk-rebalancing effect of securitization on the balance sheet, especially in the period 2010-2014.

Keywords: cooperative banks; securitization; SME lending.

JEL Classification: E44, G21, G29

1 Introduction

Liquidity transformation and delegated monitoring are important functions of the banking system (Diamond and Dybvig, 1983; Diamond, 1984). With securitization, liquidity transformation is affected because securitizing banks can sell their loans and thus transform illiquid assets into cash. Similarly, in the case of delegated monitoring, because banks are no longer the holders of securitized loans, they may have less incentive to monitor borrowers (e.g., Pennacchi, 1988; Gorton and Pennacchi, 1995; BIS, 2008; Loutskina and Strahan, 2009; Keys et al., 2010). The motivations for banks to securitize their loans are to some extent the same motivations that explain how securitization can foster the supply of credit. With securitization, banks can: diversify their funding sources (not subject to deposit insurance and reserve requirements) (e.g., Danahoo and Shaffer, 1991; Jones, 2000; Minton et al., 2004; Colamiris and Mason, 2004; Bannier and Hänsel, 2008); transfer and share credit riskiness (e.g., Bannier and Hänsel, 2008); modify their asset portfolios and take advantage of riskier profit opportunities (e.g., Panetta and Pozzolo, 2010); and adjust their capital ratios (e.g., Danahoo and Shaffer, 1991).

There is a vast literature that deals with the impact of securitization on bank lending (e.g. Altunbas et al. (2009); Loutskina and Strahan (2009); Loutskina (2011); Mian and Sufi (2009); Shivdasani and Wang (2011); Bonner et al., 2016). However, most of empirical studies analyze the impact of securitization in periods either prior to the 2007-08 financial crisis or just after the onset of the crisis when the securitization market collapsed. Furthermore, due to the limited number of studies, there is no conclusive evidence, especially for the European context (see Carbo-Valverde et al. (2015) for a study on Spanish banks), that that impact of securitization on business loans is limited in the case of small banks as compared to large banks. Since small banks play an important role in SME lending in Europe, investigating how securitization has affected their lending activity in the crisis period can contribute to the design of policy initiatives that support the recovery of the SME sector when future financial and economic crises occur.

This paper wants to contribute to filling the gaps in the literature by, first, investigating the drivers of securitization activity of small Italian banks, i.e. cooperative banks (CBs), during the financial and economic crisis

(2007-2014) and, second, analyzing the impact of securitization on the CBs' supply of loans to small and medium enterprises (SMEs).

As compared to larger Italian banks, the business model of CBs is based on relationship lending and has a strong regional focus. Because the source of financing for SMEs comes primarily from bank loans, the bank-enterprise relationship is particularly unique (Berger and Udell, 1995). The cooperative banking approach enables banks to overcome opaque information problems related to SMEs and mitigates SMEs' credit constraints.

The progressive growth of Italian CBs' SME loan portfolios during the crisis was accompanied by a limited but increasing issuance of mortgage-based securities starting from 2009. In Italy, securitization experienced a freeze during the financial crisis, especially in mid-2007 (on the secondary ABS market) and 2008 (on the primary ABS market), but resumed in 2009 also thanks to changes in the ECB's refinancing policy. During the crisis, the bulk of CB's asset-backed securities was indeed retained for ECB refinancing purposes. In terms of collateral characteristics, since 1999, when the Italian securitization market was established, the securitization activities of Italian CBs have primarily consisted of residential mortgage-backed securities and, to a lesser extent, commercial mortgage-backed securities.

This scenario offers an opportunity to study the role of mortgage-backed securitization activity of small banks in SME lending.

In the first part of the paper, I investigate the determinants of the mortgage-backed securitization activities of Italian CBs during the financial and economic crisis. I find that less deposit-funded, less profitable and less capitalized CBs are more likely to securitize loans.

In the second part of the paper, I test two hypotheses of the role of securitization. The first hypothesis is that securitization, as source of alternative funds and capital relief, supported the increase in CBs' credit to SMEs. The second hypothesis examines the risk-rebalancing role of securitization. I assume that while absorbing the demand from SMEs, CBs used securitization to invest in non-SME assets to reduce the increasing risk on their balance sheets.

I find strong evidence for the second hypothesis but no evidence for the first hypothesis. Because the second hypothesis is weakly explained by a growth in liquidity (i.e., cash and equivalents, and assets available for sale), it is likely that risk rebalancing was primarily performed through diversification of the banks' overall assets.

More in general, this paper contributes to the debate on the positive (or negative) role played by securitization in supporting lending activities. Evidence from the literature suggests that such a role was positive during the pre-crisis period but became either neutral or negative during the crisis period. Whereas the results seem to support the findings from studies on the crisis period, they also hint that securitization can indirectly sustain lending to strategic (but less "liquid") sectors, such as Italian SMEs, as a source for risk rebalancing.

The remainder of the paper is organized as follows. The next section presents the literature on the determinants of securitization and the impact on the loan supply, with an emphasis on small banks. Section 3 discusses Italian CBs' SME lending and securitization activities during the crisis. Section 4 presents the data. Section 5 outlines the empirical approach and discusses the selected variables. Section 6 discusses the results and section 7 concludes.

2 Securitization, small banks and SME lending

This paper addresses two streams of literature. The first stream discusses the motivations that explain why banks securitize. The second stream discusses the impact of securitization on banks' lending supply with a focus on SME lending. As an additional funding source, securitization can affect the supply of loanable funds available to banks (i.e., bank liabilities) and consequently reduces the importance of monetary policy actions. Therefore, the second set of studies is significant for the monetary policy implications given that securitization can affect the bank lending channel.

1.1 Drivers of securitization transactions

Theoretical backgrounds suggest that funding diversification, credit risk reduction, bank's profitability and economic and regulatory capital constraints should be the banks' primary motivations for securitization (e.g., Danahoo and Shaffer, 1991; Bartov, 1993; Jones, 2000; Minton et al., 2004; Colamiris and Mason, 2004; Karaoglu,

2005; Bannier and Hänsel, 2008; Panetta and Pozzolo, 2010). However, while the role of securitization as a source of funds for European banks is largely supported by the empirical literature, the empirical evidence is not conclusive about the impact of bank's profitability, credit risk and capital constraints on the bank's decision to securitize loans.

With regard to the role of bank's profitability, it is typically argued that securitization can improve bank's performance because it enables banks to reduce credit risk, fund new investment opportunities and specialize in activities of comparative advantage (Greenbaum and Thakor, 1987; Pavel and Phillis, 1987; Hess and Smith, 1988). It follows that more profitable banks should have less incentives to securitize loans but empirical evidence is ambiguous. Analyzing Italian banks over the period 2000-2006, Affinito and Tagliaferri (2010) find that banks with a higher return on equity (RoE) ratio (hence, more profitable banks) engage less likely and to a smaller extent in the securitization business. Similarly, Cardone-Riportella et al. (2010) provide evidence for Spanish banks from 2000-2007 that a higher cost-to-income (CIR) ratio (hence, less profitable banks) is associated with a higher probability to securitize. This positive association between CIR and securitization activity is confirmed by Bannier and Hänsel (2008) for a sample of European banks (from 17 countries) from 1997 to 2004. However, Bannier and Hänsel (2008) do not find any significant relationship between RoE and securitization transactions. In contrast to previous studies, Farruggio and Uhde (2015) find that the profitability (measured in terms of lower CIR) of a sample of European listed banks has a positive association with the probability and volume of securitization transactions but only in the pre-crisis period (1997-2007). This result is confirmed even when they use RoE as proxy for bank's profitability.

Another asserted motivation of loans securitization is credit risk reduction. The risk-reduction argument suggests that banks with a greater risk exposure should be more prone to securitize. However, the bank's capacity to transfer risk depends on the quality of the securitized assets that, in turn, can influence the size of the first-loss tranche (that is typically retained by the originator) as well as the provision of credit support (enhancement) (Calomiris and Mason, 2004; Gorton and Souleles, 2005). Bannier and Hänsel (2008) as well as Affinito and Tagliaferri (2010) provide evidence that banks with a lower loan portfolio quality are more likely to securitize and to larger extent. In contrast, Farruggio and Uhde (2015) finds a negative association between the ratio of bank's loan loss reserves to gross loans and, the bank's probability to securitize as well as the volume of securitization transactions. However, this association is not statistically significant when they consider only the crisis period (2007-2010). Similarly,

Martin-Oliver and Saurina (2007) and Cardone-Riportella et al. (2010) do not find significant evidence of a relationship between the level of credit risk and the level of securitization activity of Spanish banks.

Finally, the use of securitization for regulatory arbitrage to reduce capital requirements is documented by several studies (Jones, 2000; Calomiris and Mason, 2004; Ambrose et al., 2005; Gorton and Metrick, 2010, Acharya et al., 2013). However, the empirical studies barely support the argument for regulatory capital arbitrage in the European context. Apart from Affinito and Tagliaferri (2010) that find a negative association between the regulatory capital level and the securitization activity of Italian banks, other studies (Martin-Oliver and Saurina, 2007; Bannier and Hänsel, 2008; Cardone-Riportella et al., 2010; Farruggio and Uhde, 2015) do not provide significant evidence that regulatory capital arbitrage is a driver of European banks' securitization activity.

1.2 The impact of securitization on bank lending supply to SMEs

With securitization, banks can diversify their loan portfolios, selling certain types of loans (for example, residential mortgages) and originating other types of loans (for example, SME loans) (e.g., Demsetz, 1999); alternatively, as suggested by Affinito and Tagliaferri (2010), with securitization, banks can concentrate their portfolios on certain types of loans (such as SME loans in the case of CBs) for which they have a comparative advantage (e.g., Phillips, 1996). However, securitization can also misalign the incentives to lend to the SME sector. For example, securitization can easily divert banks' attention to the real estate-market while reducing the presence of less liquid assets such as SME loans. As described by Baradwaj et al. (2013), this phenomenon represents a substitution effect whereby "...banks actually take advantage of flexible financing and alter their lending strategy to shift away from one lending category (small business lending) to another (real-estate loans)." (p. 3).

In general, recent studies show that securitization can foster the supply of credit by providing a source of capital relief and increasing the liquidity of banks' balance sheets (e.g., Altunbas et al., 2009; Loutskina and Strahan, 2009; Mian and Sufi, 2009; Keys et al., 2010; Demyanyk and Van Hemert, 2011; Loutskina, 2011). With the transfer of part of the credit risk, regulatory requirements are less stringent and the bank's risk-taking capacity increases. It follows that securitizing banks should be more able to increase their supply of loans.

Bank size is described as a further determinant of the impact of securitization on lending. First, large banks tend to securitize to a greater extent as compared to small banks. Second, with respect to the capacity to access the securitization market, bank performance appears to have a higher weight in the rating revisions of asset-backed securities issued by small banks compared to those issued by large banks (Carbo-Valverde et al., 2011). Third, the securitization impact seems to be confined to large banks when small banks can have no interest in expanding their lending supply in a sector (such as SMEs) in which they already have a competitive advantage (Zarutskie, 2013; Baradwaj et al., 2013). The existing empirical evidence of the bank-size effect on the impact of securitization on loan supply is unequivocal. Carbo-Valverde et al. (2015) find that Spanish firms borrowing from small banks benefit from ABS issuance to a smaller extent than large banks. Similar results are found by Loutschina (2011) as well as Baradwaj et al. (2013) for the US market.

Further benefits of securitization are that securitizing banks are more flexible and can better manage changes in the market conditions associated with monetary policy movements (e.g., Kuttner, 2000; Estrella, 2002; Altunbas et al., 2009; Loutschina, 2011) or with the costs of deposits (caused by local economic shocks). For example, Altunbas et al. (2009) show that although securitization considerably reduces the importance of the bank lending channel in Europe, only banks that are particularly active on the securitization market become insulated from monetary policy. Loutschina (2011) finds similar results for US banks. When access to external funding is limited, US banks with higher loan liquidity (i.e., greater potential to securitize the loan portfolio) experience higher growth of less-liquid loans.

Nevertheless, financial crises, and systemic liquidity shocks in general, can alter securitization's impact on the loan supply, especially for SMEs. Systemic liquidity shocks that affect the banking and financial systems can indeed represent a greater hindrance to securitization-reliant banks' ability to provide credit (compared to banks that rely on more traditional sources of funds). Carbo-Valverde et al. (2015) focus on Spain and find that asset-based securitization aggravates SMEs' credit rationing in crisis periods; only the issuance of covered bonds has a positive impact on lending. The authors hypothesize that "...better quality of underlying assets in covered bonds and a sudden freeze of the ABS securitization market are the main drivers of the differences between covered bond in our findings" (Carbo-Valverde et al., 2015, p. 49). Similarly, Bonaccorsi di Patti and Sette (2015) estimate the impact

of the freeze in the securitization market on the change in business credit supply of Italian banks. They use Credit Register data on individual bank-borrower relationships and find that Italian banks that were more exposed (i.e., securitized more before the crisis) to the freeze in the securitization market tightened lending supply both at the intensive (reduced quantity) and extensive (increased price) margins. The effect was weaker if banks had more liquid assets, higher capital, and lower charge-off ratios. Looking at the US experience, Irani (2012), for example, finds that banks with a greater exposure to the securitization market were less willing to provide lines of credit to (listed) U.S. firms during the financial crisis.

3 SME loan portfolios and mortgage-backed securitization during the financial and economic crisis

Small and medium enterprises (SMEs) play an important role in the Italian economic system, more than in most other European countries (European Commission, 2015). SMEs contribute to 12% of Italy's GDP (Gruppo Cerved, 2015) and compared with all non-financial companies, they account for 36% of turnover, 41% of value added, and 30% of financial debts. More critically, SMEs generate almost 80% of all jobs in Italy.

The intensity and persistence of the financial and economic crisis, along with the restriction of the credit supply took a toll on the SME system. Since the 2007 onset of the financial crisis, the Italian SME sector has experienced a reduction in value added of approximately 10% and employment has fallen by approximately 9% (European Commission, 2015). One-fifth of SMEs that were active before the crisis either initiated bankruptcy or crisis procedures or were voluntarily liquidated because of their negative profit outlook. The credit crunch that followed the onset of the financial crisis exacerbated the negative impact of the crisis on the SME sector.

Given SMEs' limited access to capital markets for debt or equity, they heavily depend on (primarily domestic) bank credit for funding. A study of Hoffman and Sørensen (2015) shows that "... (European) SMEs remained very dependent on domestic banks for credit, in spite of high levels of banking sector integration between Eurozone countries" (p. 1). In Italy, because of an increased perceived risk, higher fund costs and stricter balance-sheet constraints, banks applied more stringent terms and conditions on loans to SMEs. According to data from the Bank Lending Survey of the Bank of Italy (Figure 1), between mid-2007 and the end of 2014, the main Italian

commercial banks dramatically tightened their credit standards for SME loans. Simultaneously, SMEs' demand for loans from commercial banks radically decreased.

[FIGURE 1 HERE]

Over the same period, compared to commercial banks, CBs have experienced a rapid growth in the SME loan portfolio. This suggests that part of the unmet demand for loans from commercial banks were absorbed by CBs. However, this growth seems to have ended in 2012, when the share of NPLs in the SME lending portfolio started to increase dramatically. Consequently, loan-loss provisions also increased, as depicted in Figure 2 where the evolution of the size of the net SME portfolio for the median CB over time (2006-2014) is compared with the amount of the SME loan-loss provisions. In particular, the loan loss provisions, as percentage of the SMEs' cash lending portfolio, increased on average from 3.5% in 2006 to 10.6% in 2014. In 2013 and 2014, further increases in NPLs were accompanied by a small contraction of the SME loan portfolio.

More in general, the financial and economic crisis affected the Italian CB system, but only to a limited extent. From 2007 to 2014, 10% (or 34) of CBs experienced extraordinary administration or liquidation procedures. However, this percentage of default cases is not very different from the pre-crisis period. In this regard, Fiordelisi and Mare (2013) identify 44 (or almost 10.5% of the sample) such cases between 1997 and 2006.

[FIGURE 2 HERE]

SMEs' increasing demand for loans has been accompanied by a resumption of securitization activities. For the purposes of this study, it is important to highlight that, since the inception of the Italian securitization market in 1999, mortgage-backed securities have been the only securitization instruments of CBs.

In Europe, from 1999-2014, the total issuance of residential (RMBSs) and commercial (CMBSs) mortgage-backed securities has represented an average of 61% (RMBSs: 54%; CMBSs: 7%) of securitization issuance (Segoviano et al., 2015). Since the 2007 onset of the financial crisis, total European securitization issuance has

declined by more than 40% of the 1999-2014 average, and much of that issuance has been retained by the originators for the primary purpose of using it as collateral with the European Central Bank (ECB). Most notably, the annual average share of ABSs pledged as collateral with the ECB rose to 28% during 2008, up from 11% in 2006 and only 6% in 2004 (Cheun et al., 2009). The large drop in securitization issuance coupled with the European banks' deleveraging process led to a credit crunch that had a particularly strong effect on SMEs (Segoviano et al., 2015).

Similar to the European market, the issuance of mortgage-backed securities by Italian CBs experienced a remarkable decrease in 2007 and a termination in 2008; beginning in 2009, however, it has resumed, with an exceptional year in 2012, when issuance reached more than 3.8 billion euros (compared to the 2006-2014 annual average of 0.98 billion euros (Figure 3)). Despite the resumption of securitization activities, the shock to the securitization market was associated with an increase in investors' risk aversion. Furthermore, following the financial crisis, regulators implemented regulatory reforms (such as new risk retention requirements; stricter disclosure obligations; higher capital charges as well as higher risk-weighted assets for securitization liquidity facilities and self-guaranteed exposures) that generated important differences in the regulatory treatment of ABSs and other investment instruments such as covered bonds and whole loan portfolios (EBA, 2015). In this context, CBs' share of retained securitization dramatically increased after 2008 compared to the pre-crisis period, decreasing the benefits and increasing the opportunity costs of these operations.

[FIGURE 3 HERE]

Across the analyzed period, securitization operations have either involved self-securitization (or retained securitization) or provided for the repurchase of junior tranches by the issuing banks and backstop lines of credit. According to the Italian securitization law, "...if banks retained some of the risk of the securitized loan portfolio, either directly because of the retention of the junior tranche or indirectly because of backstop lines of credit to sponsored vehicles, they would not be able to derecognize the loans and benefit from a reduction of regulatory capital requirements." (Bonaccorsi di Patti and Sette, 2016, p. 58). It follows that the securitization operations of

CBs have played only a limited role as credit-risk transfer and capital relief instruments. I discuss the implications of the regulatory requirements in the interpretation of the empirical results.

4 Data and sources

The sample consists of annual balance-sheet data for 368 Italian CBs in the period 2007-2014. The data on the banks' characteristics are retrieved from the ABI (Italian Banking Association) Banking database. The sample excludes CBs that experienced extraordinary administration or liquidation procedures during the observation period.

During the observation period, several CBs underwent mergers or were acquired by other CBs¹. Mergers (and acquisitions) generate artificial growth in the loan portfolio that can cause biased estimates. There are several solutions proposed by the literature, all of which offer both costs and benefits. I adopt the approach in Merkl and Stolz (2006); to minimize information loss, I “artificially” create a new entity after two banks merge. This approach to the treatment of mergers leads to an unbalanced panel. As a final rule of thumb, I decide that only banks with at least four years of observations are to remain in the sample. The unbalanced component represents 18% of the sample and the average number of years observed for each bank is 5.41.

The annual balance-sheet data from each bank were matched with the total issuance of securitization during the year. The information on securitization activities is obtained from the *securitisation.it* database provided by 130 Finance. I consider as issued securitization the difference between total gross issuance and retained issuance. The securitization database does not offer a straightforward identification of the retained share. By looking at the offering circular of each issuance, I considered as retained securitization the junior tranches with no rating assigned. When available, I then cross checked that amount with the explanatory notes of the bank's balance sheet.

Over the entire sample period (2007-2014), the number of bank-level securitization transactions is 227 and several Italian CBs have been frequent issuers.

¹ In the sample of banks and over the period 2007-2014, the number of M&As was 51.

5 Empirical methodology

The first objective of this paper is to identify the determinants of the mortgage-backed securitization activities of Italian CBs during the financial and economic crisis. According to the literature, there are four primary motives for securitizing loans: funding (and/or liquidity); risk transfer; new profit opportunities; and capital arbitrage.

The dependent variable of the econometric model is the securitization activity, which is measured as the ratio between the total issued mortgage-backed securities in t and the total assets in $t-1$ (Sec_t).

For the explanatory variables, I first consider the lagged value of Sec_t (Sec_{t-1}). According to Affinito and Tagliaferri (2010), banks that securitized more in the past are more likely to securitize in the future. Contrary to the literature, I also allow for the ratio of total gross SME loan portfolio to total assets in $t-1$ (SME_{t-1}). Because CBs specialize in SME lending, the share of SME loans is expected to play a role in the decision to securitize. However, the expected effect of this variable is ambiguous. In general, banks tend to prefer to securitize residential mortgages compared to commercial mortgages. The effect of SME_{t-1} can then be null or even negative. However, when the share of SME loans is sufficiently high, banks experience lower opportunity costs to securitize commercial mortgages; therefore, the effect can turn positive. The potentially positive effect can also be explained from a different perspective. Italian CBs have experienced a dramatic growth in their SME portfolios during the financial and economic crisis. With limited risk transfer and capital relief benefits of securitization activities, CBs with a large SME portfolio might have used securitization to rebalance their potential risk on the balance sheet.

For the banks' funding and liquidity characteristics, I use as proxies the ratio of the total deposits and total assets in $t-1$ (Dep_{t-1}) and the ratio of total cash (and equivalents) and securities available for sale and total assets in $t-1$ (Liq_{t-1}), respectively. I expect less liquid banks, and banks that are more constrained in terms of access to deposits, to securitize more.

I capture the risk transfer and sharing motive with the ratio of total NPLs and total assets in $t-1$ (NPL_{t-1}). Banks with a higher share of bad loans should be more willing to securitize to transfer credit risk from the balance sheet to the market. However, evidence suggests that since the 1999 inception of the Italian securitization market, the share of securitized bad loans has been negligible. This implies that the expected sign of NPL_{t-1} can also be negative.

The bank's profitability is measured with the return-on-asset ratio in t-1 (ROA_{t-1}). If the return from banking activity is sufficiently high, banks should have fewer incentives to securitize loans to increase profitability. Because CBs are traditionally considered non-profit maximizers, the bank's profitability might play no role in the decision to securitize.

Finally, the capitalization level is proxied by the Tier 1 capital ratio in t-1 ($Tier1_{t-1}$). Better-capitalized banks are less in need of capital relief.

As controls, I consider the gross loan growth (change in the absolute value of the gross SME loan portfolio) to total assets in t-1 ($\Delta loan_SME_{t-1}$), the logarithm of the added value per capita in the province where the bank has its headquarters in t-1 ($\ln(AddVal)_{t-1}$) and the province-level nominal GDP per capita growth rate ($\Delta NomGDP_{t-1}$). $\Delta loan_SME_{t-1}$ and $\Delta NomGDP_{t-1}$ are intended to allow for changes in the supply and demand of credit in the local market. Because CBs specialize in SME lending, I expect the dynamics of the SME loan supply growth to be more sensitive to changes in the banks' internal and external constraints than the overall loan supply growth. $\ln(AddVal)_{t-1}$ proxies for the local economic structure. Provinces that generate a higher added value per resident can have different lending patterns than provinces that generate a lower added value per resident. From this assumption, it follows that the decision to securitize can depend on the added value of the area in which the bank operates.

To address the first research question, I estimate the following empirical specification:

$$\begin{aligned}
 Sec_{i,k,t} = & \beta_1 Sec_{i,k,t-1} + \beta_2 SME_{i,k,t-1} + \beta_3 Dep_{i,k,t-1} + \beta_4 Liq_{i,k,t-1} + \beta_5 NPL_{i,k,t-1} + \beta_6 ROA_{i,k,t-1} \\
 & + \beta_7 Tier1_{i,k,t-1} + \beta_8 \Delta loan_SME_{i,k,t-1} + \beta_9 \ln(AddVal)_{k,t-1} + \beta_{10} \Delta NomGDP_{k,t-1} \\
 & + \varepsilon_{i,k,t} \quad (1)
 \end{aligned}$$

where i denotes the number of banks and k the number of provinces, and t represents the yearly time dimension.

I estimate two different models of specification (1). In the first model, the dependent variable is a dummy that takes the value of 1 if the bank securitized any loans (i.e., $Sec_t > 0$) in year t , and 0 otherwise. This specification enables an estimation of the probability of securitization. I use and compare the results from two econometric

approaches: the standard probit model and the random-effects probit model. The latter approach allows me to control for banks' random effects².

In the second specification, the dependent variable is the share of securitized assets (Sec; securitization-to-asset). In this case, I also use two different econometric approaches: the standard Tobit model and the random-effects Tobit model. These estimation approaches are consistent with the international literature (e.g., Affinito and Tagliaferri, 2010; Farraggio and Uhde, 2015).

The second research question is concerned with the impact of mortgage-backed securitization activities on the SME loan portfolio of Italian CBs. I test two potential impacts. First, securitization can have an impact on SME loan growth. This effect is supported by most of the pre-crisis literature (e.g., Altunbas et al., 2009; Loutskina and Strahan, 2009; Mian and Sufi, 2009; Keys et al., 2010; Demyanyk and Van Hemert, 2011; Loutskina, 2011). However, the literature also suggests that impact on loan growth for small banks (such as Italian CBs) is more moderate, or even null compared to large banks (Louskina, 2011; Barandwaj et al. 2013; Carbo-Valverde et al., 2015). Second, data on the evolution of CBs' SME loan portfolios during the financial and economic crisis hints that CBs might have simply responded to SMEs' increasing loan demand. Therefore, in addition to securitization's impact on SME loan growth, I test whether securitization was used as an alternative funding source to invest in less-risky assets, that is, to rebalance the risk by reducing the weight of the SME loan portfolio on total assets.

With respect to the "SME loan growth" hypothesis, I estimate the following empirical specification:

$$\begin{aligned} \Delta loan_SME_{i,k,t} = & \alpha_1 \Delta loan_SME_{i,k,t-1} + \alpha_2 \Delta loan_SME_{i,k,t-2} + \alpha_3 SME_{i,k,t-1} + \alpha_4 Seci_{i,k,t} + \alpha_5 Dep_{i,k,t-1} \\ & + \alpha_6 Liq_{i,k,t-1} + \alpha_7 NPL_{i,k,t-1} + \alpha_8 ROA_{i,k,t-1} + \alpha_9 Tier1_{i,k,t-1} + \alpha_{10} \ln(AddVal)_{k,t-1} \\ & + \alpha_{11} \Delta NomGDP_{k,t-1} + \epsilon_{i,k,t} \end{aligned} \quad (2)$$

The SME loan growth in t to total assets in t-1 ($\Delta loan_SME_t$) is the dependent variable, whereas $\Delta loan_SME_{t-1}$ and $\Delta loan_SME_{t-2}$ are the first-lag and second-lag of the dependent variable, respectively. SME_{t-1} is the ratio of total

² In probit models, fixed effects do not provide efficient estimates.

gross SME loan portfolio to total assets in t-1. The relative size of the SME loan portfolio is intended to measure a potential “overhang effect”, as proposed by DeYoung et al. (2015). This effect is expected to have a negative impact on SME loan growth. Sec_t is the securitization variable and the main regressor of interest. Following the approach in Altumbas et al. (2009), Sec_t is a non-lagged variable because we are interested in the impact of the flow of securitized loans on SME lending in the same year. On the other hand, bank-specific and province-specific characteristics refer to t-1 (or before) in order to avoid an endogeneity bias.

The other explanatory variables are the same as in specification (1). I assume that a greater funding capacity (through deposits) and more liquid assets allow banks to support SME lending. A greater share of more liquid and less risky assets such as government bonds should also contribute to counterbalance the increase in the SME loan portfolio that consists of less liquid, more risky assets. Similarly, when the overall risk of the loan portfolio, as measured by the share of NPLs, increases, banks are expected to be more risk averse and less willing to lend to the riskiest sectors. A bank’s profitability can have a similar effect. A more profitable bank, i.e., a bank that has higher returns-on-assets, can have fewer incentives to seek more profitable opportunities such as SME lending. This can imply a negative impact of both the share of non-performing assets and profitability on SME loan growth. Conversely, a more capitalized bank is more able to absorb greater potential losses that can originate from an increase in the supply of SME loans. It follows that capitalization is expected to be a key positive determinant of SME loan growth.

The alternative (or complement) to the “SME loan growth” hypothesis is the “risk-rebalancing” hypothesis. I test the latter hypothesis through the following specification:

$$\begin{aligned} \Delta SME_{i,k,t} = & \gamma_1 \Delta loan_SME_{i,k,t-1} + \gamma_2 SME_{i,k,t-1} + \gamma_3 Sec_{i,k,t} + \gamma_4 Dep_{i,k,t-1} + \gamma_5 Liq_{i,k,t-1} + \gamma_6 NPL_{i,k,t-1} \\ & + \gamma_7 ROA_{i,k,t-1} + \gamma_8 Tier1_{i,k,t-1} + \gamma_9 \ln(AddVal)_{k,t-1} + \theta_{i,t} \quad (3) \end{aligned}$$

ΔSME_t is the growth of the gross SME loan portfolio-to-asset between t-1 and t. In other words, this variable measures how the weight of the gross SME loan portfolio changes from one year to the next. Because this change can be caused by either SME loan growth or changes in non-SME assets, I control for the first-lag of $\Delta loan_SME_t$

(i.e., $\Delta \text{loan_SME}_{t-1}$). I further conduct a robustness check by using as alternative dependent variable the part of the change of ΔSME_t that is not explained by $\Delta \text{loan_SME}_t$. The “risk-rebalancing” hypothesis is supported if the estimated coefficient of the securitization variable in specification (3) is negative and statistically significant. The assumptions about the impact of the other explanatory variables are similar to specification (2). I further study the “risk-rebalancing” hypothesis by estimating a third specification in which the dependent variable is the change in the liquidity-to-asset ratio between t-1 and t. The objective is to verify whether securitization has been used to increase the share of more liquid and less risky assets compared to the share of the SME loan portfolio. The last specification is the following:

$$\begin{aligned} \Delta \text{Liq}_{i,k,t} = & \delta_1 \Delta \text{loan_SME}_{i,k,t-1} + \delta_2 \Delta \text{Liq}_{i,k,t-1} + \delta_3 \text{SME}_{i,k,t-1} + \delta_4 \text{Sec}_{i,k,t} + \delta_5 \text{Dep}_{i,k,t-1} + \delta_6 \text{Liq}_{i,k,t-1} \\ & + \delta_7 \text{NPL}_{i,k,t-1} + \delta_8 \text{ROA}_{i,k,t-1} + \delta_9 \text{Tier1}_{i,k,t-1} + \delta_{10} \ln(\text{AddVal})_{k,t-1} + \delta_{11} \Delta \text{NomGDP}_{k,t-1} \\ & + \vartheta_{i,k,t} \quad (4) \end{aligned}$$

The dependent variable of specification (4) is the change in the ratio of cash (and equivalents) and assets available for sale to total assets between t-1 and t. Compared to specification (3), here I include in the explanatory variables the first-lag of the dependent variable (i.e., ΔLiq_{t-1}).

As a final remark on the explanatory variables, time fixed-effects are included in all of the specifications (2)-(4)³.

Specifications (2)-(4) are estimated with the system-GMM (two-step) approach (Arellano and Bover, 1995; Blundell and Bond, 1998), following Roodman (2009a). I also estimate the Arellano-Bond test for second-order correlation (AR (2)) in differences and the Hansen J-test of joint validity of instruments (the overidentification test)⁴.

Table 1 reports the summary statistics.

³ The bank fixed effects are not included because they are implied in the estimation procedure (system-GMM).

⁴ The Hansen test is preferred to the Sargan test if there is a potential heteroskedasticity problem. However, the Hansen test becomes biased as the number of instruments increases (Roodman, 2009b). For informational purposes, in each estimation I report the number of instruments.

[TABLE 1 HERE]

6 Results

6.1 Determinants of mortgage-backed securitization

This section identifies the determinants of the mortgage-backed securitization activities of Italian CBs during the financial and economic crisis (2007-2014). The results are reported in Table 2. The quality tests of the various econometric models are all statistically significant. Furthermore, the estimates of the main determinants of securitization are both consistent and robust across estimation methods. To the best of my knowledge, this is the first analysis to cover a period of this length (2007-2014) during the recent financial and economic crisis. However, I find that the principal motivations of CBs to securitize are almost consistent with those proposed by the literature; that notwithstanding, some exceptions are revealed.

Despite the positive sign of the first-lag of the securitization activity, the coefficient is statistically significant only for the probit model. When I control for the random-effects, the coefficient is not statistically significant. In contrast, in a study of the pre-crisis period, Affinito and Tagliaferri (2010) find, for Italian banks, a positive and highly statistically significant correlation between current and retarded levels of securitization activity.

The ratio of total SME loan portfolio to total assets in $t-1$ is positive and statistically significant. This suggests that a greater weight of less liquid (and likely more risky) assets, such as SME loans, increase both the probability of securitizing and the volume of securitized loans. This result is linked with the “risk-rebalancing” hypothesis that is tested further below. The characteristics of most of the securitization activities considered in the analysis did not allow CBs to derecognize the securitized loans from the balance sheet. It follows that the main explanation for this result is that CBs likely used the securitization proceedings to invest in non-SME assets.

Conversely, the ratio between total deposits and total assets in $t-1$ is both negative and statistically significant. CBs that funded their assets with deposits have been less likely to securitize (and do so to a lesser extent). This result can also be interpreted in the context of the financial crisis. CBs with a high deposit-to-asset ratio have been

less exposed to liquidity freezes and therefore are less likely to seek alternative sources of funding. The freeze of both the European interbank market and the securitization market during the crisis probably had a more negative impact on less deposit-funded banks. The ratio between the total “liquidity” (cash and securities available for sale) and total assets in t-1 can be considered as another proxy for liquidity needs. However, even though it is negative, the liquidity proxy is not statistically significant. However, the negative sign can be partially explained. Most of the “liquidity” measure is represented by securities available for sale. In the case of CBs, these securities are primarily government bonds. In case of need, these securities could be sold in the secondary market or pledged as collateral with the ECB. Conversely, banks with low “liquidity” and therefore fewer securities had to issue asset-backed securities to use them as collateral with the ECB. Furthermore, risk-free assets offer a sizable diversification effect. The SME loan portfolio-to-asset variable probably captures most of the risk level in the assets, thus explaining the insignificance of the liquidity-to-asset ratio.

The share of NPLs to total assets does not seem to be a driver of securitization activities in the period considered. Moreover, the sign of the coefficient is negative. The result is inconsistent with the literature that proposes a positive and statistically significant effect (risk-transfer mechanism) of bad loans on securitization (e.g., Pais, 2005; Gorton and Souleles, 2005; Bannier and Hänsel, 2007; Affinito and Tagliaferri, 2010) but not with those studies that find a negative or non-significant effect (e.g., DeMarzo and Duffie, 1999; Calem and Lacour-Little, 2004; Ambrose et al., 2005; Martin-Oliver and Saurina, 2007; Cardone-Riportella et al., 2010; Ferruccio and Uhde, 2015). Some of these latter studies suggest, for example, the intention to engage in regulatory capital arbitrage as a possible explanation. This hypothesis argues that banks prefer to securitize high-quality loans so that they can enjoy higher ratings on the issued tranches and then enjoy a higher regulatory capital ratio. During the financial crisis, the market required Italian CBs (and financial institutions in general) to increase their retained share of securitized loans. This exogenous shock on the securitization market could have further contributed to the banks’ preference to securitize high-quality loans instead of low-quality loans.

The negative coefficient of the profitability proxy, i.e., return-on-assets, hints that the less profitable a bank is, the more likely it is to securitize to take advantage of profit opportunities. Most of empirical studies find a similar

relationship between profitability measures and securitization activity (e.g., Bannier and Hänsel, 2008; Affinito and Tagliaferri, 2010; Cardone-Riportella et al., 2010; Casu et al., 2013).

The coefficient of the tier-1 capital ratio is negative and statistically significant. This result is consistent with the empirical study of Affinito and Tagliaferri (2010) on Italian banks, suggesting that CBs might have used securitization either to release or to free up a portion of their capital. Moreover, capital is not only the bank's buffer but also a source of funding. In the case of CBs, they can raise capital only from their members. During the financial crisis, CBs that experienced more constraints in raising capital from members might have used securitization as an alternative funding source.

Of the three control variables, only SME loan growth is statistically significant. In particular, the impact of SME loan growth on securitization activity is negative. This is consistent with the assumption that CBs that have experienced fewer supply and demand constraints in lending to SMEs, have been less likely to securitize loans and have securitized a smaller quantity of loans. Because the estimated models prevent an allowance for time-fixed effects, this result might also be driven by the dynamics of the SME loan market and the securitization market during the financial crisis⁵.

[TABLE 2 HERE]

6.2 The impact on SME lending

This section studies the impact of the mortgage-backed securitization activities of the Italian CBs on SME lending activity. More specifically, I test two hypotheses. Whereas the first hypothesis is concerned with the impact of securitization on SME loan growth, i.e., the “SME loan growth” hypothesis, the second hypothesis considers the impact of securitization on the growth of the share of the SME loan portfolio to total assets, i.e., the “risk-rebalancing” hypothesis. I estimate three specifications, as explained in section 5. The dependent variable of the

⁵ The time-fixed effects are not included in the econometric models because of high multicollinearity with the explanatory variables. Moreover, the random-effects models either failed to converge or led to ambiguous results.

first specification is the ratio of new SME loans to the previous-year total assets. This specification is intended to test the “SME loan growth” hypothesis. The second and third specifications have as their dependent variable the change in the SME loan portfolio-to-asset ratio and the change in the liquidity-to-asset ratio, respectively. The second and third specifications are intended to test the “risk-rebalancing” hypothesis.

The results are summarized in Table 3. The p-values of the second-lag autocorrelation test and the Hansen J-test of overidentification suggest both that the three models are well specified and that the estimates are reliable.

The impact of the SME loan portfolio-to-asset is negative and statistically significant in the second and third specifications. The presence of a potential “overhang risk” (DeYoung et al., 2015) that is proxied by a high SME loan portfolio-to-asset ratio does not seem to result in a reduction in the supply of SME loans but instead in a decline in the share of SME loans to total assets. The “overhang risk” stems from the fact that the SME loan portfolio is less liquid than other types of loan portfolios (e.g., residential mortgages) or securities (e.g., government bonds). Furthermore, banks that specialize in SME lending also tend to reduce the share of liquid assets. In terms of impact size, a one-standard-deviation increase (12.4% of total assets) in the SME loan portfolio-to-asset is associated with a next-year decrease in the SME loan portfolio-to-asset equal to 1.2% and a next-year decrease in liquidity-to-asset equal to 2.6%.

The main variable of interest, i.e., the total issuance of securitized assets to total previous-year assets, is statistically significant only in the second and third specifications. The coefficient in the second specification is negative and highly statistically significant. Conversely, the coefficient in the liquidity-to-asset growth specification is positive and significant only at the 10% statistical level. This result does not support the “SME loan growth” hypothesis but instead, supports the “risk-rebalancing” hypothesis. Securitization activities weakly result in an increase in liquidity, hinting of some evidence that part of the proceedings from securitization have been invested in liquid assets, such as government bonds, compared to SME loans. However, this weak statistical relationship notes that such investments were more common in non-SME assets. A one-standard-deviation increase (1.4% of previous-year total assets) in the issuance of new mortgage-backed securities is associated with a next-year decline in SME loan portfolio-to-assets equal to 0.7% and a next-year increase in liquidity-to-assets equal to 0.4%. With respect to the findings from other studies, the literature on small banks and securitization is limited but can offer

some starting points for interpretation. Baradwaj et al. (2015) find the same effect (negative and not statistically significant) for U.S. small banks, indicating that their securitization activity is unrelated to their supply of small business loans. Baradwaj et al. (2015) argue that small banks already enjoy a competitive advantage against large banks in SME lending. In the case of Italian CBs, securitization transactions were either residential or commercial mortgage-backed securities. The alternative funding provided by securitization might have allowed CBs either to engage in further expansion in the mortgage loan sector (mostly residential) or to invest in non-loan assets.

Unlike the SME loan portfolio and the securitization variables, the deposit-to-asset ratio seems to have a positive and statistically significant impact on SME loan growth but a negative impact on liquidity. During the crisis, deposit-funded CBs have had access to a more stable, cheaper source of funding to finance its lending activity in the SME sector. This can also explain why more deposit-funded CBs have invested less in more liquid assets. That said, both impacts are somewhat limited. A one-standard-deviation increase (11.9% of total assets) in the deposit-to-asset ratio is associated with a next-year increase in new SME loans equal to 0.7% of the total SME loan portfolio and a next-year decrease in the liquidity-to-asset ratio equal to 0.7%.

Additionally, the level of liquid assets has had a positive and statistically significant impact on the supply of SME loans. First, marketable securities, such as government bonds, might have been used as collateral in the main and, especially, long term refinancing operations with the Eurosystem. This extra funding might have been used to support SME lending⁶. Second, liquid assets have an important diversification effect and banks can easily sell highly liquid securities in the market to finance SME loans. This is consistent with the result of the third specification, in which the coefficient turns negative. A one-standard-deviation increase (10.5% of total assets) in liquidity-to-asset ratio is associated with a next-year increase in new SME loans equal to 0.7% of the total SME loan portfolio and a next-year decrease in the liquidity-to-asset ratio equal to 2.8%.

The results for the impact of deposits and liquidity on the supply of SME loans are similar to the findings of other studies. For example, Altunbas et al. (2009) argue that European banks with a more liquid portfolio are more

⁶ Since the first TLTRO programme was implemented in September 2014 and this study covers the period 2007-2014 (and the most recent observation on the liquidity ratio is 2013), I assume that the funding from the ECB might have been used to finance not only SME loans but also non-SME investments.

likely to expand their supply of loans. With respect to the financial crisis, Bonaccorsi di Patti and Sette (2015) find that Italian banks that relied more on securitization as a source of funding effected a greater reduction in the credit supply to nonfinancial firms. During the crisis, the freeze of the securitization market has reinforced the freeze of the interbank market, amplifying the positive impact of available liquidity and traditional deposit funding on SME lending.

Nevertheless, a higher credit risk in the loan portfolio results in lower SME loan growth and lower growth of the SME loan portfolio-to-asset. The impact of the weight of NPLs on the SME portfolio has been particularly sizeable during the financial and economic crisis. A higher share of NPLs in the previous year implies, in the next year, higher loan-loss provisions, greater potential loan losses and consequently, reduced capital buffers. It can be argued that during the crisis, the effect was amplified by an increase in the banks' risk aversion. A one-standard-deviation increase (2.6% of total assets) in NPLs to total assets is associated with a next-year decline in new SME loans equal to 0.8% of total SME loan portfolio and a next-year decrease in the SME loan portfolio-to-assets equal to 0.6%.

The bank's profitability has a negative and highly statistically significant impact on the share of the SME loan portfolio. A one-standard-deviation increase (0.6% of total assets) in the return-on-asset ratio is associated with a next-year decline in the SME loan portfolio-to-asset ratio equal to 0.7%.

Similar to more profitable banks, more capitalized banks tend to shrink the supply of new SME loans. A one-standard-deviation increase (8.2% of risk-weighted assets) in the tier-1 ratio is associated with a next-year decline in new SME loans equal to 0.9%.

The results about the impact of bank's profitability and capitalization on SME lending are not consistent with the expectations. However, a possible explanation can be the mechanism of "evergreening" of loans. With evergreening practices, bank issues new loans to existing borrowers to enable them to maintain payments on outstanding troubled loans that would impair the bank's reported capital and profitability (Peek and Rosengren, 2005). In support of this explanation, Albertazzi and Marchetti (2010) find evidence that larger less-capitalized banks reduced lending to riskier borrowers after the onset of the financial crisis, but this "flight to quality" did not occur for smaller less capitalized banks.

[TABLE 3 HERE]

6.3 Robustness checks

6.3.1 Balanced panel

As a preliminary analysis, I test whether the decision to use an unbalanced panel leads to biased estimates of the main variable of interest in specifications (2)-(4). Table 4 provides the estimates of only the balanced panel. When using a balanced panel, the number of banks shrinks from 368 to 291 (roughly 21% fewer banks). Similar to the results in Table 4, the securitization-to-asset variable is not statistically significant in the “new SME loans” specification (first), but has a negative and statistically significant impact on the share of the SME loan portfolio (second). Unlike the estimate in the unbalanced panel, the impact on the change in the liquidity-to-asset ratio becomes statistically insignificant.

[TABLE 4 HERE]

6.3.2 Retarded securitization activity

The securitization variable is the ratio of issued mortgage-backed securities in one year to total assets at the end of the previous year. I then consider in the original specifications the impact of the securitized assets that year on new SME loans over the same year. However, this securitization can have a retarded effect on SME loan growth. Table 5 offers the estimates of specifications (2)-(4), including the first lag of the securitization variable. However,

the results remain unchanged and the retarded securitization variable is not statistically significant in any of the three specifications.

[TABLE 5 HERE]

6.3.3 “Net” SME loan portfolio growth

As a further exercise, I reconsider the definition of the SME loan portfolio-to-asset in specification (3). The first lag of the SME loan growth in specification (3) might not be sufficiently able to remove the part of the growth of the SME loan portfolio-to-asset that is attributable only to the issuance of new SME loans. I construct an alternative measure of the growth of the SME loan portfolio-to-asset that is the residual of the regression of the growth of the SME loan portfolio-to-asset on the new SME loans in the same year to total assets in the previous year. Table 6 presents the estimates of specification (3), in which the dependent variable is replaced with the new measure of the SME loan portfolio-to-asset growth. The negative impact of the securitization activities is still highly statistically significant, but the size of the coefficient is smaller than the estimate in Table 4. A one-standard-deviation increase (1.4% of previous-year assets) in the securitization variable is associated with a decrease of 0.4% in the growth of the SME loan portfolio-to-asset that is explained by a change in non-SME assets. This more robust result further supports the “risk-rebalancing” hypothesis.

[TABLE 6 HERE]

6.3.4 Pre- and post-2010

The regulatory reforms that were implemented after the financial crisis have increased the opportunity costs of asset-backed securities operations as compared to other instruments such as covered bonds (EBA, 2015). The

first important regulatory reform was the “Risk Retention Rule” that was introduced in 2011. Furthermore, the unconventional refinancing operations of the ECB might have offered to banks an alternative source of funding that reduced the incentives to issue asset-backed securities. As a consequence, in the case of Italian CBs, there might have occurred a substitution effect between mortgage-backed securities and other sources of funding. However, I believe that the changes in the regulatory framework and in the monetary policy have had a limited substitution effect for the Italian CBs. First, to the best of my knowledge, there is no evidence that the Italian CBs have issued covered bonds in the period 2007-2014. Second, in order to access the ECB funds, banks should provide ABSs or other marketable securities as collateral⁷.

However, even if the substitution effect was limited, in the period 2010-2014 (as compared to the period 2007-2010), the sovereign debt crisis, the change in the regulatory treatment of ABSs and the intensification of the unconventional refinancing operations of the ECB can have affected the incentives of CBs to issue ABSs and the impact of the ABSs on the supply of SME loans.

In order to investigate a potential structural change in the determinants of securitization activity between 2007-2010 and 2011-2014, I estimate three different specifications of the probability and volume of mortgage-backed securitization operations, respectively. In the first specification I introduce in specification (1) (entire sample over the period 2007-2014) a dummy variable that controls for the time fixed-effect of the period 2011-2014. In the second and third specifications, specification (1) is estimated in the sub-periods 2007-2010 and 2011-2014, respectively. Results are reported in Table 7. First, compared to the base results in Table 3, three variables -SME loan portfolio to assets, the profitability measure and the new SME loans to assets- are no longer statistically significant in all the specifications. This result suggests that the impact of these bank’s characteristics on securitization issuance is time dependent. The time dummy is indeed very significant in both statistical and economic terms. In particular, it hints that both the probability and the volume of securitization operations of CBs have increased dramatically after 2010. In the sample, the average total yearly issuance of mortgage-backed securities changed from about 0.2% of assets in 2007-2010 to 0.5% in 2011-2014. Furthermore, a bank that

⁷ In the empirical analysis, marketable securities are included in the variable *Liq.*

securitized in the previous year has had a greater probability to securitize also in the subsequent year in the period 2011-2014. Finally, in contrast to the base results where the liquidity variable is not statistically significant, liquidity turns out to be a major driver of the securitization activity of CBs in the first years after the onset of the financial crisis when banks' access to short-term funding was severely constrained.

As for what concerns the impact of securitization on SME lending activity, I investigate the existence of a structural change between 2007-2010 and 2011-2014 by introducing an interaction term of the securitization variable with a time dummy for the period 2007-2010 in specifications (2)-(4). Consistent to the base results in Table 3, I observe that securitization has had no statistical impact on the supply of new loans to SMEs in both sub-periods (Table 8). However, there seems to have been a difference in terms of impact on the asset composition. On the one hand, the risk-rebalancing effect of securitization on the SME portfolio has been much smaller in the period 2007-2010 than in period 2011-2014. It can be argued that while the growth rate of the SME loan portfolio has reduced after 2010, the quality of the SME portfolio has decreased mostly in the same period. Thus, the need of rebalancing risk has been greater after 2010. On the other hand, the negative impact of securitization has been smaller or even positive on the growth of the share of liquid assets in the period 2007-2010. In conclusion, it can be assumed that the risk-rebalancing effect has been much stronger in the period 2011-2014 than in the period 2007-2010.

7 Conclusions

The financial and economic crisis affected both the SME sector and the Italian banking system. The Italian cooperative banking system was also affected by the crisis, suffering from a dramatic increase in NPLs. The increasing riskiness of loan portfolios combined with the freeze of the liquidity market should have had a negative impact on the supply of loans to SMEs. Those loans are usually less liquid than other types of loans, such as residential mortgages. Several CBs implemented securitization operations (RMBSs and CMBSs) during the crisis period considered (2007-2014).

First, I investigate the determinants of the securitization activities of Italian CBs during the financial and economic crisis. Second, I investigate the impact of those securitization activities on the supply of new SME loans.

I find that less deposit-funded, less profitable and less capitalized CBs have been more likely to securitize (mortgage) loans during the crisis and to a larger extent. These results are consistent with pre-crisis studies, except for the impact of NPLs, which is not statistically significant. In the analysis of the determinants, I also consider the share of the SME loan portfolio to total assets. The positive relationship between the SME loan portfolio-to-assets and the decision to securitize hints that CBs have used securitization to manage the increasing weight of their SME loan portfolios on their balance sheets. The findings of the impact analysis confirm this interpretation.

As far as the impact is concerned, I find that securitization activities have not affected the supply of new loans to SMEs. However, I find a risk-rebalancing effect of securitization, especially for the period 2011-2014. Given the increased credit demand from SMEs during the financial and economic crisis, CBs have used securitization to reduce the weight of their SME loan portfolios on their balance sheets. There is some evidence that CBs have invested the proceedings from the issuance of securitized assets in liquid assets (e.g., government bonds). However, it seems that in general, CBs have invested in non-SME assets.

This paper contributes to the literature on the impact of securitization on lending activity, particularly with regard to small banks. The main policy implication is that securitization can support SME lending not only directly as a credit-risk transfer mechanism and funding source but also indirectly by rebalancing the risk in a bank's overall assets.

References

- V. V. ACHARYA – P. SCHNABL – G. SUAREZ, “Securitization without risk transfer”, *Journal of Financial Economics*, Vol. 107(3), pp. 515-536.
- M. AFFINITO – E. TAGLIAFERRI (2010), "Why do (or did?) banks securitize their loans? Evidence from Italy", *Journal of Financial Stability*, Vol. 6(4).
- U. ALBERTAZZI - D. J. MARCHETTI (2010), "Credit supply, flight to quality and evergreening: An analysis of bank-firm relationships after Lehman", Working Paper No. 756, Bank of Italy.

- Y. ALTUNBAS - L. GAMBACORTA - D. MARQUES-IBANEZ (2009), "Securitisation and the bank lending channel", *European Economic Review*, Vol. 53(8).
- B. W. AMBROSE - M. LACOUR-LITTLE - A. B. SANDERS (2005), "Does regulatory capital arbitrage, reputation, or asymmetric information drive securitization?", *Journal of Financial Services Research*, Vol. 28(1–3), pp. 113–133.
- M. ARELLANO - O. BOVER (1995), "Another look at the instrumental variable estimation of error-components models", *Journal of Econometrics*, Vol. 68(1), pp. 29-51
- C. E. BANNIER - D. N. HÄNSEL (2008), "Determinants of European banks' engagement in loan securitization", discussion paper, Deutsche Bundes bank.
- B. G. BARADWAJ - M. DEWALLY - Y. SHAO (2013), "Does securitization support entrepreneurial activity?", *Journal of Financial Services Research*, Vol. 47, pp. 1–25.
- E. BARTOV (1993), "The timing of asset sales and earnings manipulation", *Accounting Review*, Vol. 68(4), pp. 840-855.
- A. BERGER - G. UDELL (1995), "Relationship lending and lines of credit in small firm finance", *Journal of Business*, Vol. 68, pp. 351-381.
- BIS—BANK FOR INTERNATIONAL SETTLEMENTS, *78th Annual Report*, Basel, 2008.
- R. BLUNDELL - S. BOND (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics*, Vol. 87(1), pp. 115-143
- E. B. BONACCORSI DI PATTI - E. SETTE (2015), "Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register", *Journal of Financial Intermediation*, Vol. 25, pp. 54–76.
- C. BONNER - D. STREITZ - M. WEDOW (2016), "On the differential impact of securitization on bank lending during the financial crisis", De Nederlandsche Bank Working Paper No. 501. Available at SSRN: <https://ssrn.com/abstract=2740418>
- P. S. CALEM - M. LACOUR-LITTLE (2004), "Risk-based capital requirements for mortgage loans", *Journal of Banking and Finance*, Vol. 28, pp. 647–672.

-
- S. CARBÓ-VALVERDE - H. DEGRYSE - F. RODRÍGUEZ-FERNÁNDEZ (2015), "The impact of securitization on credit rationing: Empirical evidence", *Journal of Financial Stability*, Vol. 20, pp. 36–50.
- S. CARBÓ-VALVERDE - D. MARQUES-IBANEZ - F. RODRÍGUEZ-FERNÁNDEZ (2011), "Securitization, bank lending and credit quality: The case of Spain", European Central Bank Working Paper, No. 1329.
- C. CARDONE-RIPORTELLA - R. SAMANIEGO-MEDINA - A. TRUJILLO-PONCE (2010), "What drives bank securitisation? The Spanish experience", *Journal of Banking and Finance*, Vol. 34(11), pp. 2639-2651
- B. CASU - A. CLARE - A. SARKISYAN - S. THOMAS (2013), "Securitization and bank performance", *Journal of Money, Credit and Banking*, Vol. 45(8), pp. 1–18.
- S. CHEUN - I. VON KÖPPEN-MERTES - B. WELLER (2009), "The collateral frameworks of the Eurosystem, the Federal Reserve system and the Bank of England and the financial market turmoil", Occasional Paper Series, No. 107, European Central Bank: Frankfurt am Main.
- C. W. COLAMIRIS - J. R. MASON (2004), "Credit card securitization and regulatory arbitrage", *Journal of Financial Services Research*, Vol. 26(1), pp. 5–27.
- R. DEYOUNG - A. GRON - G. TORNA - A. WINTON (2015), "Risk overhang and loan portfolio decisions: Small business loan supply before and during the financial crisis", *The Journal of Finance*, Vol. 70(6), pp. 2451–2488.
- P. DEMARZO - D. DUFFIE (1999), "A liquidity-based model of security design", *Econometrica*, Vol. 67(1), pp. 65–99.
- R. S. DEMSETZ (1999), "Bank loan sales: A new look at the motivations for secondary market activity", Federal Reserve Bank of New York, Research Report.
- Y. DEMYANYK - O. VAN HEMERT (2011), "Understanding the subprime mortgage crisis", New York University, Stern School of Business, Mimeo.
- D. DIAMOND (1984), "Financial intermediation and delegated monitoring", *Review of Economic Studies*, Vol. 51(3), pp. 393–414.
- D. DIAMOND - P. DYBVIK (1983), "Bank runs, deposit insurance and liquidity", *Journal of Political Economy*, Vol. 91(3), pp. 401–419.

- K. K. DONAHOO - S. SHAFFER (1991), "Capital requirements and the securitization decision", *Quarterly Review of Economics and Business*, Vol. 31(4), pp. 12–23.
- A. ESTRELLA (2002), "Securitization and efficacy of monetary policy", *FRBNY Economics Policy Review*, Vol. 8, pp. 243–255.
- EUROPEAN BANKING AUTHORITY (2015), *EBA report on qualifying securitisation: Response to the commission's call for advice of January 2014 on long-term financing*, Available: <https://www.eba.europa.eu/documents/10180/950548/EBA+report+on+qualifying+securitisation.pdf>
- EUROPEAN COMMISSION (2015), *2015 SBA Fact Sheet — Italy*, Available: <http://ec.europa.eu/DocsRoom/documents/16344/attachments/18/translations/en/renditions/native>
- C. FARRUGGIO - A. UHDE (2015), "Determinants of loan securitization in European banking", *Journal of Banking and Finance*, Vol. 56, pp. 12-27
- F. FIORDELISI - D. S. MARE (2013), "Probability of default and efficiency in cooperative banking", *Journal of International Financial Markets Institutions and Money*, Vol. 26, pp. 30–45
- G. GORTON - A. METRICK (2010), "Regulating the shadow banking system", *Brookings papers on economic activity*, Vol. 2010.2, pp. 261-297.
- G. B. GORTON - G. G. PENNACCHI (1995), "Banks and loan sales marketing nonmarketable assets", *Journal of Monetary Economics*, Vol. 35(3), pp. 389–411.
- G. B. GORTON - N. S. SOULELES (2005), "Special purpose vehicles and securitization", in NBER Working Papers, No. 11190 (In: Stulz, R. and Carey, M. (Eds.), *The risks of financial institutions*, University of Chicago Press, Chicago, 2006).
- S. I. GREENBAUM - A.V. THAKOR (1987), "Bank funding modes: Securitization versus deposits", *Journal of Banking and Finance*, Vol. 11(3), pp. 379-401.
- GRUPPO CERVED (2015), *Rapporto Cerved PMI 2015*.
- A.C. HESS - C.W. SMITH (1988), "Elements of mortgage securitization", *The Journal of Real Estate Finance and Economics*, Vol. 1(4), pp. 331-346.
- M. HOFFMANN - B. SØRENSEN (2015), "Small firms and domestic bank dependence in Europe's Great

Recession", Working paper, University of Zurich.

- R. IRANI (2012), "Bank health and corporate liquidity provision", Mimeo, NYU Stern.
- D. JONES (2000), "Emerging problems with the Basel capital accord: regulatory capital arbitrage and related issues", *Journal of Banking and Finance*, Vol. 24(1–2), pp. 35-58
- E. KARAOGLU (2005), "Regulatory capital and earnings management in banks: The case of loan sales and securitizations", FDIC Center for Financial Research Working Paper, N. 2005-05. Available: https://www.fdic.gov/bank/analytical/cfr/2005/wp2005/CFRWP_2005_05_Karaoglu.pdf
- B. J. KEYS - T. MUKHERJEE - A. SERU - V. VIG (2010), "Did securitization lead to lax screening? Evidence from subprime loans", *The Quarterly Journal of Economics*, Vol. 125(1), pp. 307-362.
- K. KUTTNER (2000), "Securitization and monetary policy", Mimeo, Federal Reserve Bank of New York, New York.
- E. LOUTSKINA - P. E. STRAHAN (2009), "Securitization and the declining impact of bank finance on loan supply: Evidence from mortgage originations", *The Journal of Finance*, Vol. 64(2), pp. 1–29.
- E. LOUTSKINA (2011), "The role of securitization in bank liquidity and funding management", *Journal of Financial Economics*, Vol. 100(3), pp. 663–684.
- A. MARTIN-OLIVER - J. SAURINA (2007), "Why do banks securitize assets?", Banco de España, Mimeo.
- C. MERKL - S. STOLZ (2006), "Bank's regulatory buffers, liquidity networks and monetary policy transmission", Discussion paper, No. 06/2006, Deutsche Bundesbank, Frankfurt am Main.
- A. MIAN - A. SUFI (2007), "The consequences of mortgage credit expansion: Evidence from the 2007 mortgage default crisis", University of Chicago GSB, Mimeo.
- B. A. MINTON - A. SANDERS - P. STRAHAN (2004), "Securitization by banks and finance companies: Efficient financial contracting or regulatory arbitrage?", Working Paper, Ohio State University.
- A. PAIS (2005), "The role of securitization in the capital structure of banks", Massey University, Mimeo.
- F. PANETTA - A. F. POZZOLO (2010), "Why do banks securitize their assets? Bank-level evidence from over one hundred countries", SSRN Working Paper, available at <http://ssrn.com/abstract=1572983> or <http://dx.doi.org/10.2139/ssrn.1572983>.

- C. PAVEL - D. PHILLIS (1987), "Why commercial banks sell loans: An empirical analysis", *Economic Perspectives*, Vol. 11(3), Federal Reserve Bank of Chicago.
- J. PEEK - E. S. ROSENGREN (2005), "Unnatural selection: Perverse incentives and the misallocation of credit in Japan", *American Economic Review*, Vol. 95(4).
- G. G. PENNACCHI (1988), "Loan sales and the cost of bank capital", *The Journal of Finance*, Vol. 43(2), pp. 375–396.
- S. M. PHILLIPS (1996), "The place of securitization in the financial system: implications for banking and monetary policy", in Kendall, L.T. and Fishman, M.J. (Eds.), *A primer on securitization*, The MIT Press, Cambridge, Massachusetts.
- D. ROODMAN (2009a), "How to do xtabond2: An introduction to difference and system GMM in Stata", *The Stata Journal*, Vol. 9(1), pp. 86-136.
- D. ROODMAN (2009b), "A note on the theme of too many instruments", *Oxford Bulletin of Economics and Statistics*, Vol. 71(3), pp. 135-158.
- M. SEGOVIANO - B. JONES - P. LINDNER - J. BLANKENHEIM (2015), "Securitization: The road ahead", Staff Discussion Notes, SDN/15/01, International Monetary Fund.
- A. SHIVDASANI - Y. WANG (2011), "Did structured credit fuel the LBO boom?" *The Journal of Finance*, Vol. 66(4), pp. 1291-1328.
- R. ZARUTSKIE (2013), "Competition, financial innovation and commercial bank loan portfolios", *Journal of Financial Intermediation*, Vol. 22(3), pp. 373–396.

Tables and Figures

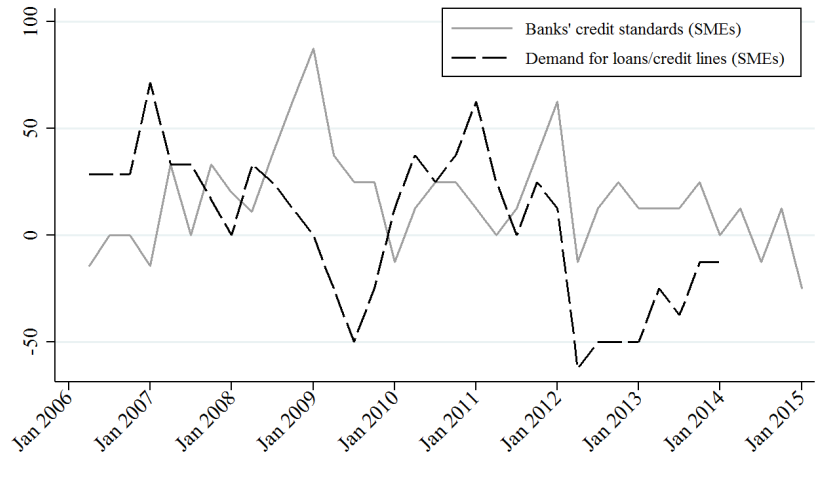


Figure 1: Credit standards and demand for credit: January 2006-January 2015

This figure shows the relationship between the change in credit standards applied by the eight major Italian credit groups on SME lending and the demand for loans and credit lines from SMEs.

Source: Bank of Italy (Bank Lending Survey), author's calculations

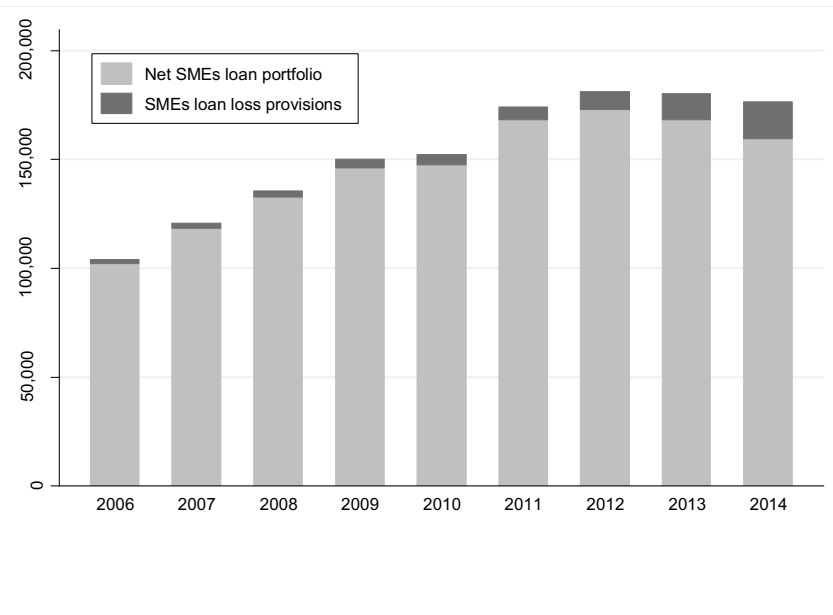


Figure 2: SME loan portfolios of Italian cooperative banks: 2006-2014

This figure shows the evolution of the CBs' SME loan portfolio. It compares the median size of the net SME portfolio with the median size of SME loan-loss provisions. Data are expressed in thousands of euros.

Source: ABI Banking database, author's calculations

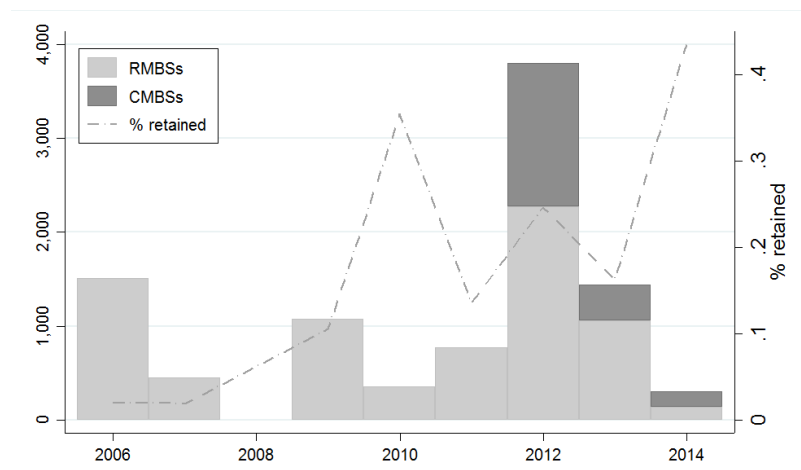


Fig. 3 Securitization issuance of Italian cooperative banks: 2006-2014

This figure shows the mortgage-based securitization issuance of Italy's CBs. The securitization data represents only the placed amount. The figure compares the issuance of residential mortgage-backed securities (RMBSs) with commercial mortgage-backed securities (CMBSs). Data are in millions of euros.

Source: Securitisation.it, author's calculations.

Table 1
Summary statistics

This table presents the summary statistics of the dependent and explanatory variables of specifications (1)-(4).

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
$\Delta\text{loan_SME}_t$	SME loan growth to assets	2,748	0.023	0.054	-0.411	1.164
SME_{t-1}	SME loan portfolio to assets	2,748	0.440	0.124	0.004	0.730
ΔSME_t	SME loan portfolio to assets growth	2,380	-0.010	0.039	-0.214	0.319
Sec_t	Securitization-to-asset	2,748	0.003	0.014	0	0.184
Sec_t (dummy)	Securitization (t) (dummy)	2,748	0.065	0.247	0	1
Dep_{t-1}	Deposit-to-asset ratio	2,748	0.466	0.119	0.000	0.834
Liq_{t-1}	Liquidity-to-asset ratio	2,748	0.195	0.105	0.006	0.721
ΔLiq_{t-1}	Liquidity-to-asset ratio growth	2,380	0.023	0.052	-0.260	0.337
NPL_{t-1}	NPLs-to-asset ratio	2,748	0.043	0.026	0	0.182
ROA_{t-1}	Return-on-asset ratio	2,748	0.005	0.006	-0.051	0.044
Tier1_{t-1}	Tier 1 capital ratio	2,748	0.173	0.082	0.032	1.086
$\ln(\text{AddVal})_{t-1}$	Added value (natural log)	2,748	10.112	0.283	9.479	10.742
$\Delta\text{NomGDP}_{t-1}$	Nominal GDP growth rate	2,748	0.007	0.032	-0.119	0.111

Table 2

Determinants of securitization activity

The table presents the results of the estimation of four models in which the dependent variable is the bank's mortgage-backed securitization activities. (I) and (II) are probit models in which the dependent variable is a dummy: 0 = no securitization activity in year t; 1 = securitization activity in year t. (III) and (IV) are Tobit models in which the dependent variable is the ratio between the total issuance of securitized loans in t to the total assets in t-1. The standard errors are within brackets. There are clustered standard errors for (II) and (IV). The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	Sec _t (dummy)		Sec _{t-1}	
	(I) Probit	(II) Random effects probit	(III) Tobit	(IV) Random effects tobit
Sec _{t-1} (dummy)	0.349** (0.135)	0.129 (0.172)	- -	- -
Sec _{t-1}	- -	- -	0.345 (0.203)	0.059 (0.237)
SME _{t-1}	1.186** (0.570)	1.488** (0.752)	0.115* (0.060)	0.136** (0.066)
Dep _{t-1}	-1.642*** (0.483)	-1.795*** (0.584)	-0.158*** (0.049)	-0.161*** (0.052)
Liq _{t-1}	-0.146 (0.567)	0.073 (0.773)	-0.025 (0.065)	-0.010 (0.068)
NPL _{t-1}	-1.411 (1.729)	-0.945 (2.135)	-0.133 (0.178)	-0.089 (0.188)
ROA _{t-1}	-20.212** (7.989)	-21.969** (9.862)	-1.807** (0.859)	-1.868** (0.873)
Tier1 _{t-1}	-7.455*** (1.340)	-7.956*** (1.594)	-0.704*** (0.138)	-0.699*** (0.146)
Δloan_SME _{t-1}	-2.649*** (0.962)	-3.136** (1.242)	-0.282*** (0.108)	-0.312*** (0.110)
ln(AddVal) _{t-1}	-0.068 (0.247)	-0.063 (0.265)	-0.007 (0.021)	-0.007 0.023
ΔNomGDP _{t-1}	1.805 (1.307)	2.003 (1.545)	0.129 (0.138)	0.148 (0.137)
Observations	2,380	2,380	2,380	2,380
Number of banks	368	368	368	368
Pseudo R2	0.128	-	0.278	-
Wald Chi2	124.10***	78.48***	-	62.48***
LR Chi2	-	-	142.28***	-

Table 3

The impact of securitization activity on SME loan growth, SME loan portfolio growth and liquidity growth

The table presents the estimates with system-GMM (two step) of three different specifications. In specification (I), the dependent variable is the growth of the supply of SME loans between t-1 and t to total assets. In specification (II), the dependent variable is the growth of the SME loan portfolio to total assets between t-1 and t. In specification (III), the dependent variable is the growth in the liquidity (cash and assets available for sale) to total assets between t-1 and t. The standard errors are within brackets. Standard errors are robust and clustered at bank level. The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	(I) $\Delta\text{loan_SME}_t$	(II) ΔSME_t	(III) ΔLiq_t
$\Delta\text{loan_SME}_{t-1}$	0.085 (0.058)	0.064 (0.044)	-0.106 (0.075)
$\Delta\text{loan_SME}_{t-2}$	0.050** (0.021)	- -	- -
ΔLiq_{t-1}	- -	- -	-0.138 (0.084)
SME_{t-1}	-0.049 (0.034)	-0.095*** (0.025)	-0.207*** (0.052)
Sec_t	-0.073 (0.130)	-0.526*** (0.149)	0.371* (0.193)
Dep_{t-1}	0.056** (0.022)	-0.005 (0.015)	-0.062* (0.033)
Liq_{t-1}	0.066* (0.037)	0.018 (0.022)	-0.270*** (0.055)
NPL_{t-1}	-0.305*** (0.079)	-0.235*** (0.068)	0.040 (0.112)
ROA_{t-1}	-0.645 (0.459)	-1.106*** (0.415)	-0.784 (0.668)
Tier1_{t-1}	-0.114** (0.048)	-0.055 (0.039)	0.022 (0.068)
$\ln(\text{AddVal})_{t-1}$	0.008 (0.005)	0.011** (0.005)	-0.012 (0.008)
$\Delta\text{NomGDP}_{t-1}$	0.044 (0.035)	-0.006 (0.030)	0.046 (0.039)
Observations	2,012	2,380	2,012
Number of banks	368	368	368
Number of instruments	168	192	175
Arellano-Bond test AR(2) (p-value)	0.184	0.204	0.447
Hansen test of overid. (p-value)	0.446	0.294	0.399

Table 4

The impact of securitization activity on SME loan growth, SME loan portfolio growth and liquidity growth (balanced panel)

The table presents the estimates with system-GMM (two step) of three different specifications. In specification (I), the dependent variable is the growth of the supply of SME loans between t-1 and t to total assets. In specification (II), the dependent variable is the growth of the SME loan portfolio to total assets between t-1 and t. In specification (III), the dependent variable is the growth in the liquidity (cash and assets available for sale) to total assets between t-1 and t. The standard errors are within brackets. Standard errors are robust and clustered at bank level. The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	(I) $\Delta\text{loan_SME}_t$	(II) ΔSME_t	(III) ΔLiq_t
$\Delta\text{loan_SME}_{t-1}$	0.058 (0.065)	0.055 (0.055)	-0.104 (0.078)
$\Delta\text{loan_SME}_{t-2}$	0.055** (0.025)	- -	- -
ΔLiq_{t-1}	- -	- -	-0.097 (0.089)
SME_{t-1}	-0.054 (0.034)	-0.085*** (0.022)	-0.182*** (0.058)
Sec_t	-0.107 (0.127)	-0.547*** (0.151)	0.310 (0.203)
Dep_{t-1}	0.054** (0.022)	-0.017 (0.014)	-0.062** (0.031)
Liq_{t-1}	0.055 (0.036)	0.006 (0.021)	-0.251*** (0.049)
NPL_{t-1}	-0.270*** (0.070)	-0.238*** (0.069)	-0.014 (0.110)
ROA_{t-1}	-0.445 (0.443)	-1.267*** (0.462)	-0.331 (0.633)
Tier1_{t-1}	-0.096** (0.042)	-0.004 (0.037)	-0.022 (0.072)
$\ln(\text{AddVal})_{t-1}$	0.009 (0.006)	0.010** (0.004)	-0.021** (0.009)
$\Delta\text{NomGDP}_{t-1}$	0.026 (0.039)	-0.010 (0.033)	0.055 (0.044)
Observations	1,746	2,037	1,746
Number of banks	291	291	291
Number of instruments	164	192	164
Arellano-Bond test AR(2) (p-value)	0.219	0.198	0.763
Hansen test of overid. (p-value)	0.473	0.331	0.273

Table 5

The impact of securitization activity on SME loan growth, SME loan portfolio growth and liquidity growth
(first-lag of securitization activity)

The table presents the estimates with system-GMM (two step) of three different specifications. In specification (I), the dependent variable is the growth of the supply of SME loans between t-1 and t to total assets. In specification (II), the dependent variable is the growth of the SME loan portfolio to total assets between t-1 and t. In specification (III), the dependent variable is the growth in the liquidity (cash and assets available for sale) to total assets between t-1 and t. The standard errors are within brackets. Standard errors are robust and clustered at bank-level. The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	(I) $\Delta\text{loan_SME}_t$	(II) ΔSME_t	(III) ΔLiq_t
$\Delta\text{loan_SME}_{t-1}$	0.084 (0.059)	0.061 (0.042)	-0.101 (0.077)
$\Delta\text{loan_SME}_{t-2}$	0.048** (0.021)	- -	- -
ΔLiq_{t-1}	- -	- -	-0.129 (0.085)
SME_{t-1}	-0.038 (0.032)	-0.093*** (0.025)	-0.213*** (0.054)
Sec_t	-0.033 (0.117)	-0.535*** (0.146)	0.287 (0.214)
Sec_{t-1}	-0.037 (0.029)	-0.014 (0.038)	0.035 (0.081)
Dep_{t-1}	0.056*** (0.022)	-0.006 (0.014)	-0.062* (0.033)
Liq_{t-1}	0.074** (0.036)	0.022 (0.022)	-0.280*** (0.055)
NPL_{t-1}	-0.300*** (0.078)	-0.244*** (0.068)	0.019 (0.115)
ROA_{t-1}	-0.523 (0.451)	-1.143*** (0.419)	-0.918 (0.711)
Tier1_{t-1}	-0.107** (0.046)	-0.056 (0.039)	0.028 (0.068)
$\ln(\text{AddVal})_{t-1}$	0.006 (0.005)	0.011** (0.005)	-0.012 (0.008)
$\Delta\text{NomGDP}_{t-1}$	0.034 (0.036)	-0.001 (0.030)	0.055 (0.039)
Observations	2,012	2,380	2,012
Number of banks	368	368	368
Number of instruments	173	196	179
Arellano-Bond test AR(2) (p-value)	0.187	0.208	0.520
Hansen test of overid. (p-value)	0.98	0.302	0.361

Table 6

The impact of securitization activity on SME loan portfolio growth (net growth)

The table presents the estimates with system-GMM (two step) of three specifications. The dependent variable is the growth of the SME loan portfolio to total assets between t-1 and t net of SME loan growth between t-1 and t to total assets. The standard errors are within brackets. Standard errors are robust and clustered at bank-level. The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	$\Delta\text{SME}_t(\text{net})$
$\Delta\text{SME}_{t-1}(\text{net})$	0.031 (0.071)
$\Delta\text{loan_SME}_{t-1}$	0.028 (0.035)
SME_{t-1}	-0.077*** (0.019)
Sec_t	-0.374*** (0.102)
Dep_{t-1}	-0.020 (0.014)
Liq_{t-1}	-0.011 (0.018)
NPL_{t-1}	0.023 (0.054)
ROA_{t-1}	-0.426 (0.304)
Tier1_{t-1}	0.007 (0.036)
$\ln(\text{AddVal})_{t-1}$	0.011*** (0.004)
$\Delta\text{NomGDP}_{t-1}$	-0.019 (0.019)
Observations	2,012
Number of banks	368
Number of instruments	219
Arellano-Bond test AR(2) (p-value)	0.682
Hansen test of overid. (p-value)	0.285

Table 7

Determinants of securitization activity (before and after 2010)

The table presents the results of the estimation of four models in which the dependent variable is the bank's mortgage-backed securitization activities. (I)s are random-effects probit models in which the dependent variable is a dummy: 0 = no securitization activity in year t; 1 = securitization activity in year t. (II)s are random-effects Tobit models in which the dependent variable is the ratio between the total issuance of securitized loans in t to the total assets in t-1. The standard errors are within brackets. There are clustered standard errors for (II) and (IV). The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	Sec _t (dummy)			Sec _t		
	(I) Random effects probit			(II) Random effects tobit		
Period	(Ia) (2007-2014)	(Ib) (2007-2010)	(Ic) (2011-2014)	(IIa) (2007-2014)	(IIb) (2007-2010)	(IIc) (2011-2014)
Sec _{t-1} (dummy)	0.017 (0.180)	(omitted) ^a -	0.442*** (0.154)	- -	- -	- -
Sec _{t-1}	- -	- -	- -	-0.124 (0.225)	-29.755 (5,712.053)	0.235 (0.280)
SME _{t-1}	1.168 (0.814)	0.455 (1.312)	1.174 (0.788)	0.096 (0.066)	0.039 (0.119)	0.108 (0.070)
Dep _{t-1}	-2.503*** (0.632)	-2.483** (1.238)	-2.017*** (0.587)	-0.211*** (0.053)	-0.225* (0.117)	-0.187*** (0.053)
Liq _{t-1}	-1.265 (0.858)	-5.071*** (1.905)	-0.844 (0.859)	-0.128** (0.071)	-0.483** (0.188)	-0.084 (0.076)
NPL _{t-1}	-3.342 (2.303)	-8.024 (5.240)	-2.947 (2.228)	-0.284 (0.188)	-0.771 (0.486)	-0.255 (0.197)
ROA _{t-1}	1.007 (11.873)	9.653 (28.903)	-2.540 (11.600)	0.211 (0.964)	0.969 (2.600)	-0.038 (1.016)
Tier1 _{t-1}	-9.828*** (1.816)	-8.991** (3.702)	-8.586*** (1.666)	-0.797*** (0.153)	-0.759** (0.354)	-0.782*** (0.156)
Δloan_SME _{t-1}	-0.810 (1.215)	-0.282 (2.127)	-0.613 (1.262)	-0.0091 (0.103)	-0.062 (0.199)	-0.073 (0.115)
ln(AddVal) _{t-1}	-0.001 (0.284)	0.305 (0.600)	-0.013 (0.262)	-0.001 (0.023)	0.029 (0.054)	-0.005 (0.023)
ΔNomGDP _{t-1}	-1.437 (1.823)	-3.089 (2.916)	-0.097 (2.272)	-0.172 (0.149)	-0.302 (0.270)	-0.122 (0.197)
Time dummy (2011-2014)	1.047*** (0.151)	- -	- -	0.090*** (0.013)	- -	- -
Observations	2,380	1,000	1,332	2,380	1,048	1,332
Number of banks	368	354	364	368	355	364
Wald Chi2	102.77***	23.23**	79.29***	82.90***	14.66	55.54***

^aThe securitization dummy in specification (i) is omitted because it predicts failures perfectly.

Table 8

The impact of securitization activity on SME loan growth, SME loan portfolio growth and liquidity growth
(before and after 2010)

The table presents the estimates with system-GMM (two step) of three different specifications. In specification (I), the dependent variable is the growth of the supply of SME loans between t-1 and t to total assets. In specification (II), the dependent variable is the growth of the SME loan portfolio to total assets between t-1 and t. In specification (III), the dependent variable is the growth in the liquidity (cash and assets available for sale) to total assets between t-1 and t. The standard errors are within brackets. Standard errors are robust and clustered at bank-level. The symbols *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	(I) $\Delta\text{loan_SME}_t$	(II) ΔSME_t	(III) ΔLiq_t
$\Delta\text{loan_SME}_{t-1}$	0.077 (0.060)	0.062 (0.043)	-0.109 (0.076)
$\Delta\text{loan_SME}_{t-2}$	0.047** (0.021)	- -	- -
ΔLiq_{t-1}	- -	- -	-0.147* (0.085)
SME_{t-1}	-0.045 (0.035)	-0.095*** (0.024)	-0.205*** (0.051)
Sec_t	-0.135 (0.133)	-0.581*** (0.152)	0.352* (0.184)
Sec_t * (2007-2010)	0.203 (0.190)	0.442** (0.186)	-0.539** (0.257)
Dep_{t-1}	0.058** (0.021)	-0.003 (0.014)	-0.067* (0.033)
Liq_{t-1}	0.071** (0.036)	0.021 (0.022)	-0.269*** (0.054)
NPL_{t-1}	-0.312*** (0.082)	-0.227*** (0.067)	0.017 (0.110)
ROA_{t-1}	-0.690 (0.461)	-1.087** (0.413)	-0.858 (0.649)
Tier1_{t-1}	-0.116** (0.050)	-0.056 (0.039)	0.026 (0.066)
$\ln(\text{AddVal})_{t-1}$	0.008 (0.006)	0.011** (0.005)	-0.013 (0.008)
$\Delta\text{NomGDP}_{t-1}$	0.044 (0.035)	-0.005 (0.030)	0.050 (0.038)
Observations	2,012	2,380	2,012
Number of banks	368	368	368
Number of instruments	171	196	178
Arellano-Bond test AR(2) (p-value)	0.184	0.195	0.479
Hansen test of overid. (p-value)	0.465	0.380	0.519