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Clemens Bonner, Daniel Streit
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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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De Nederlandsche Bank NV
P.O. Box 98
1000 AB AMSTERDAM
The Netherlands

On the differential impact of securitization on bank lending during the financial crisis^{*}

Clemens Bonner^a, Daniel Streitz^b and Michael Wedow^c

^a *De Nederlandsche Bank*

^b *Bonn University*

^c *European Central Bank*

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Abstract

This paper analyzes the effect of securitization on bank loan supply over the 2001 to 2013 period using a large sample of Eurozone banks. We document that an increase in banks' ABS issuances positively correlates with bank loan supply before the 2007-08 financial crisis but not afterwards. The underlying collateral of the securitization is correlated with changes of loan supply of the respective type. The main motivation for banks to issue ABS and covered bonds is their use as a funding tool. Since the required skills are similar, ABS issuers were better able to switch to covered bonds, allowing them to gain from the higher liquidity of covered bonds during and right after the financial crisis. We do not find evidence of ABS issuances increasing bank risk.

Keywords: Securitization, Credit Supply, Financial Crisis.

JEL classification: G21.

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1. Introduction

Securitization is a vital part of modern banking. Especially in the aftermath of the crisis, a large stream of literature has commented on the the economic costs of securitization, most notably the reduced incentives for banks to screen and monitor their clients (Allen and Gale (2007); Allen et al. (2009); Brunnermeier (2009); Calomiris (2009); Keys et al. (2009, 2010)).¹ The economic benefits of securitization have mainly been attributed to a possible increase in lending. The trade-off between costs and benefits is also controversial among policymakers. Specifically, the European Central Bank (ECB) and the Bank of England (BoE) recently highlighted the benefits of reviving the impaired securitization market in the European Union (ECB (2014)).

One can distinguish three channels through which securitization can increase lending. First, through risk diversification, securitization can allow banks to charge lower interest rates, which in turn spurs demand (Nadauld and Weisbach (2012)). Second, if certain criteria are met, including significant risk transfer (SRT) requirements, securitization reduces capital requirements (EBA (2014)), giving banks more leeway to issue loans (Norden et al. (2014)). Third, securitization turns illiquid assets into liquid securities allowing banks to use asset-backed securities (ABS) as a funding tool or as collateral for short-term financing transactions.²

There are a number of studies dealing with the impact of ABS on bank lending (Altunbas et al. (2009); Loutskina and Strahan (2009); Loutskina (2011); Mian and

¹ The general negative post-crisis sentiment towards ABS is also reflected in the regulatory response to the financial crisis. In BCBS (2014), the Basel Committee on Banking Supervision (BCBS) proposed to increase the risk-weights on securitization. Similarly, the initial proposals for the Liquidity Coverage Ratio (LCR), requiring banks to hold enough liquid assets to cover their outflows over the next 30 days, did not consider ABS as liquid asset (BCBS (2010)).

² Also see Bertay et al. (2015), who analyze the impact of securitization on economic activity.

Sufi (2009); Shivdasani and Wang (2011)). Existing evidence, however, is limited to the period prior to the 2007-08 financial crisis. The purpose of this paper is to provide evidence regarding the effect of securitization on bank loan supply before, during, and after the financial crisis. In line with regulatory efforts, we distinguish different types of securitization (mortgage ABS and non-mortgage ABS), compare it to the effects of covered bonds and whether the bank placed or retained the ABS. The overarching aim is to obtain a better understanding of the magnitude that the revival of the securitization market could have on lending to the real economy. To obtain a view on the economic costs of securitization, we also analyze its impact on bank riskiness.

Using a large sample of 2,089 Eurozone banks over the period from 2001 to 2013, we contribute to the literature along several dimensions. First, we study the link between securitization and bank lending before and after the financial crisis. We document that securitization and bank lending are positively correlated before but not during and after the financial crisis. Second, we assess the potential stabilising role of covered bonds as an alternative form of access to funding as suggested by Shin (2009). The author argues that long intermediation chains, as common for ABS, are inherently unstable. An increased use of products with shorter intermediation chains, such as covered bonds, could therefore strengthen the resilience of the financial system. Consistent with the theoretical arguments by Shin (2009), our paper documents that banks that relied more heavily on covered bonds before the financial crisis reduced their lending less during the crisis relative to banks that relied on ABS funding. Further, we find that ABS issuers are more likely to start issuing covered bonds during and after the financial crisis. Third, we provide a detailed assessment by loan type. We document that the collateral that is underlying is correlated with changes of loan supply of the respective

type (e.g. real ABS issuance is more related to corporate lending than to other loan types). This evidence is important as it would suggest that a revival of the real ABS market would impact corporate loan supply more than it would the mortgage loan supply (and vice versa for mortgage-backed securities (MBS) and covered bonds).

The remainder of the paper is organized as follows. In Section 2., we discuss the theoretical background. Section 3. describes our sample selection process. The main empirical analysis is presented in Section 4., while Section 5. concludes.

2. Background

2.1 What is securitization and how might it affect lending?

Analyzing the impact of securitization on bank lending requires an understanding of the various interdependencies of the two activities. Securitization is often described as the "originate to distribute" model.³ The process begins with a bank ("sponsoring bank") issuing regular loans. Once it has issued a certain amount of loans, the sponsoring bank sells the (diversified) pool of loans to a so-called Special Purpose Vehicle (SPV). The SPV is specifically established for securitization, has no physical location, no employees and is not subject to banking regulation.⁴ The SPV slices the asset pools in tranches, which are sold to investors. [Gorton and Souleles \(2007\)](#) argue that banks used to work closely with rating agencies, ensuring that the tranches are just above the rating threshold. The highest quality tranches usually receive a AAA rating.

Securitization allows banks to trade otherwise non-marketable products and shift

³ For more details, see [Gorton and Souleles \(2007\)](#).

⁴ For this reason, [Gorton and Metrick \(2012\)](#) describe SPVs as "robot companies".

the credit risk from issuing loans to investors that wish to bear it. As argued by Brunnermeier (2009), this risk diversification allowed for lower interest rates on mortgages and other types of loans. Nadauld and Weisbach (2012), for instance, show that securitization lowers the price of corporate debt. Additionally, if certain criteria are met, including significant risk transfer (SRT) requirements, securitization allows banks to reduce capital requirements.⁵ The credit lines, often referred to as liquidity backstop, which sponsoring banks usually grant to the SPV, have considerably lower or no capital requirement. Several papers show that banks pass on the benefits from risk transfer to borrowers.⁶ Lastly, banks could obtain funding either through outright sales of the ABS or by using it as collateral for short-term financing transactions. Ultimately, securitization changes the role of banks from liquidity providers to pure intermediaries between borrowers and capital markets, allowing them to issue larger amounts of loans (Diamond and Dybvig (1983)).

Especially the aftermath of the crisis showed that securitization entails substantial economic costs. Many risks that were thought to be reduced remained, in fact, unchanged.⁷ Since sponsoring banks usually provided various contractual or implicit (reputational) guarantees to the SPV, banks remained subject to similar credit risks as before. Additionally, Brunnermeier (2009) argues that banks were among the largest ABS investors and therefore rather than transferring risks outside of the banking system, ABS increased the interconnectedness among banks. Finally, Keys et al. (2009), Keys et al. (2010), and Wang and Xia (2014) argue that since banks only face the credit risk for some months, securitizations reduce banks' incentives to carefully screen and

⁵ See EBA (2014).

⁶ See, for instance, Nadauld and Weisbach (2012) or Norden et al. (2014).

⁷ See, for instance, Gorton (2009), Calomiris (2009) or Brunnermeier (2009).

monitor borrowers. [Keys et al. \(2010\)](#) find that loans that are commonly used in securitizations default at higher rates, despite the fact that they typically entail less credit risk. This finding supports the view that securitisation reduced incentives to screen borrowers.

For the purpose of our study, it is important to account for three factors: 1) The feedback loop from securitization to loan issuance (more lending leads to more securitization and vice versa); 2) the riskiness of this additional lending; and 3) the heterogeneity of the underlying loans.

Covered bonds are an alternative to securitization ([Shin \(2009\)](#)). Like ABS, covered bonds are debt securities that are backed by a pool of assets (typically mortgages). However, in contrast to ABS, the loans remain on the issuing bank's balance sheet. Hence, covered bonds are not suited as a tool to reduce the loan portfolio risk and to receive regulatory capital relief. But, just like ABS, covered bonds can be used as a funding tool and hence also positively impact bank loan supply. Due to the fact that assets backing the covered bonds remain on the issuers balance sheet, covered bonds maintain the disciplining effect on banks to carefully screen borrower given that they will incur any losses on the loan portfolio. We hypothesise that covered bond issuers may benefit from better access to funding, leading to more stable lending relative to ABS issuers. We therefore explicitly take a bank's ability to issue covered bonds into account when analyzing the effect of securitization on bank lending. Moreover, we also test whether ABS issuers switched to covered bonds during the financial crisis to substitute for the loss of funding in ABS markets.

2.2 The European Securitization Market Over Time

As shown in [EBA \(2014\)](#), the European securitization market grew significantly prior to the financial crisis. Outstanding amounts peaked at EUR 2 trillion between 2008 and 2009 compared to about EUR 250 billion in the years 2000 and 2001. After 2009, outstanding amounts have contracted. In 2013, RMBS were by far the largest market segment, followed by SME ABS. With EUR 1.5 trillion outstanding, the EU market is about one fifth of the US market.

These patterns are confirmed by [Figure 1](#), which is based on our data sample showing that issuances peak in 2008 followed by a contraction. Remarkable is the switch from non-retained to retained ABS. In 2006, almost all new issuances were placed with investors, while in 2009 banks retained more than 90% of newly issued ABS. In the same period, the amounts of ABS pledged with the Eurosystem sharply increased. [Figure 1](#) therefore shows that, while issuances decreased, European banks continued to securitize assets also after the crisis. However, instead of selling them in the market, banks used these ABS as collateral for central bank funding. It is therefore important to distinguish retained and placed ABS when analyzing the impact of securitization on credit supply.

[[Figure 1](#) here]

3. Data

Our sample comprises all Eurozone banks contained in Bankscope with a total asset value of at least 1,000 million USD.⁸ We further exclude banks with less than 3 consecutive years of data coverage. We augment the balance sheet information with information on bank securitization and covered bond issuance activity from Dealogic. In particular, we obtain information on ABS and covered bond issue volumes. The final sample comprises 2,089 banks. The time period covered in this study is 2001 to 2013.⁹ Table 1 provides descriptive statistics for the final sample.

[Table 1 here]

The mean book value of assets is USD 27,353 (median USD 2,427 million) and the mean total loan volume is USD 12,777 (median USD 1,317 million). With regard to banks' solvency, the average equity to assets ratio is 7% and the average liquidity ratio 26%. On average, the ABS and covered bond issue volume is only 0.17% of total assets, as only a subset of banks in our sample is active in the securitization market, i.e., the 95 percentile is zero for both variables. The 99 percentile, however, is 3.8% for ABS and 4.8% for covered bonds. Conditional on issuing ABS (covered bonds), the average issue volume is 8.5% (5.5%) of total assets (not tabulated).

[Table 2 here]

⁸ We focus on the 11 initial member states plus Greece. The sample therefore includes banks from Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Bankscope coverage and reliability is generally poor for very small institutions. Moreover, smaller banks typically rely less on market based funding sources such as ABS and covered bonds.

⁹ Information from 1999 and 2000 is used to create lagged variables.

Table 2 shows the number of banks that issue ABS and covered bonds over time. We can see that the number of ABS issuers remains stable during the crisis but sharply declines after 2009 (most of the banks that issue ABS during the crisis retain the issues on the balance sheet, cf. Figure 1). At the same time, the number of covered bond issuers increases after the crisis. This increase seems to at least partially be driven by banks beginning to issue covered bonds for the first time.

4. Analysis

4.1 The Model

In order to analyze whether an increase in bank securitization activity leads to an increase in loan supply, we follow Altunbas et al. (2009) and specify the following equation:

$$\begin{aligned} \Delta \ln(\text{Loans})_{i,t} = & \alpha_i + \alpha_t + \beta * \Delta \ln(\text{Loans})_{i,t-1} + \gamma * \text{SEC}_{i,t-1} \\ & + \sum_{j=0}^1 \delta_j * \ln(\text{GDP})_{k,t-j} + \phi * X_{i,t-1} + \epsilon_{i,t}. \end{aligned} \tag{1}$$

$\Delta \ln(\text{Loans})$ is the change in log loan volume, SEC is the ABS or covered bond issue volume in percent of total assets, $\Delta \ln(\text{GDP})$ is the change in log GDP, and X is a set of bank-level controls. In particular, we control for bank size (log of total assets), solvency (equity over total assets), liquidity (liquid assets over total deposits), and the ratio of loan loss provisions over to total assets. All bank-specific characteristics refer to $t - 1$ to avoid an endogeneity bias. Following Popov and Van Horen (2015), we capture demand effects of bank lending by including interaction terms of country and

year fixed effects.¹⁰ Finally, we also include bank fixed effects.

4.2 Securitization, Bank Lending, and the 2007-08 Financial Crisis

Table 3 shows our results when estimating the impact of securitization on bank lending before, during and after the financial crisis. The results point to ABS being positively associated with bank lending before the financial crisis but not afterwards.

[Table 3 here]

Consistent with [Altunbas et al. \(2009\)](#), we find that an increase in securitization activity is positively correlated with an increase in loan volume in the pre-crisis period (2001 to 2006). A one-unit increase in securitization activity corresponds to a 0.6% increase in loan volume. This positive effect, however, diminishes in the financial crisis (Column 2). A likely reason for this result is that the market liquidity of ABS declined significantly during the crisis making it more difficult for banks to use them as a funding tool. The majority of new ABS deals could not be placed in the market and had to be retained by the issuer. To further analyze this link, we therefore explicitly distinguish between placed and retained ABS for the post 2006 period.¹¹ We find that while placed ABS do not have a significant impact on banks' loan supply, retained ABS even have a negative impact on banks' credit supply to the real economy. A likely reason for these results is that banks were not prepared for the sudden need to retain ABS. Banks with previously high issuances were forced to retain more ABS,

¹⁰ Although many of the ABS issuing financial institutions are large international banks, their loan portfolio tends to be largely domestic, especially during stress. Also see [Giannetti and Laeven \(2012\)](#).

¹¹ As shown in the Appendix Table 9, ABS are significantly more likely to be retained during the 2007-09 financial crisis, in particular, ABS with exposure to GIPS countries.

impacting their loan supply relatively more.¹² Other variables worth mentioning are *Liquidity* and *Solvency*, which are both positively associated with lending during the financial crisis. This is in line with several studies, arguing that banks with higher liquidity and capital levels are better able to absorb shocks and therefore maintain their lending during stress.¹³

4.3 Different Loan Types and Bonds

So far, we have documented that ABS positively correlate with loan supply before the financial crisis but not during and afterwards. Even more so, retained ABS seem to be associated with declining loan supply. In this section, we analyze whether the effect differs across different loan types. In particular, we distinguish between lending to corporations and mortgage lending and additionally include covered bonds. The results are reported in Table 4.

[Table 4 here]

Table 4 shows no significant impact of mortgage-backed or real ABS on banks' mortgage supply. While the results in Column 2 are in line with Table 3, the insignificance in Column 1 is likely caused by the poor data coverage of mortgage loans in Bankscope prior to 2007. Interestingly, real ABS are positively associated with corporate loans during and after the financial crisis and especially when they are placed (Column 6).

¹² Table 8 in the appendix additionally includes covered bonds as control variable and distinguishes real and mortgage ABS.

¹³ See, for instance, Gambacorta and Mistrulli (2004) or De Haas and Van Lelyveld (2013).

Covered bonds, typically also backed by mortgages, have a positive impact on mortgage supply during and after the financial crisis. It is likely that these dynamics are caused by the fact that covered bonds remained rather liquid during the financial crisis.¹⁴ In contrast to ABS, banks were able to maintain their funding from covered bonds. Albeit less clear, these results could also be interpreted as evidence that the majority of banks issue covered bonds and ABS for funding reasons as opposed to capital relief. The results for the other variables are largely in line with Table 3.

4.4 The Role of Covered Bonds

In line with the theoretical argumentation by [Shin \(2009\)](#), our results so far suggest that ABS and covered bond issuance has a different impact on banks' lending behavior. To further understand the underlying mechanisms, we classify banks according to their securitization activity before the crisis. We explicitly analyze the change in lending during the crisis, conditional on whether the bank is an active ABS or covered bond issuer before the crisis or not. The dummy variable `ABS Issuer2006` equals one if the bank is an active ABS issuer in 2006, and zero otherwise. We choose 2006 because a bank's securitization activity before the crisis is exogenous to the crisis itself (i.e., we want to avoid a bank's decision to issue ABS to be impacted by the crisis). The dummy variable `Post 2007` equals one after 2007 (i.e., all years from 2008 onwards), and zero otherwise.¹⁵

[Table 5 here]

¹⁴ See [EBA \(2013\)](#) for empirical evidence.

¹⁵ The results are qualitatively similar if we focus on a narrow crisis definition, i.e., the years 2008 and 2009. However, the sovereign debt crisis in Europe gives reason to also consider the years 2010 to 2013, i.e., the post 2009 period cannot be classified as normal market conditions in Europe. Untabulated results indicate that the impact of pre-crisis securitization activity on bank lending is even more pronounced during the sovereign debt crisis relative to the sub-prime crisis period.

Table 5 suggests that all banks reduce their lending after 2007. This finding is particularly pronounced for ABS issuers. Covered bonds issuers also cut lending more significantly than non-issuers. However, the effect is considerably smaller compared to ABS issuers (column 5, the coefficients are statistically different from each other as indicated in the bottom of the table). These findings are consistent with [Shin \(2009\)](#), who argues that long intermediation chains (e.g. ABS) are inherently more instable than short intermediation chains (e.g. covered bonds) in adverse market conditions.

After having shown that banks that issue covered bonds are less impacted by the crisis than ABS issuers, we analyze a bank's decision to start issuing covered bonds. Our results indicate that banks are generally not more likely to start issuing covered bonds post 2007 (column 1). However, banks that used to be ABS issuers before the crisis, are significantly more likely to become covered bonds issuers during and after the crisis (column 2). A possible explanation for these results is that issuing securitization or covered bonds requires similar systems and skills. For banks that used to issue ABS, the switch to covered bonds (at that time the more profitable instrument) was relatively easy since the required expertise was already available.

[Table 6 here]

4.5 Securitization and Bank Risk

As laid out earlier, securitization can in principle help transferring risks from the banking sector to other investors and hence disperse the risk across the economy making the banking sector safer. However, as shown by [Dionne and Harchaoui \(2003\)](#) or [Haensel and Krahen \(2007\)](#), in practice, banks were able to design securitizations

that provided capital relief without reducing risks. Further, [Keys et al. \(2009\)](#) and [Keys et al. \(2010\)](#) show that since banks only faced the risk from issuing mortgages for a few months, banks incentives to carefully screen and monitor borrowers were reduced, presumably leading to increased risk-taking.

To complete the picture, this section analyzes whether bank securitization activity predicts changes in bank risk. That is, we relate the bank's ABS activity to changes in banks' Z-score, a commonly used measure for credit risk.¹⁶ The Z-Score is calculated as the inverse of the probability of insolvency, implying that a higher Z-Score indicates fewer risks and more stability. We separately analyze the pre-crisis and post-crisis period and distinguish between mortgage and real ABS as well as placed and retained ABS. The results are reported in [Table 7](#).

[[Table 7](#) here]

Our analysis suggests that ABS issuance does not correlate with the bank's Z-score prior to the 2007-08 financial crisis. This could be due to significantly better performance in terms of credit risk of European ABS when compared to the US.¹⁷ During and after the crisis, however, our analysis points to a positive correlation. This is consistent with [Le et al. \(2016\)](#), who show for a sample of U.S. banks that before the crisis, securitization increased bank risk. Since the crisis, however, [Le et al. \(2016\)](#) find that securitizing banks do not make riskier loans and do not have higher credit or market risks. The authors attribute this change in the impact of

¹⁶ See [Laeven and Levine \(2009\)](#) for a detailed discussion on the Z-score calculation for banks. Also see [Foos et al. \(2010\)](#) and [Demirgüç-Kunt and Huizinga \(2010\)](#).

¹⁷ For example, according to a recent analysis by Standard and Poor's, the cumulative default rate on European consumer-related securitization, including SME CLOs, between the start of the financial downturn in July 2007 and Q3 2013 has been only 0.05%. By comparison, securitisation on US loans, including subprime loans, experienced default rates of 18.4% over the same period. See [ECB \(2014\)](#).

securitization on bank risk taking to three factors: 1) The turmoil in the subprime market made investors more risk-averse leading to reduced demand for ABS with more risky mortgage pools; 2) Increased losses and charge-offs reduced banks' willingness to grant riskier mortgages, and 3) Financial regulation following the crisis discouraged banks to issue riskier ABS. In sum, we conclude that high quality ABS, as mainly issued by European banks after the crisis, rather have a positive than a negative impact on bank risk. We attribute this difference in performance between US and European ABS to two factors: 1) The stronger social security systems in Europe reduce the threat of sudden unemployment on client's capability to repay their mortgages, and 2) For European banks, securitization has historically been a more integrated part of their business model. While the US securitization market is typically dominated by institutions that solely issue securitization, the European market is dominated by universal banks. In the case of universal banks, reputational risks set strong incentives to continue screening and monitoring borrowers ('aligned interest').

5. Conclusion

This paper shows that that securitization is positively associated with bank lending before the crisis but not afterwards. We attribute this effect to the reduction of the market liquidity of ABS, making it a less effective funding instrument. Analyzing the potential stabilising role of covered bonds as an alternative form of access to funding we find that banks that relied more heavily on covered bonds before the financial crisis reduced their lending less during the crisis relative to banks that relied on ABS funding. Further, we find that ABS issuers are more likely to start issuing covered bonds during

and after the financial crisis. Finally, the analysis shows that the underlying collateral of the securitization is correlated with changes of loan supply of the respective type. All results are robust to controlling for demand effects of bank lending. We also find some evidence that ABS that were retained by the issuer even had a negative impact on bank lending.

Since it is likely to enhance the liquidity of ABS and its effectiveness as a funding tool, our results can be interpreted as being supportive of the ECB's purchase programs as well as regulatory efforts to give a more positive treatment to (high-quality) ABS in financial regulation. The magnitude and potential unintended consequences, however, are subject to further research.

Moreover, our findings do not suggest that securitization in the euro area is associated with increases in bank risk. In fact, the various developments (higher risk-aversion of investors and regulatory incentives to issue more high quality mortgages and ABS) following the crisis, leads to securitization reducing bank risk, highlighting the distinct effect of securitization on banks' risk taking in the US and in Europe.

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Figure 1: ABS Issue Volume European Market

This figure shows the overall ABS and MBS issue volume in the European market, as well as the ABS volume pledged to the Eurosystem over time. Source: Dealogic, ECB (http://www.ecb.europa.eu/paym/pdf/collateral/collateral_data.pdf).

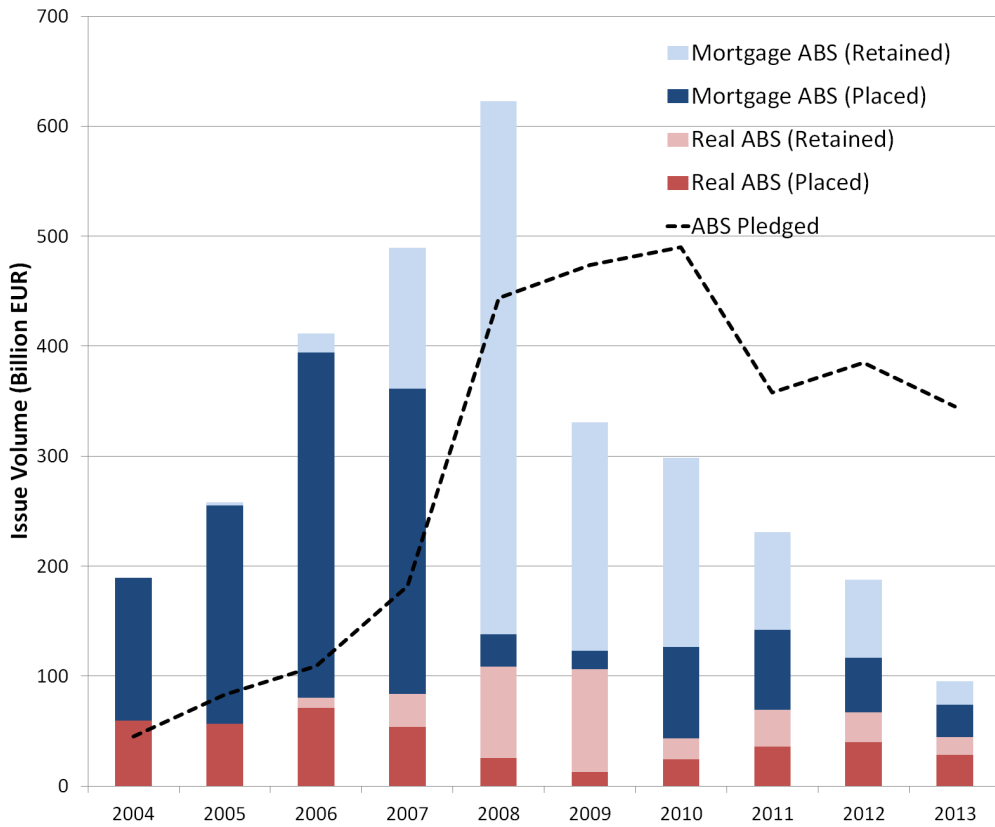


Table 1: Descriptive Statistics

This table reports summary statistics for bank characteristics and bank securitization activity. All variables are defined in the Appendix.

	Mean	Median	p95	p99	Max	Std	N
Total Loans (million USD)	12777.3	1317.4	40382.0	253573.2	1034293.2	59645.5	18683
Mortgage Loans (million USD)	2222.3	0.0	3935.1	55441.9	472052.5	17537.7	18683
Corporate Loans (million USD)	1565.7	0.0	3555.4	35595.1	366228.5	12193.5	18683
Total Assets (million USD)	27352.8	2427.0	71695.4	608625.0	3065093.5	147427.2	18886
Solvency (%)	7.2	5.9	13.9	54.0	54.0	6.3	18875
Loan Loss Provisions (%)	0.4	0.3	1.2	2.9	2.9	0.5	18038
Liquidity (%)	26.4	15.9	85.4	250.0	250.0	34.1	18733
ABS (%)	0.2	0.0	0.0	3.8	165.1	2.8	16797
Mortgage ABS (%)	0.1	0.0	0.0	2.3	165.1	2.2	16797
Real ABS (%)	0.1	0.0	0.0	0.0	119.9	1.5	16797
Covered Bonds (%)	0.2	0.0	0.0	4.8	60.7	1.7	16797

Table 2: Bank Securitization Activity Over Time

This table presents summary statistics on the number of banks that are active (real or mortgage) ABS or covered bond issuers in each year.

Year	ABS Issuer	Covered Bond Issuer	Thereof: ABS <i>and</i> Covered Bond Issuer	First Time CB Issuer
2000	6	13	3	13
2001	11	15	4	2
2002	8	13	3	2
2003	9	13	2	1
2004	8	17	1	5
2005	22	22	4	11
2006	42	28	6	8
2007	47	33	8	9
2008	61	59	20	29
2009	62	68	25	18
2010	22	67	11	11
2011	15	74	8	19
2012	17	59	3	10
2013	10	55	5	12

Table 3: Bank Lending and Securitization

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)
	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$
ABS_{t-1}	0.006*	-0.000	
	(0.003)	(0.002)	
$ABS(\text{Retained})_{t-1}$			-0.006*
			(0.003)
$ABS(\text{Placed})_{t-1}$			0.001
			(0.001)
$\Delta \ln(\text{Total Loans})_{t-1}$	-0.208***	-0.120**	-0.120**
	(0.069)	(0.047)	(0.047)
$\ln(\text{Total Assets})_{t-1}$	-0.168*	-0.086	-0.087
	(0.086)	(0.057)	(0.057)
Loan Loss Provisions $_{t-1}$	-0.018	0.008	0.008
	(0.021)	(0.012)	(0.012)
Liquidity $_{t-1}$	0.000	0.001*	0.001*
	(0.001)	(0.001)	(0.001)
Solvency $_{t-1}$	0.034**	0.011*	0.011*
	(0.016)	(0.006)	(0.006)
Intercept	2.331*	1.342	1.355
	(1.223)	(0.888)	(0.888)
Obs.	4,860	9,328	9,328
Adj. R^2	0.429	0.149	0.150
Year x County Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Time Period	2001-2006	2007-2013	2007-2013

Table 4: Bank Lending and Securitization: Different Lending Aggregates

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$
Mtg ABS $_{t-1}$	0.029 (0.023)	0.002 (0.005)	0.002 (0.005)	0.037 (0.045)	-0.015** (0.007)	
Real ABS $_{t-1}$	0.000 (.)	-0.005 (0.009)	-0.005 (0.009)	0.002*** (0.001)	0.004* (0.002)	
Covered Bonds $_{t-1}$	-0.526 (2.185)	0.011** (0.005)	0.011** (0.005)	-0.001 (0.008)	-0.013 (0.010)	-0.013 (0.010)
Mtg ABS(Retained) $_{t-1}$		0.001 (0.007)	0.001 (0.007)			-0.003 (0.008)
Mtg ABS(Placed) $_{t-1}$		0.001 (0.007)	0.001 (0.007)			-0.025** (0.010)
Real ABS(Retained) $_{t-1}$		-0.002 (0.015)	-0.002 (0.015)			-0.002 (0.011)
Real ABS(Placed) $_{t-1}$		-0.009 (0.010)	-0.009 (0.010)			0.004** (0.002)
$\Delta \ln(\text{Mtg Loans})_{t-1}$	-0.150*** (0.041)	-0.252** (0.122)	-0.252** (0.122)			
$\Delta \ln(\text{Corp Loans})_{t-1}$				-0.422*** (0.111)	-0.205*** (0.038)	-0.205*** (0.038)
$\ln(\text{Total Assets})_{t-1}$	-1.181** (0.530)	-0.346* (0.178)	-0.346* (0.178)	-0.131 (0.184)	-0.181 (0.161)	-0.184 (0.161)
Loan Loss Provisions $_{t-1}$	-0.076 (0.136)	-0.049 (0.044)	-0.049 (0.044)	-0.041 (0.053)	-0.017 (0.016)	-0.017 (0.016)
Liquidity $_{t-1}$	0.005 (0.004)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.002)	0.003 (0.002)	0.003 (0.002)
Solvency $_{t-1}$	-0.020 (0.020)	-0.054 (0.054)	-0.054 (0.054)	0.038 (0.024)	0.020** (0.009)	0.020** (0.009)
Intercept	18.017** (8.210)	5.854** (2.789)	5.906** (2.853)	1.748 (2.693)	2.803 (2.432)	2.859 (2.426)
Obs.	195	2978	2978	958	3417	3417
Adj. R^2	0.245	0.132	0.131	0.374	0.161	0.161
Year x Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Period	2001-2006	2007-2013	2007-2013	2001-2006	2007-2013	2007-2013

Table 5: Bank Securitization Activity and Lending During and After the Financial Crisis

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending during and after the 2008-09 financial crisis. We differentiate between banks that were active ABS issuers before the crisis and banks that did not engage in securitization activity. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)	(4)	(5)
	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$
ABS Issuer ₂₀₀₆ (0/1)*Post 2007 (0/1)		-0.010 (0.026)	-0.244*** (0.026)		
Mtg or Real ABS Issuer ₂₀₀₆ (0/1)*Post 2007 (0/1)				-0.030 (0.036)	-0.316*** (0.037)
Covered Bond Issuer ₂₀₀₆ (0/1)*Post 2007 (0/1)				0.033 (0.030)	-0.114*** (0.023)
Post 2007 (0/1)	-1.480*** (0.132)	-1.478*** (0.132)		-1.472*** (0.132)	
Intercept	2.758*** (0.520)	2.755*** (0.521)	0.051*** (0.002)	2.742*** (0.521)	0.051*** (0.002)
Mtg or Real ABS Effekt = Covered Bond Effect?					0.00***
Obs.	14188	14188	14596	14188	14596
Adj. R^2	0.205	0.205	0.0149	0.205	0.0157
Control Variables	Yes	Yes	Yes	Yes	Yes
Country x Year Fixed Effects	No	No	Yes	No	Yes
Country Fixed Effects	Yes	Yes	No	Yes	No
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes

Table 6: First Time Covered Bond Issuer

This table reports fixed effects panel regression results analyzing a bank's decision to start issuing covered bonds. The dependent variable is a dummy that equals one if the bank issued covered bonds for the first time in year t , and zero otherwise. We differentiate between banks that were active ABS issuers before the crisis and banks that did not engage in securitization activity. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *,**,*** Indicate statistical significance at the 10%,5%,1% level.

	(1)	(2)
	First Time CB (0/1)	First Time CB (0/1)
Post 2007 (0/1)	0.015 (0.009)	0.002 (0.010)
Mtg or Real ABS Issuer ₂₀₀₆ (0/1)*Post 2007 (0/1)		0.053** (0.025)
Intercept	-0.071 (0.065)	-0.051 (0.066)
Obs.	14206	14206
Adj. R^2	0.0220	0.0234
Control Variables	Yes	Yes
Country x Year Fixed Effects	No	No
Country Fixed Effects	Yes	Yes
Bank Fixed Effects	Yes	Yes

Table 7: Securitization and Bank Risk

This table reports regression results analyzing the effect of bank securitization activity on bank risk. *MBS (RBS) Issuer (0/1)* is a dummy variable that equals one if the bank issues MBS (RBS) in year t . All other variables are defined in Table 1. Standard errors are heteroskedasticity robust and clustered at the originator level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1) Z-Score $_t$	(2) Z-Score $_t$	(3) Z-Score $_t$
MBS Issuer (0/1) $_{t-1}$	-0.169 (-1.09)	0.156* (1.88)	
RBS Issuer (0/1) $_{t-1}$	-0.075 (-0.57)	-0.004 (-0.03)	
MBS Issuer Placed (0/1) $_{t-1}$			0.052 (0.44)
MBS Issuer Retained (0/1) $_{t-1}$			0.136 (1.55)
RBS Issuer Placed (0/1) $_{t-1}$			0.111 (0.66)
RBS Issuer Retained (0/1) $_{t-1}$			-0.033 (-0.26)
ln(Total Assets) $_{t-1}$	0.009 (0.06)	-0.120 (-1.04)	-0.120 (-1.04)
Loan Loss Provisions $_{t-1}$	-0.126** (-2.27)	-0.200*** (-6.25)	-0.201*** (6.25)
Liquidity $_{t-1}$	0.003 (1.64)	-0.000 (-0.01)	-0.000 (-0.01)
Solvency $_{t-1}$	0.004 (0.40)	0.033*** (3.13)	0.033*** (3.14)
Observations	6,271	9,625	9,625
Adj. R^2	0.107	0.147	0.147
Country x Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Period	2001-2006	2007-2013	2007-2013

Appendix

Table 8: Bank Lending and Securitization: Different Securitization Types

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *,**,*** Indicate statistical significance at the 10%,5%,1% level.

	(1)	(2)	(3)
	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$
Mtg ABS $_{t-1}$	0.061*** (0.012)	-0.003 (0.003)	
Real ABS $_{t-1}$	0.004*** (0.001)	0.002 (0.001)	
Covered Bonds $_{t-1}$	-0.002 (0.002)	-0.007 (0.005)	-0.006 (0.006)
Mtg ABS(Retained) $_{t-1}$			-0.005 (0.004)
Mtg ABS(Placed) $_{t-1}$			-0.001 (0.003)
Real ABS(Retained) $_{t-1}$			-0.007 (0.008)
Real ABS(Placed) $_{t-1}$			0.003*** (0.001)
$\Delta \ln(\text{Total Loans})_{t-1}$	-0.209*** (0.069)	-0.119** (0.047)	-0.119** (0.047)
$\ln(\text{Total Assets})_{t-1}$	-0.166* (0.086)	-0.085 (0.058)	-0.086 (0.058)
Loan Loss Provisions $_{t-1}$	-0.018 (0.021)	0.008 (0.012)	0.008 (0.012)
Liquidity $_{t-1}$	0.000 (0.001)	0.001* (0.001)	0.001* (0.001)
Solvency $_{t-1}$	0.034** (0.016)	0.011* (0.006)	0.011* (0.006)
Intercept	2.168* (1.206)	1.343 (0.891)	1.345 (0.891)
Obs.	4,860	9,328	9,328
Adj. R^2	0.431	0.150	0.150
Year x Country Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Time Period	2001-2006	2007-2013	2007-2013

Table 9: Placed vs Retained ABS - ABS-Level Evidence

This table reports logit regression results analyzing the likelihood that an ABS tranche is retained by the originator. The sample comprises all senior ABS tranches originated by European banks. *Crisis (0/1)* is a dummy variable, that equals one if the ABS is issued between september 2007 and december 2009. *Liquidity (Originator)* is the ratio of liquid assets to total deposits and short-term funding of the ABS originator at the time of the ABS issue. *Solvency (Originator)* is defined as total equity over total assets. *Loan Loss Provisions (Originator)* is defined as loan loss provisions over total assets. *Profitability (Originator)* is the ratio of net income to total assets. *GIPS (0/1)* is a dummy variable, that equals one if the ABS contains exposure to GIPS countries (Greece, Ireland, Portugal, or Spain). *log(Tranche Amount)* is the log of tranche amount (in million USD). *log(Tranche Maturity)* is the log of tranche maturity (in days). Standard errors are heteroskedasticity robust and clustered at the originator level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)
	Retained (0/1)	Retained (0/1)	Retained (0/1)
Crisis (0/1)	4.181*** (0.537)	7.688*** (2.062)	4.139** (1.796)
Liquidity (Originator)	-0.003 (0.009)	0.003 (0.007)	0.000 (0.008)
Profitability (Originator)	-0.252 (0.375)	-0.283 (0.463)	-0.639 (0.404)
Solvency (Originator)	0.047 (0.091)	0.155 (0.100)	0.140 (0.094)
Loan Loss Provisions (Originator)	0.798 (0.518)	0.773 (0.570)	0.781 (0.574)
Crisis (0/1)*Liquidity		-0.030 (0.023)	-0.002 (0.021)
Crisis (0/1)*Profitability		-0.389 (0.947)	-2.016* (1.163)
Crisis (0/1)*Solvency		-0.541** (0.225)	-0.504** (0.200)
Crisis (0/1)*Loan Loss Provisions		1.872 (1.787)	5.374*** (1.736)
GIPS (0/1)*Crisis (0/1)			5.718*** (1.421)
GIPS (0/1)			-0.537 (0.571)
log(Tranche Amount)	-0.164 (0.106)	-0.199** (0.096)	-0.152 (0.119)
log(Tranche Maturity)	0.569 (0.558)	0.738 (0.549)	0.591 (0.649)
Intercept	-6.458 (4.099)	-7.360* (4.254)	-5.067 (5.266)
Obs.	555	555	555
Adj. R^2			
Tranche Rating Fixed Effects	Yes	Yes	Yes
ABS Type Fixed Effects	Yes	Yes	Yes

Table 10: Bank Lending and Securitization - Excluding G-SIBs

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)
	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$	$\Delta \ln(\text{Total Loans})_t$
ABS_{t-1}	0.006* (0.004)	-0.000 (0.002)	
$ABS(\text{Retained})_{t-1}$			-0.008* (0.005)
$ABS(\text{Placed})_{t-1}$			0.002 (0.002)
$\Delta \ln(\text{Total Loans})_{t-1}$	-0.221*** (0.075)	-0.118** (0.049)	-0.118** (0.049)
Obs.	4696	8746	8746
Adj. R^2	0.469	0.147	0.148
Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes
Time Period	2001-2006	2007-2013	2007-2013

Table 11: Bank Lending and Securitization: Different Lending Aggregates - Excluding G-SIBs

This table reports fixed effects panel regression results analyzing the impact of securitization on bank lending. All variables are defined in the Appendix. Standard errors are heteroskedasticity robust and clustered at the bank level to account for non-independent observations within banks. *, **, *** Indicate statistical significance at the 10%, 5%, 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Mtg Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$	$\Delta \ln(\text{Corp Loans})_t$
Mtg ABS $_{t-1}$	0.030 (0.024)	0.004 (0.005)	0.037 (0.051)	-0.020** (0.008)		
Real ABS $_{t-1}$	0.000 (.)	-0.004 (0.014)	0.002*** (0.001)	0.004** (0.002)		
Covered Bonds $_{t-1}$	-0.605 (2.311)	0.009 (0.008)	0.009 (0.007)	0.001 (0.009)	-0.024*** (0.009)	-0.025*** (0.009)
Mtg ABS(Retained) $_{t-1}$			0.005 (0.008)			-0.010 (0.009)
Mtg ABS(Placed) $_{t-1}$			0.001 (0.007)			-0.028** (0.011)
Real ABS(Retained) $_{t-1}$			-0.003 (0.015)			0.004 (0.013)
Real ABS(Placed) $_{t-1}$			-0.014 (0.011)			0.004** (0.002)
$\Delta \ln(\text{Mtg Loans})_{t-1}$	-0.150*** (0.041)	-0.263** (0.126)	-0.263** (0.126)		-0.200*** (0.038)	-0.200*** (0.038)
$\Delta \ln(\text{Corp Loans})_{t-1}$				-0.373*** (0.108)		
Obs.	189	2899	2899	859	3272	3272
Adj. R^2	0.241	0.135	0.134	0.468	0.184	0.184
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Period	2001-2006	2007-2013	2007-2013	2001-2006	2007-2013	2007-2013

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De Nederlandsche Bank N.V.
Postbus 98, 1000 AB Amsterdam
020 524 91 11
dnb.nl