Digging into the Black Box of Portfolio Replenishment in Securitization: Evidence from the ABS Loan-Level Initiative.*

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Abstract

With the introduction of simple, transparent, and standardized (STS) securitizations in Europe in 2019, loans which are transferred to the special-purpose entity after the closing of the transaction, i. e. ex post, shall meet the eligibility criteria applied to the initial underlying exposures. We analyze an extensive data set on 95 ABS backed by more than 1.6 million SME loans in the period from 2013 until 2017 from the central repository under the ECB loan-level initiative. Our study reveals that loans added to ABS portfolios ex post perform worse than loans being part of the initial ABS portfolio since originators choose low-quality loans to include in ABS portfolios after the closing. As loans added to the ABS portfolio ex post also show lower performance compared to similar loans removed from the portfolio prior to ABS maturity, average loan performance in the portfolio declines. Turning to the bank perspective, we find that originators being undercapitalized or exhibiting high NPL ratios make particularly use of portfolio replenishment. The opposite holds if originators specify loan eligibility criteria in their ABS prospectuses.

Keywords: ABS, Agency Problems, Portfolio Replenishment, Securitization
JEL Classification: G11, G21, G23

I Introduction

The novel securitization framework in Europe constitutes a major milestone in the capital markets union reform agenda. With the aim of establishing a trustworthy securitization market, this legislative package specifies several criteria for simple, transparent and standardized (STS) securitizations in order to clearly distinguish them from opaque and complex transactions. The simplicity requirement involves that underlying exposures of asset-backed securities (ABS) shall meet predetermined, clear and documented eligibility criteria, which do not allow for active portfolio management on a discretionary basis. Even more importantly, exposures transferred to the special-purpose entity after the closing of the transaction shall meet the eligibility criteria applied to the initial underlying exposures (Regulation (EU) 2017/2402, Article 20 (7)). The main objective of this criterion is to impede originators from deliberately adding poor-performing loans to ABS portfolios ex post, thus chronologically after the closing of the transaction, when investors have already made their investment decision.

However, the novel securitization framework became only effective in 2019. Beforehand, portfolio replenishment in securitization, i. e., the addition of loans to ABS portfolios ex post in order to ensure sufficient cash flows for investors, was contractually limited by the ABS prospectus. But the contractual framework still provides originators with some discretionary scope, since only 64 % of 149 manually explored ABS prospectuses address portfolio replenishment at all and only 40 % explicitly define loan eligibility criteria for loans added to the ABS transaction after the closing.[1] This may result in adverse effects on portfolio composition and performance, demonstrating the particular relevance of portfolio replenishment for ABS investors. On a side note, portfolio replenishment is not surprising

[1] For instance, ABS prospectuses determine that "no receivable is a defaulted receivable", "no receivable is a delinquent receivable and no receivable has been a delinquent receivable at any time during the six months period immediately preceding the relevant cut-off date." In addition, the originator has to ensure that the "purchase of the receivable does not result in a violation of any concentration limit." For reasons of confidentiality, we do not reveal the originator or ISIN of the ABS prospectuses. The quotations reflect commonly used wording which can be found in various prospectuses.

in securitization since the time to maturity of ABS tranches is often shorter than that of the corresponding underlying loans (Loumioti and Vasvari, 2019b). Beyond maturing loans, portfolio replenishment can also be attributed to prepaid, canceled, repurchased, and defaulted loans prior to ABS maturity (European Central Bank, 2019).

The purpose of this paper is to analyze which consequences result from portfolio replenishment for ABS portfolio composition and performance from the investor perspective and which bank characteristics drive originators to make particularly use of portfolio replenishment. To the best of our knowledge, this paper is the first to study portfolio replenishment in typical securitizations, which clearly need to be distinguished from collateralized loan obligations (CLOs) since "unlike a typical securitisation, CLO managers are not transferrring credit exposures from their balance sheets. CLO managers are managing assets to create an investment return for third-party clients, like typical portfolio managers" (European Banking Authority, 2014).

In our empirical analysis, we rely on a comprehensive and novel data set on ABS collected for the purpose of the loan-level reporting initiative on behalf of the ECB. Our sample covers the reporting period from 2013 until 2017 and consists of 95 ABS backed by 1,608,270 SME loans from seven European countries. Applying several regression models and propensity score matching procedures, a large set of control variables, several fixed effects (FE), as well as a variety of robustness tests, we provide evidence that loans added to the ABS portfolio ex post perform worse than loans being part of the portfolio directly at the time of securitization. Originators seem to indeed exploit existing leeway in portfolio replenishment since they are aware of adding loans of poorer quality to ABS portfolios which perform worse afterwards. Additionally, we show that portfolio replenishment adversely affects overall ABS portfolio performance. At the bank level, we reveal that originators being undercapitalized or exhibiting high NPL ratios make particularly use of portfolio replenishment. The opposite holds if originators specify loan eligibility criteria in their ABS prospectuses.

The remainder of this paper is organized as follows. Section II reviews the literature. In Section III, we present our data sources and sample-selection procedures. Section IV introduces our variables and summary statistics. In Section V, we outline our empirical strategy and discuss our empirical findings. In Section VI, we perform several robustness tests. Section VII concludes.

II Literature review

Our paper contributes to at least two important literature strands, namely studies on agency conflicts as well as on portfolio replenishment in securitization. Below, we provide an overview of both literature strands putting more emphasis on the latter due to its closer connection to our paper, even though it predominantly focuses on CLOs so far.

II.1 Agency conflicts in securitization

Agency conflicts in securitization arise from asymmetric information between the informed bank that grants and securitizes loans, and investors that buy ABS tranches. Those information asymmetries induce investor uncertainty about banks' screening and monitoring effort, as well as the quality of the securitized loans. Several studies analyzing ABS backed by mortgages provide evidence that agency conflicts in securitization result in lower banks' screening effort, which in turn leads to low-quality securitized loans (e.g., Downing et al., 2009; Keys et al., 2010, 2012; An et al., 2011; Purnanandam, 2011). In contrast to results on ABS backed by mortgages, the findings of previous studies on ABS backed by corporate loans are contradictory. On the one hand, Bord and Santos (2015) reveal lax underwriting standards in CLOs and consequently, worse loan performance of securitized loans as opposed to non-securitized ones. On the other hand, Benmelech et al. (2012) do predominantly not corroborate significant differences in loan performance between securitized and non-securitized loans originated by the same bank. In accordance, Kara et al. (2016) do not find any differences with respect to loan pricing. Additionally, after securitizing a loan, bank incentives to conscientiously monitor borrowers decrease in ABS backed by corporate loans (e.g., Wang and Xia, 2014; Kara et al., 2018).

In addition to the quality of the underlying loan exposures, the actual risk for ABS investors also depends on the ABS tranche structure. Due to the waterfall principle, investors suffer losses from defaulted loans to a different extent (e.g., DeMarzo, 2005; Hanson and Sunderam, 2013). In order to signal high-quality ABS tranches as well as appropriate loan screening and monitoring efforts, originators usually provide overcollateralization and risk retention to lower tranche default risk (e.g., Guo and Wu, 2014; Begley and Purnanandam, 2017). In the follow-up of the latest financial crisis, central banks and regulators, most prominently the ECB and the U.S. Securities and Exchange Commission, recognized the negative effects of agency issues inherent in securitization as well as increasing investor mistrust towards ABS. Therefore, they introduced loan-level initiatives to improve transparency and facilitate investor risk assessment of ABS tranches (Ertan et al., 2017; Neilson et al., 2019).

II.2 Portfolio replenishment in securitization

While agency conflicts are widely explored covering many different types of securitizations, studies on portfolio replenishment remain, to the best of our knowledge, mainly limited to CLOs. However, there is no common definition of CLOs in the literature. Predominantly, CLOs are defined as securitzations backed by corporate loans and are often associated with active portfolio management performed by CLO collateral managers. Those are enabled to substantially change the portfolio composition after CLO issuance (e.g., Benmelech et al., 2012; Gorton and Metrick, 2012; Fabozzi et al., 2018; Gallo and Park, 2019; Loumioti and Vasvari, 2019a,b; Peristiani and Santos, 2019). Nevertheless, CLO managers' behavior regarding portfolio management is restricted by contractually predetermined, as well as legally given standards (Franke et al., 2012; Bozanic et al., 2018).

In their study, Peristiani and Santos (2015) observe that CLO managers sell about 30 % of their initial loan investments by the end of the second year after issuance. Moreover, they demonstrate that the monthly purchase activity of CLOs accounts for 5.5 % of total portfolio balance. Benmelech et al. (2012) confirm these dynamics in CLO portfolio composition, and observe that the probability of a loan to be excluded after one month amounts to 4 %, after three months this probability yields 7 %, and after six months the probability of being excluded reaches 11 %. These regular loan replacements in CLOs cause extensive credit risk assessment effort for CLO managers. Driven by cost considerations, managers of frequently rebalanced CLOs are more likely to add loans with greater covenant standardization to their portfolio, most likely because standardization reduces information costs in screening and monitoring (Bozanic et al., 2018).

Beyond selecting loans with greater covenant standardization, CLO managers may strategically, but in line with the given contractual and legal frameworks, choose poor- or well-performing loans to add them to, or remove them from the current CLO portfolio. In this regard, empirical findings in the literature are ambiguous. On the one hand, studies argue that CLO managers intend to enhance portfolio quality after the closing. For instance, Fabozzi et al. (2018) provide evidence that portfolio default rates decrease with increasing portfolio replenishment. In accordance, Peristiani and Santos (2019) reveal a link between CLO manager compensation and the return of the CLO equity tranche. Since managers are able to improve their own profit by ensuring well-performing CLOs, they have an incentive to remove distressed loans and add high-quality loans to CLOs. In this context, Peristiani and Santos (2019) additionally suggest that managers who are affiliated with the loan originator exhibit lower risk appetite than managers without affiliation and exclude distressed loans before default. Following their line of argumentation, this is feasible because managers with affiliation have access to private information concerning future loan repayments.

On the other hand, Loumioti and Vasvari (2019b) argue that CLO managers make use of portfolio replenishment in order to pass overcollateralization (OC) tests.[2] Thus, CLO managers sell well-performing loans from the portfolio since they are priced above their principal balance, whereas low-rated loans can only be sold below their principal balance. Loumioti and Vasvari (2019a) confirm these findings in their most recent study, in which they evaluate the impact of portfolio constraints specified in CLO prospectuses on CLO performance. Their empirical results indicate that more severe constraints come along with more frequent portfolio rebalancing, as well as with the exclusion of profitable loans and the inclusion of riskier ones to pass OC tests.

Finally, Franke et al. (2012) examine the impact of asset portfolio dynamics in CLOs and collateralized bond obligations on the equity tranche size. However, they yield no significant coefficients for a dummy variable which is equal to one for dynamic portfolios, and zero otherwise. They argue that strict replenishment rules prevent managers from strategically adding poor-performing loans to as well as removing well-performing loans from already-securitized portfolios.

III Data sources and sample selection

This paper builds on two distinct samples. Whereas our *Loan-level Sample* contains granular information on securitized loans, our *Bank-level Sample* comprises the related originator characteristics as well as aggregated ABS information at the bank level derived from the

[2] Simply put, the threshold to pass OC tests is calculated by dividing the sum of total principal balances of well-performing loans, cash received from trading activities and the fair value of defaulted loans by the principal balance of CLO notes.

loan- and portfolio-level. Both samples cover the reporting period from 2013 until 2017. The data sources and sample-selection procedures are described below.

III.1 Loan-level sample

Our primary sample, the *Loan-level Sample*, includes detailed information on ABS portfolio at the loan level. We obtain this data from the European DataWarehouse (ED), the first and so far only central securitization repository in Europe. Being established in 2012 in the wake of the ECB's ABS loan-level initiative, ED collects, validates, and distributes granular and standardized loan, tranche, and portfolio information on more than 1,200 ABS transactions comprising about 120 million loans (European DataWarehouse, 2019). As data from ED contains very granular information for all ABS transactions, we are able to track every single loan in the respective ABS portfolio over time . In our analysis, we focus on ABS backed by SME loans since SMEs are renowned for being specifically affected by information asymmetries (Dietsch and Petey, 2002; Albertazzi et al., 2017).[3] Accordingly, originators retain ABS backed by SME loans to a greater extent compared to other asset classes. For instance, around 86 % of newly issued European ABS backed by SME loans were retained in 2013, whereas for ABS backed by residential mortgages this percentage only amounted to 66 % (Association for Financial Markets in Europe, 2014).

At the loan level, the reporting requirements for ABS backed by SME loans as part of the ECB's loan-level initiative comprise 48 mandatory and 65 optional variables grouped into six categories: identifiers, obligor information, loan characteristics, interest rate details, financials, and performance measures. In our analysis, we primarily employ mandatory variables because, on average, 98 % of the mandatory, but only 32 % of the optional fields

[3] According to the European Commission, SMEs employ fewer than 250 persons. Furthermore, SMEs exhibit a maximum annual turnover of EUR 50 million or an annual balance sheet not exceeding EUR 43 million (European Commission, 2003). Overall, SMEs account for more than 99 % of all EU-28 non-financial business sector enterprises, and generate almost 57 cents of every euro value added in the non-financial business sector. SMEs employ around two-thirds of the total EU-28 workforce (Muller et al., 2018).

are reported. In Table 1 in the appendix, we summarize the sample-selection procedure for our *Loan-level Sample* in detail. Initially, we start with 32,026,829 loan observations. First, we drop missing and implausible observations, but only with regard to variables used in our analysis.[4] For instance, we exclude observations for which the days in arrears exceed the loan period or where the loan maturity date is before the loan origination date. Second, following Ertan et al. (2017), we exclude ambiguous originators. As a next step, we take into account that originators are obliged to report to ED at least quarterly, but may voluntarily report on a monthly basis. In order to ensure that loans from monthly-reporting originators are not overweighted in our analysis, we focus on the last observation in a quarter in case of voluntary monthly reporting and ignore previous observations in the same quarter. Employing the last observation is motivated by the fact that the majority of quarterly-reporting banks reports shortly before the end of a quarter.

Eventually, our *Loan-level Sample* includes 8,906,985 loan-quarter observations, encompassing 1,608,270 SME loans to 908,865 borrowers, which are securitized in 95 ABS portfolios by originators from Belgium, France, Germany, Italy, the Netherlands, Portugal, and Spain. These countries represent almost all Eurozone countries active in SME loan securitization (Association for Financial Markets in Europe, 2014). In Table 2 in the appendix, we illustrate our final *Loan-level Sample*'s distribution by reporting year and country.

III.2 Bank-level sample

Our second sample contains originator characteristics as well as aggregated ABS information at the bank level derived from the loan- and portfolio-level. Below, we refer to this second sample as *Bank-level Sample*. One major difference between our *Loan-* and

[4] The variables used in our analysis are described in Section IV. In case of loan default or delinquency, we observe that the originators in our sample reduce the current loan balance by the default or delinquent amount. We do not drop these observations, but rather reverse this adjustment by adding the default or delinquent amount to the current loan balance.

Bank-level Sample is the observation frequency. Whereas our *Loan-level Sample* comprises quarterly observations, our *Bank-level Sample* is based on annual observations since characteristics for most of our originators are only available annually. In order to create our second sample, we utilize the originator names of the ABS transactions from our final *Loan-level Sample* as starting point. We manually match the corresponding banks available in Fitch Connect and collect important bank characteristics. Subsequently, we annualize relevant variables from our *Loan-level Sample* as well as ABS information derived from the portfolio level obtained from ED by calculating weighted averages. Weighting is either based on the current loan or portfolio balance. Finally, we add those annualized information to our *Bank-level Sample*. Overall, our *Bank-level Sample* includes 167 annual observations containing 49 banks and 63 ABS transactions. Our *Bank-level Sample* comprises eight originators less than our *Loan-level Sample* since we cannot identify those in Fitch Connect.

IV Variable construction and summary statistics

IV.1 Loan-level analysis

As the name suggests, our loan-level analysis is based on the *Loan-level Sample*. It aims at revealing whether originators exploit existing leeway by adding low-quality loans to ABS portfolios after the closing which perform worse afterwards and which negatively affects ABS portfolio performance. We describe all variables used in our loan-level analysis below and define them in Table 3 in the appendix. Summary statistics based on our *Loan-level Sample* are reported in Table 4. Additionally, Table 5 in the appendix shows the variables' pairwise correlations.[5] We winsorize the values of all continuous variables in our *Loan-level Sample* at the 1 % and 99 % level.

[Table 4 about here.]

Identification strategy for *Incoming Loans*:

When analyzing whether originators exploit existing leeway by particularly adding poor-performing loans to ABS portfolios after the closing, our variable of main interest is *Incoming Loan*. We define *Incoming Loan* as an indicator variable, referring to a loan that is not yet included in the ABS portfolio at the time when the transaction is reported to ED for the first time.[6] We determine this indicator variable by both identifying the first reporting quarter of each ABS transaction and the first reporting quarter of each loan. If the first loan reporting quarter is chronologically after the corresponding first ABS reporting quarter, this loan is categorized as an *Incoming Loan*. The mean value of *Incoming Loan* is 0.46 indicating that 46 % of the observations in our *Loan-level Sample* refer to loans added to ABS transactions after the transactions' first reporting quarter.

In order to get a better idea of portfolio replenishment in securitization, we illustrate in Figure 1 the total portfolio volume, the volume of *Incoming Loans*, as well as the volume of loans which are excluded from the portfolio prior to ABS maturity for two exemplary ABS portfolios during our observation period. We refer to loans being removed from the portfolio prior to ABS maturity as *Outgoing Loans*. The removal of loans can be attributed to the fact loans mature or default, are prepaid, canceled, or repurchased (European Central Bank, 2019). Figure 1 reveals that the volume of *Incoming Loans* is not constant over time, and represents a crucial determinant for ABS portfolio composition. Besides, the volume of loans excluded from the portfolio is substantially lower than that

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[5] We also test for multicollinearity using variance inflation factors (VIF). In our *Loan-level Sample*, the mean VIF accounts for 1.44 and all VIFs are smaller than 1.85. This result indicates that multicollinearity is not an issue in our empirical setting.

[6] In a robustness test, we restrict our sample to ABS transactions where the closing is within our sample period and our findings do not change (see Section VI).

of *Incoming Loans*. This is most likely because maturing loans exhibit low loan balances as opposed to newly granted loans.

[Figure 1 about here.]

Ex ante loan quality and and ex post loan performance measures:
We employ three different ex ante loan quality and five different ex post loan performance measures. Whereas the ex ante loan quality measures quantify the loan risk assessment by the bank at the time of loan securitization, the ex post loan performance measures comprise realized loan risk afterwards.

In order to measure ex ante loan quality, we employ the *PD* (1) and *LGD* (2), as well as the product of both variables $PD \cdot LGD$ (3). *PD* represents the loan probability of default. In our PD estimation procedure, we apply a logit model with our loan default indicator as endogenous variable, control for several loan and borrower characteristics, and apply various FE (see Table 6 in the appendix). The mean *PD* is 2 % in our *Loan-level Sample*. *LGD* refers to the bank internal loss given default estimate. On average, we observe a *LGD* of 29 %. We compute $PD \cdot LGD$ by multiplying *PD* and *LGD*.

The ex post loan performance measures include the following variables: *Default* (1), *Default Amount* (2), *Delinquency* (3), *Delinquent Amount* (4), and *Number of Days in Delinquency* (5). *Default* is defined as an indicator variable equal to one if the borrower ever defaulted on the loan, and zero otherwise. In our *Loan-level Sample*, the mean of *Default* accounts for 3 %. Our second ex post loan performance measure, *Default Amount*, refers to the maximum of the natural logarithm of the loan default amount. On average, *Default Amount* is 0.19, which corresponds to EUR 2,654. *Delinquency* represents an indicator variable and equals one if the borrower is ever in arrears, either with respect to principal or interest payments, and zero otherwise. *Delinquency* is 10 % on average. *Delinquent Amount* refers to the natural logarithm of the maximum sum of principal and interest arrears per loan. In our *Loan-level Sample*, *Delinquent Amount* is 0.76 on average, corresponding to EUR 1,230. Our fifth ex post loan performance measure is *Number of Days in Delinquency* which is defined as the natural logarithm of the maximum number of days for which the borrower delays principal or interest payments. The mean *Number of Days in Delinquency* is 0.28 representing around 3.7 days.

Loan-level controls:

To incorporate observable differences among loans, we control for numerous loan characteristics, basically following the variable definitions by Ertan et al. (2017).

First of all, *Interest Rate* refers to the current loan interest rate and serves as a proxy for loan riskiness. In our *Loan-level Sample*, the mean *Interest Rate* is 3.52 %. Additionally, we control for loan riskiness by using an indicator variable which is equal to one if a loan is collateralized, and zero otherwise (*Collateralization*). 74 % of the observations include collateralized loans. Furthermore, we calculate *Years since Loan Origination* as the natural logarithm of the time period, expressed in years, between the loan origination and the current reporting date. Similarly, *Loan Years to Maturity* refers to the natural logarithm of the remaining years to maturity at the current reporting date. On average, we observe that *Years since Loan Origination* is 1.37 reflecting around 4.77 years, and *Loan Years to Maturity* amounts to 1.30 corresponding to around 4.87 years.

Moreover, we specify *Current Balance* as the natural logarithm of the current loan balance. On average, the *Current Balance* in our *Loan-level Sample* is 9.99 representing EUR 97,822. In addition, *Securitized Loan Ratio* refers to the ratio of the outstanding loan balance at the time of securitization to the original loan amount. This variable serves as a proxy for the time to loan securitization and is of particular relevance as bank screening incentives are expected to be weaker for loans that are securitized directly after their origination. In our *Loan-level Sample*, the mean value of *Securitized Loan Ratio* accounts to 0.72 suggesting that the average loan observation in our sample corresponds to a loan which was securitized 11 quarters after its origination. We also control for *Pool Time* by computing the number of quarters a loan is included in the ABS portfolio to take the time span of a possible default event into account. The mean *Pool Time* is 10 quarters.

We further employ *Lending Relationship* as control variable, although the empirical evidence on the effect of an existing relationship between borrower and lender is ambiguous (e.g., Kysucky and Norden, 2016). *Lending Relationship* is defined as an indicator variable which is equal to one if a borrower borrows at least twice from the same bank, and zero otherwise. In our *Loan-level Sample*, 64 % of the observations include borrowers that exhibit lending relationships with their bank. Furthermore, we control for *Loan Uniqueness* by estimating the natural logarithm of the number of loans that were originated in the same year, and that can be assigned to the same one-digit NACE industry code as well as to the same two-digit postcode area. Observing a low number of comparable loans may be particularly difficult to assess. On average, 1,466 comparable loans are reported in our *Loan-level Sample*.

IV.2 Bank-level analysis

Building on our loan-level perspective, we conduct our bank-level analysis based on our *Bank-level Sample* and explain the corresponding variables below. Table 7 in the appendix presents an overview of our bank-level variables. In Table 8, we report the summary statistics. Table 9 in the appendix shows the variables' pairwise correlations.[7]

[Table 8 about here.]

Identification strategy for portfolio replenishment:

In order to analyze portfolio replenishment at the bank level, we use our variable definition for *Incoming Loan* from the loan-level analysis as the starting point to define our endoge-

[7] Multicollinearity is also not an issue in our empirical setting using our *Bank-level Sample*. The mean VIF accounts for 2.59, and all VIFs are smaller than 6.05.

nous variable at the bank level. First, we weight our *Incoming Loan* variable at the loan level based on the current loan balance to aggregate it at the portfolio level at a distinct reporting quarter. Second, we compute the average value of percentage of *Incoming Loans* at the portfolio level per originator and per year to gain annual bank-level observations (*Percentage of Incoming Loans*). Overall, in our *Bank-level Sample*, the *Percentage of Incoming Loans* amounts to 38 %.

Bank exposure to credit risk and capital strength:

In our bank-level analysis, we incorporate bank exposure to credit risk and capital strength as exogenous variables of main interest. The *NPL Ratio*, as proxy for bank exposure to credit risk, is computed by dividing the volume of non-performing loans by the volume of gross loans. In our *Bank-level Sample*, we observe a mean *NPL Ratio* of 13 %. Turning to the originator capital strength, we include the *Equity Ratio* defined as the ratio of equity to total assets. On average, the *Equity Ratio* amounts to 7 %.

Bank-level controls:

Our controls at the bank level comprise information on the bank size, business model, liquidity, and profitability. We proxy bank size and business model by utilizing the natural logarithm of total assets (*Bank Size*), as well as the sum of net loans divided by total assets (*Loan Ratio*). *Bank Size* accounts for around 10.65 on average representing EUR 221 billion. The mean *Loan Ratio* is 61 %. In addition, we measure a bank's liquidity position in relation to its funding needs by employing the ratio of liquid assets to deposits and short-term funding (*Liquidity*). We observe, on average, a ratio of 35 %. Regarding the originator efficiency and profitability, we utilize the Cost-Income-Ratio (*CIR*) as well as the Return on Equity (*RoE*). On average, the *CIR* amounts to 67 % and the *RoE* to -1 %. Finally, we include *Loan Growth* to control for the possible impact of changes in bank lending policy on the extent of portfolio replenishment in securitization. On average, *Loan Growth* is 1 % in our *Bank-level Sample*.

V Empirical strategy and results

V.1 Loan-level analysis

Loan performance of *Incoming Loans:*

We first evaluate whether *Incoming Loans* perform worse than loans already being part of the portfolio at the first ABS reporting quarter. The endogenous variables in our regression are our five loan performance measures defined in Section IV.1. As exogenous variable of main interest, we use our indicator variable *Incoming Loan*. Beyond that, we control for several loan and borrower characteristics, namely *Interest Rate*, *Collateralization*, *Years since Loan Origination*, *Loan Years to Maturity*, *Current Balance*, *Securitized Loan Ratio*, *Pool Time*, *Lending Relationship*, and *Loan Uniqueness* (see Section IV.1). In addition, we incorporate the interaction of the reporting quarter and the ABS portfolio FE, as well as loan origination year, industry, loan type, and borrower type FE, in order to control for unobserved dynamics over time as well as unobserved variations at the loan-, borrower-, and portfolio-level. In particular, the interaction of the reporting quarter and ABS portfolio FE enables us to assess the effect of *Incoming Loans* on loan performance within the same ABS portfolio and at one single reporting date. Thus, this FE captures bank behavior and ABS transaction characteristics within one point in time which both may affect our results. We estimate the following regression model on our *Loan-level Sample*:

$$\begin{aligned} Loan\ Performance_{itp} = {} & \alpha + \beta \cdot Incoming\ Loan_{it} + \gamma' \cdot Loan-level\ Controls_{it} \\ & + \zeta' \cdot Reporting\ Quarter\ x\ ABS\ Portfolio\ FE \\ & + \nu' \cdot Loan\ Origination\ Year\ FE + \rho' \cdot Industry\ FE \\ & + \tau' \cdot Loan\ Type\ FE + \upsilon' \cdot Borrower\ Type\ FE + \epsilon_{itp}, \end{aligned} \tag{V.1}$$

where i indexes loans, t indexes quarters, p indexes one specific loan performance measure, and ϵ_{itp} is the error term. We use robust standard errors that are clustered with respect to the interaction of the reporting quarter and ABS portfolio. Clustering is especially important as we expect correlations between a large number of underlying loans within an ABS portfolio at one reporting date. We expect the coefficient of *Incoming Loan* (β) to be significantly positive.

Table 10 presents our regression results and shows that *Incoming Loans* exhibit significantly lower loan performance. Specifications (1) and (3) reveal that *Incoming Loans* demonstrate, on average, a 0.45 percentage points (pp) higher probability of being a defaulted loan and a 1.24 pp higher probability of being a delinquent loan compared to non-incoming loans. This represents about 15 % of our sample's mean *Default* and 12.4 % of our sample's mean *Delinquency*. Consistently, *Default Amount* (2), *Delinquent Amount* (4), and *Number of Days in Delinquency* (5) are also significantly higher if the respective loan is added to the portfolio after the closing of the ABS transaction.

[Table 10 about here.]

***Bank awareness analysis*:**

Building on the results of our first analysis, we explore whether banks are aware of adding low-quality loans to ABS portfolios after the closing which perform poorly afterwards. This is of particular interest to identify a link between originators' selection of which loans to add ex post and subsequent loan performance.[8] Therefore, we aim at providing a possible channel through which our previous results on loan performance are induced by originators. We focus on *PD*, *LGD* and the product of both variables, *PD x LGD*, as our exogenous variables of main interest since these loan quality measures are already known at the time of securitization. We estimate whether low-quality loans are more likely to be

8 This approach is roughly comparable to the analysis of Benmelech et al. (2012) who evaluate determinants of loan securitization and loan performance subsequent to securitization. However, in contrast to our paper, they focus on the comparison between securitized and non-securitized loans.

added to the ABS portfolio ex post when investors have already made their investment decision based on the following regression model using our *Loan-level Sample*

$$\begin{aligned} Incoming\ Loan_{it} = \alpha + \beta \cdot Loan\ Quality_{itq} + \gamma' \cdot Loan - level\ Controls_{it} \\ + \zeta' \cdot Reporting\ Quarter\ x\ ABS\ Portfolio\ FE \\ + \nu' \cdot Loan\ Origination\ Year\ FE + \rho' \cdot Industry\ FE \\ + \tau' \cdot Loan\ Type\ FE + \upsilon' \cdot Borrower\ Type\ FE + \epsilon_{itq}, \end{aligned} \tag{V.2}$$

where i indexes loans, q indexes one specific loan quality measure, t indexes quarters, and ϵ_{itq} is the error term. We again use robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio. Loan-level controls include the same variables as in Equation V.1. We expect the coefficient of our ex ante loan quality measures to be significantly positive.

We report our regression results in Table 11 in specifications (1) to (3). We yield significantly positive coefficients for *PD* and *PD x LGD* indicating that low-quality loans are more likely to be added to ABS portfolios after the closing than loans of higher quality which are already part of the initial ABS portfolio. Unlike *PD* and *PD x LGD*, the coefficient of *LGD* is not significant.

[Table 11 about here.]

In order to connect both our loan performance and loan quality analysis, we explore whether loans with high *PDs* at the time of securitization and particularly poor performance after being securitized are more likely to be added to the ABS portfolio after the closing. For this purpose, we interact the *PD* with our ex post loan performance measures in specifications (4) to (8) in Table 11. The significantly positive coefficients reveal that loans with predicted high probabilities of default and poor performance after securitization are indeed more likely to be classified as *Incoming Loans*. Therefore, our results demonstrate that originators indeed add low-quality loans ex post which are more likely to become non-performing afterwards.

***Portfolio effect analysis*:**

From an investor perspective, it is of particular relevance to analyze whether portfolio replenishment adversely affects ABS portfolio performance. Therefore, we compare *Incoming Loans* with similar *Outgoing Loans* based on propensity score matching, originally proposed by Rosenbaum and Rubin (1983). The comparison between those two groups is motivated by the fact that ABS portfolio performance changes if *Incoming Loans* and *Outgoing Loans* are significantly different. In order to match *Incoming Loans* and *Outgoing Loans* as accurately as possible, we create a subsample. For each loan in our *Loan-level Sample*, we only retain the point in time when it is added to and/or removed from the ABS portfolio. Consequently, we observe each loan either one point or two points in time in our subsample. In total, our subsample still includes 1,379,670 observations and 1,183,674 loans. 51 % of observations refer to *Incoming Loans*.

In order to implement the propensity score matching, we apply the most frequently used algorithm, the nearest-neighbor (N – N) matching, for matching *Incoming Loans* and *Outgoing Loans* (e.g., Stuart, 2010). This matching algorithm compares each *Incoming Loan* with the arithmetic average of n *Outgoing Loans*, having the closest propensity scores. We assume n = 1, 5, 10, 20, and 50. We estimate the propensity scores based on the following logit regression model and report our results in Table 12 in the appendix:[9]

$$\begin{aligned} Incoming\ Loan_{it} = {} & \alpha + \gamma' \cdot Loan-level\ Controls_{it} \\ & + \zeta' \cdot Reporting\ Quarter\ x\ ABS\ Portfolio\ FE \\ & + \nu' \cdot Loan\ Origination\ Year\ FE + \rho' \cdot Industry\ FE \\ & + \tau' \cdot Loan\ Type\ FE + \upsilon' \cdot Borrower\ Type\ FE + \epsilon_{it}, \end{aligned} \tag{V.3}$$

[9] We also estimate a probit regression and report our results in Table 12 in the appendix. If we use this estimation for our propensity score matching, our findings based on propensity score matching still hold (see Table 14 in the appendix).

where i indexes loans, t indexes quarters, and ϵ_{it} is the error term. We again use robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio. Loan-level controls include the same variables as in Equation V.1. We expect that *Incoming Loans* perform worse than similar *Outgoing Loans*.

Table 13 illustrates our regression results analyzing whether portfolio replenishment adversely affects ABS portfolio performance. Across all specifications, we find significantly positive coefficients revealing that *Incoming Loans* perform worse than similar *Outgoing Loans* with respect to all five ex post loan performance measures. Thus, we provide evidence that originators decrease average loan performance in an ABS portfolio by adding loans to the portfolio ex post which perform worse than loans being removed from the portfolio. This lowers the asset value in the ABS portfolio and consequently, the attractiveness of the investment which ABS investors have already made before. Altogether, the results of our loan-level analysis demonstrate that originators tend to exploit their leeway since they replenish their ABS portfolios ex post by adding low-quality loans to already-securitized loan portfolios which perform poorly afterwards and which adversely affects ABS performance.

[Table 13 about here.]

V.2 Bank-level analysis

***Balance sheet effects analysis*:**

Building on our loan-level analysis, we examine whether there are common bank characteristics that drive originators to make use of portfolio replenishment in securitizations. Thus, we apply our *Bank-level sample* and proxy for the extent of portfolio replenishment by utilizing *Percentage of Incoming Loans* as the endogenous variable. Due to the bounded nature of this variable between zero and one, we apply a fractional response regression model. This is particularly suited for modeling continuous variables bounded to the interval [0, 1] by ensuring that the predicted values lie in the unit interval (Papke and Wooldridge, 1996). Fractional response regression modeling is applied in several studies (e.g., Ramalho and da Silva, 2009; Bastos, 2010; Bellotti and Crook, 2012; Li et al., 2018), and is based on a quasi-likelihood estimation. In line with the study of Louzis et al. (2012), our exogenous variables depicts bank exposure to credit risk, capital strength, size, business model, liquidity, efficiency and profitability. Thereof, our variables of main interest are *NPL Ratio*, as proxy for bank exposure to credit risk, and *Equity Ratio*, as proxy for capital strength. We apply the following fractional response regression model on annual data using our *Bank-level Sample*:

$$\begin{aligned} Percentage\ of\ Incoming\ Loans_{it} = {} & \alpha + \beta_1 \cdot NPL\ Ratio_{it} + \beta_2 \cdot Equity\ Ratio_{it} \\ & + \beta_3 \cdot Bank\ Size_{it} + \beta_4 \cdot Loan\ Ratio_{it} \\ & + \beta_5 \cdot Liquidity_{it} + \beta_6 \cdot CIR_{it} \\ & + \beta_7 \cdot RoE_{it} + \beta_8 \cdot Loan\ Growth_{it} \\ & + \gamma' \cdot Reporting\ Year\ FE + \epsilon_{it}, \end{aligned} \tag{V.4}$$

where i indexes originating banks, t indexes years, and ϵ_{it} is the error term. We use robust standard errors that are clustered with respect to the originator. We expect the coefficient of *NPL Ratio* (β_1) to be positive, as well as the coefficient of *Equity Ratio* (β_2) to be negative. The first prediction can be explained by the fact that originators with high *NPL Ratios* attempt to lower these ratios or at least keep them at a constant level by conducting portfolio replenishment in securitization. Against this background, we also expect that originators with lower *Equity Ratios* especially make use of portfolio replenishment as poor-performing loans held on their balance sheets further negatively affect the *Equity Ratio*.

As presented in Table 15, we gain a significantly positive coefficient of *NPL Ratio* as well as a significantly negative coefficient of *Equity Ratio*. These findings are consistent with our expectation and reveal that banks being undercapitalized or exhibiting high *NPL Ratios* particularly make use of portfolio replenishment in securitization. This result corresponds with our loan-level analysis, and provides evidence that originators seem to add low-quality loans to already-securitized ABS portfolios in order to obtain positive balance sheet effects.

[Table 15 about here.]

Analysis of ABS prospectuses:

To expand our results at the bank level, we manually explore the ABS prospectuses and assign two indicator variables for each ABS transaction in our *Bank-level Sample*. First, *Replenishment* is equal to one if the ABS prospectus includes a description of the possibility of portfolio replenishment, and zero otherwise. Second, we define *Eligibility Criteria* as an indicator variable equal to one if the ABS prospectus not only includes the possibility of portfolio replenishment, but also explicitly specifies eligibility criteria for loans being ex post added to the ABS transactions, and zero otherwise. By adding these two variables to our regression model (see Equation V.4), we diminish our *Bank-level Sample* size by four observations because the corresponding prospectuses are not available.

As illustrated in Table 16, specification (1) reveals that originators which include the possibility of portfolio replenishment in their ABS prospectuses conduct significantly less portfolio replenishment than other originators. In particular, the *Percentage of Incoming Loans* decreases by 21 pp. This result is in line with specification (2) which shows that originators define specific loan eligibility criteria in their ABS prospectuses make also less use of portfolio replenishment in securitization. On average, we provide evidence that their *Percentage of Incoming Loans* is 33 pp lower than for other originators. This shows that details and requirements in ABS prospectuses may constitute a disciplining effect on originators regarding portfolio replenishment in securitization.

[Table 16 about here.]

VI Robustness checks

Firstly, we account for the fact that 53 % of our observations in the *Loan-level Sample* refer to Belgian loans. Thus, we exclude all Belgian loans and re-estimate our three regression models at the loan level using only 4,212,900 observations. Table 17 in the appendix illustrates the results of our first analysis exploring whether *Incoming Loans* perform worse than other loans in the ABS portfolios. Across all five ex post loan performance measures and in line with our main analysis, we gain significantly positive coefficients. In Table 18 in the appendix, we present the results of our second regression model. The significantly positive coefficients across all specifications, except for *LGD*, confirm our finding that low-quality loans as well as low-quality loans performing poorly after securitization are more likely to be added to ABS portfolios after the closing as opposed to loans of higher quality. Table 19 in the appendix reports our propensity score matching based on our subsample. *Incoming Loans* still perform worse than *Outgoing Loans*, observing statistical significance in all specifications with the exception of *Default*. This reinforces our results in the main analysis.

Secondly, a possible concern may be that our results at the loan level are driven by the fact that we cannot observe all ABS transactions since the closing date because the loan-level initiative was introduced only in January 2013. For this reason, we re-estimate our regressions and the propensity score matching using only those ABS transactions which we observe since their issue date. In this subsample, we maintain 3,854,205 observations. As illustrated in Table 20 in the appendix, all five specifications validate our main results, i.e. *Incoming Loans* perform significantly worse compared to non-incoming loans. While the statistical significance remains at the same level, the economic significance even rises. Table 21 in the appendix shows exclusively positive coefficients of our loan quality measures which are significant in cases of *PD* x *LGD* as well as of all interaction effects of *PD* and our measures of loan performance after securitization. This result reinforces our finding that low-quality loans and especially low-quality loans which perform worse in the

ABS portfolio are more likely to be *Incoming Loans*. Turning to the propensity score matching reported in Table 22 in the appendix, we observe positive coefficients across all specifications. However, the statistical significance declines and we only yield significant coefficients in case of our three delinquency measures.

Thirdly, we incorporate that our loan-level results may be driven by the fact that *Incoming Loans* and non-incoming loans differ, on average, in both their *Years since Loan Origination* and *Loan Years to Maturity*. Even though we control for *Years since Loan Origination* and *Loan Years to Maturity*, we also vary *Years since Loan Origination* and *Loan Years to Maturity* in this robustness test. Thus, in our adjusted regression models, we use the non-logarithmized variables as well as the squared variables as controls. As presented in Tables 23, 24, and 25 in the appendix, we yield the same findings in all loan-level regression models.

VII Conclusion

The novel securitization framework in Europe requires loans transferred to STS securitizations after the closing to meet the same eligibility criteria as initial underlying exposures. As of 2019, this novel requirement protects investors by preventing originators from exploiting discretionary leeway. Based on our observation period from 2013 until 2017, we empirically explore portfolio replenishment in securitization prior to the novel framework on a very granular level. At the loan level, we analyze which consequences result from portfolio replenishment for ABS portfolio composition and performance from the investor perspective. Building on that, we turn to the bank perspective and determine whether there are common bank characteristics that drive originators to make use of portfolio replenishment in securitization. To the best of our knowledge, this paper is the first to study portfolio replenishment in typical securitizations which need to be clearly distinguished from CLOs (European Banking Authority, 2014).

We obtain our extensive securitization data set from ED, the first and so far only central repository of all loan-level information under the ECB's loan-level reporting initiative. Applying several regression models and propensity score matching procedures, a large set of control variables, several FE, as well as a variety of robustness tests, our results indicate that loans added to ABS transactions after the closing exhibit lower performance than loans being part of the portfolio directly at the point of securitization. We additionally reveal that originators exploit existing leeway in portfolio replenishment by adding low-quality loans to ABS portfolios which indeed perform worse afterwards. This adversely affects overall ABS portfolio performance.

Based on these findings at the loan level, we turn to the bank perspective and enrich our data set collected from ED by originator characteristics from Fitch Connect. We find that originators being undercapitalized or exhibiting high NPL ratios make particularly use of portfolio replenishment. Furthermore, we manually explore ABS prospectuses and show that originators, which include the possibility of portfolio replenishment or specify eligibility criteria for loans being transferred to already-securitized ABS portfolios in their ABS prospectuses, make less use of portfolio replenishment. Especially because we provide evidence that specific loan eligibility criteria defined in ABS prospectuses limit portfolio replenishment in securitization, the novel requirement by the STS regulation is expected to be of particular importance for revitalizing a trustworthy securitization market in Europe.

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VIII Appendix

Table 1: Overview of the *Loan-level Sample* selection procedure

	Loans	Borrowers	ABS portfolios	Observations at the loan level
Data reported to ED from 2013-2017	**6,612,261**	**2,517,548**	**172**	**32,026,829**
Less				
Relevant variables are missing or implausible (e.g., days in arrears exceed the loan period, reporting date is before the loan origination date)	3,488,507	802,547	19	13,141,233
Ambiguous bank names	905,699	704,420	58	5,617,992
Voluntary monthly reporting	609,785	101,716	0	4,360,619
Loan-level Sample	**1,608,270**	**908,865**	**95**	**8,906,985**

Table 2: Number of loans and SMEs by country-reporting year in our *Loan-level Sample*

	2013		2014		2015		2016		2017	
Country	Loans	SMEs	Loans	SMEs	Loans	SMEs	Loans	SMEs	Loans	SMEs
BE	293,962	151,871	279,053	145,776	270,550	139,013	256,558	129,974	276,199	141,323
DE	0	0	0	0	23,516	18,211	26,662	20,189	32,473	22,968
ES	24,934	23,435	8,672	8,060	70,213	62,867	89,295	80,070	89,902	82,111
FR	26,675	7,962	33,362	4,799	114,081	56,578	171,197	78,088	227,609	95,502
IT	86,786	75,905	66,312	58,013	104,260	90,127	107,262	91,826	126,709	111,476
NL	0	0	11,663	6,680	9,839	5,723	7,942	4,718	5,961	3,603
PT	29,827	20,223	38,032	24,842	62,631	40,773	61,394	42,988	50,496	35,941
Total	462,184	279,396	437,094	248,170	655,090	413,292	720,310	447,853	809,349	492,924

This table reports the number of loans and borrowers from 2013 until 2017 for every year and country. Our sample consists of seven different countries: Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), the Netherlands (NL), and Portugal (PT).

Table 3: Definitions of our variables in the *Loan-level Sample*

Variable	Description	Data source
Replenishment measure		
Incoming Loan	Indicator variable equal to one for loans that are not yet included in the ABS transaction at the time when the transaction is reported to ED for the first time, and zero otherwise.	ED, own calc.
Ex ante loan quality and ex post loan performance measures		
PD	Loan probability of default.	ED, own calc.
LGD	Bank internal loss given default estimate.	ED
Default	Indicator variable equal to one if the borrower ever defaulted on the loan, and zero otherwise.	ED, own calc.
Default Amount	Natural logarithm of the maximum default amount per loan.	ED, own calc.
Delinquency	Indicator variable equal to one if the borrower was ever in arrears, either with respect to principal or interest payments, and zero otherwise.	ED, own calc.
Delinquent Amount	Natural logarithm of the maximum sum of principal and interest arrears per loan.	ED, own calc.
Number of Days in Delinquency	Natural logarithm of the maximum number of days for which the borrower delays principal or interest payments per loan.	ED, own calc.
Loan-level controls		
Interest Rate	Current loan interest rate (in %).	ED
Collateralization	Indicator variable equal to one if a loan is collateralized, and zero otherwise.	ED, own calc.
Years since Loan Origination	Natural logarithm of the time period, expressed in years, between loan origination and the current reporting date.	ED, own calc.
Loan Years to Maturity	Natural logarithm of the remaining years to maturity at the time of the current reporting date.	ED, own calc.
Current Balance	Natural logarithm of the current loan balance.	ED, own calc.
Securitized Loan Ratio	Ratio of the outstanding loan balance at the time of securitization to the original loan amount.	ED, own calc.
Pool Time	Number of quarters a loan is included in the ABS transaction.	ED, own calc.
Lending Relationship	Indicator variable equal to one if a borrower borrows at least twice from the same bank, and zero otherwise.	ED, own calc.
Loan Uniqueness	Natural logarithm of the number of loans that were originated in the same year, and that can be assigned to the same one-digit NACE industry code as well as the same two-digit postcode area.	ED, own calc.

Table 4: Summary statistics for our *Loan-level Sample*

Variable	N	Mean	SD	p10	p50	p90
Replenishment measure						
Incoming Loan	8,906,985	0.46	0.50	0.00	0.00	1.00
Ex ante loan quality and and ex post loan performance measures						
PD	8,906,985	0.02	0.06	0.00	0.01	0.05
LGD	8,906,985	0.29	0.27	0.03	0.19	0.69
Default	8,906,985	0.03	0.16	0.00	0.00	0.00
Default Amount	8,906,985	0.19	1.42	0.00	0.00	0.00
Delinquency	8,906,985	0.10	0.30	0.00	0.00	1.00
Delinquent Aamount	8,906,985	0.76	2.33	0.00	0.00	4.18
Number of Days in Del.	8,906,985	0.28	0.93	0.00	0.00	0.69
Loan-level controls						
Interest Rate (%)	8,906,985	3.52	1.67	1.50	3.33	5.75
Collateralization	8,906,985	0.74	0.44	0.00	1.00	1.00
Years since Loan Origination	8,906,985	1.37	0.62	0.51	1.36	2.24
Loan Years to Maturity	8,906,985	1.30	0.75	0.29	1.28	2.38
Current Balance	8,906,985	9.99	1.88	8.01	9.97	12.19
Securitized Loan Ratio	8,906,985	0.72	0.27	0.32	0.81	1.00
Pool Time	8,906,985	10.06	5.77	3.00	9.00	19.00
Lending Relationship	8,906,985	0.64	0.48	0.00	1.00	1.00
Loan Uniqueness	8,906,985	6.43	1.46	4.38	6.59	8.19

This table reports the descriptive statistics for the variables used in our loan-level analysis. Variables are described in the appendix in Table 3. N refers to the number of observations. SD means standard deviation. p10, p50, and p90 represent the first, fiftieth, and the ninety-ninth percentile.

Table 5: Correlations for our *Loan-level Sample*

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	Incoming Loan	1.00																
(2)	PD	-0.13	1.00															
(3)	LGD	-0.02	-0.03	1.00														
(4)	Default	-0.06	0.46	-0.02	1.00													
(5)	Default Amount	-0.03	0.06	0.03	0.84	1.00												
(6)	Delinquency	-0.02	0.10	-0.03	0.30	0.31	1.00											
(7)	Delinquent Amount	-0.02	0.11	-0.02	0.35	0.38	0.96	1.00										
(8)	Number of Days in Del.	-0.03	0.06	0.02	0.38	0.43	0.80	0.83	1.00									
(9)	Interest Rate (%)	-0.22	0.22	0.21	0.09	0.06	0.13	0.11	0.14	1.00								
(10)	Collateralization	0.05	-0.01	-0.28	0.00	-0.01	-0.02	-0.01	-0.04	-0.19	1.00							
(11)	Years since Loan Origination	-0.38	0.17	-0.03	0.07	0.04	0.10	0.11	0.10	0.20	0.05	1.00						
(12)	Loan Years to Maturity	-0.04	0.01	-0.17	0.00	0.02	0.06	0.07	0.05	-0.11	0.21	0.13	1.00					
(13)	Current Balance	0.02	0.12	-0.12	0.05	0.07	0.06	0.10	0.05	-0.16	0.18	0.08	0.64	1.00				
(14)	Securitized Loan Ratio	0.24	0.08	-0.00	0.04	0.04	0.07	0.07	0.06	0.00	0.02	-0.23	0.23	0.22	1000			
(15)	Pool Time	-0.13	0.12	-0.01	0.04	0.03	0.09	0.09	0.09	0.14	0.090	0.39	0.28	0.25	0.32	1.00		
(16)	Lending Relationship	0.11	0.01	-0.15	-0.00	-0.04	-0.12	-0.12	-0.11	-0.16	0.28	-0.11	-0.02	0.02	0.06	0.11	1.00	
(17)	Loan Uniqueness	0.05	-0.13	-0.06	-0.05	-0.02	-0.05	-0.05	-0.03	-0.09	-0.02	-0.28	-0.10	-0.13	0.04	0.02	0.14	1.00

This table reports the pairwise correlations of our variables used in the loan-level analysis. Variables are described in the appendix in Table 3.

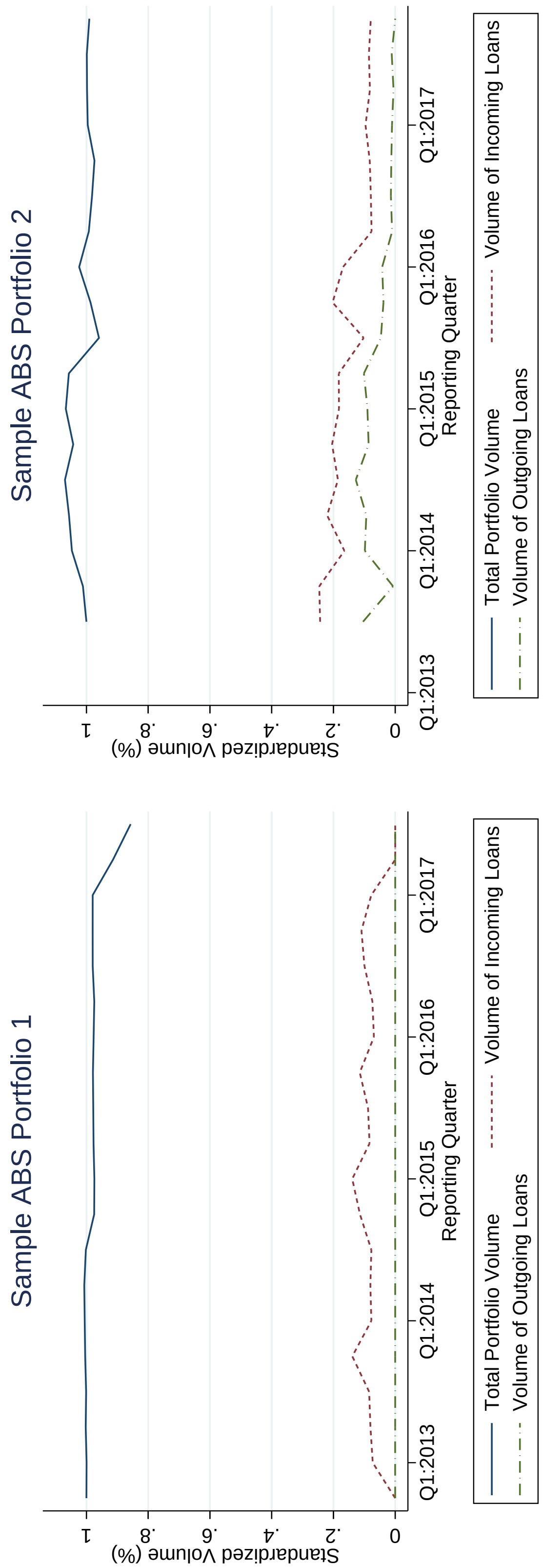

Figure 1: Development of total portfolio volume, total volume of *Incoming Loans* and *Outgoing Loans* for two exemplary ABS portfolios in our sample

Table 6: Logit regression to estimate loan-level *PDs*

	Default
	(1)
Interest Rate	0.00424***
	(0.00125)
Collateralization	-0.00715
	(0.00445)
Years since Loan Origination	0.0121**
	(0.00539)
Loan Years to Maturity	-0.00887***
	(0.00208)
Current Balance	0.00534***
	(0.00104)
Securitized Loan Ratio	0.0262***
	(0.00987)
Lending Relationship	-0.000227
	(0.00280)
Loan Uniqueness	-0.000216
	(0.000870)
Reporting quarter FE	Yes
Loan type FE	Yes
Borrower type FE	Yes
Industry FE	Yes
N	16,227,716
R^2	0.21

This table reports the logit model to estimate a PD for every single loan in our *Loan-level Sample*. Variables are described in the appendix in Table 3. Marginal effects are reported and robust standard errors that are clustered with respect to the ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 7: Definitions of our variables in the *Bank-level Sample*

Variable	Description	Data source
Replenishment measure		
Percentage of Incoming Loans	Annualized weighted average of loans added to already-securitized ABS portfolios after their first reporting quarter. Weighting is based on the current loan balance.	ED, own calc.
ABS prospectus information		
Replenishment	Indicator variable equal to one if the ABS prospectus of a transaction includes a description of the possibility of portfolio replenishment, and zero otherwise.	ED prospectuses, own calc.
Eligibility Criteria	Indicator variable equal to one if the ABS prospectus not only includes the possibility of portfolio replenishment, but also specifies certain eligibility criteria for loans being added to the ABS transactions ex post, and zero otherwise.	ED prospectuses, own calc.
Bank exposure to credit risk and capital strength		
NPL Ratio	Ratio of non-performing loans volume to gross loans volume.	Fitch Connect
Equity Ratio	Ratio of equity to bank total assets.	Fitch Connect
Bank-level controls		
Bank Size	Natural logarithm of bank total assets.	Fitch Connect
Loan Ratio	Sum of net loans divided by bank total assets.	Fitch Connect
Liquidity	Ratio of liquid assets to deposits and short-term funding.	Fitch Connect
CIR	Cost-Income-Ratio.	Fitch Connect
RoE	Return on Equity.	Fitch Connect
Loan Growth	Loan growth compared to the previous year.	Fitch Connect

Table 8: Summary statistics for our *Bank-level Sample*

Variable	N	Mean	SD	p10	p50	p90
Replenishment measure						
Percentage of Incoming Loans	167	0.38	0.43	0.00	0.12	1.00
Bank exposure to credit risk and capital strength						
NPL Ratio	167	0.13	0.10	0.03	0.13	0.27
Equity Ratio	167	0.07	0.02	0.04	0.07	0.10
ABS prospectus information						
Replenishment	163	0.61	0.49	0.00	1.00	1.00
Eligibility Criteria	163	0.13	0.34	0.00	0.00	1.00
Bank-level controls						
Bank Size	167	10.65	1.97	8.29	10.53	13.65
Loan Ratio	167	0.61	0.16	0.37	0.63	0.81
Liquidity	167	0.35	0.18	0.13	0.32	0.62
CIR	167	0.67	0.28	0.48	0.61	0.80
RoE	167	-0.01	0.41	-0.26	0.03	0.10
Loan Growth	167	0.01	0.16	-0.06	-0.01	0.10

This table reports the descriptive statistics for the variables used in our bank-level analysis. Variables are described in the appendix in Table 7. N refers to the number of observations. SD means standard deviation. p10, p50, and p90 represent the tenth, fiftieth, and the ninetieth percentile.

Table 9: Correlations for our *Bank-level Sample*

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	NPL Ratio	1.00							
(2)	Equity Ratio	-0.05	1.00						
(3)	Bank Size	-0.40	-0.17	1.00					
(4)	Loan Ratio	0.24	0.56	-0.49	1.00				
(5)	Liquidity	-0.24	-0.53	0.35	-0.89	1.00			
(6)	CIR	0.38	-0.21	0.03	-0.03	-0.08	1.00		
(7)	RoE	-0.21	-0.10	-0.02	-0.05	0.01	0.14	1.00	
(8)	Loan Growth	-0.35	0.16	0.02	0.04	0.06	-0.48	-0.26	1.00

This table reports the pairwise correlations of our variables used in the bank-level analysis. Variables are described in the appendix in Table 7.

Table 10: Loan performance of *Incoming Loans*

	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Del.
	(1)	(2)	(3)	(4)	(5)
Incoming Loan	0.00454***	0.0398***	0.0124***	0.0877***	0.0227***
	(0.0014)	(0.0138)	(0.0025)	(0.0202)	(0.0086)
Interest Rate	0.00757***	0.0721***	0.0246***	0.177***	0.0793***
	(0.0004)	(0.0040)	(0.0011)	(0.0081)	(0.0032)
Collateralization	0.00411***	0.0541***	0.0244***	0.187***	0.0710***
	(0.0011)	(0.0123)	(0.0027)	(0.0240)	(0.0069)
Years since Loan Origination	0.0133***	0.147***	0.00539	0.0661	0.0106
	(0.0029)	(0.0287)	(0.0071)	(0.0591)	(0.0193)
Loan Years to Maturity	-0.0104***	-0.106***	0.000310	-0.0794***	-0.00344
	(0.0011)	(0.0111)	(0.0017)	(0.0140)	(0.0058)
Current Balance	0.00628***	0.0795***	0.00883***	0.128***	0.0276***
	(0.0005)	(0.0059)	(0.0008)	(0.0091)	(0.0028)
Securitized Loan Ratio	0.0332***	0.344***	0.0483***	0.420***	0.180***
	(0.0040)	(0.0417)	(0.0057)	(0.0494)	(0.0200)
Pool Time	-0.00127***	-0.0145***	-0.000208	-0.00466*	-0.00454***
	(0.0002)	(0.0023)	(0.0003)	(0.0028)	(0.0010)
Lending Relationship	-0.00132	-0.00773	-0.0226***	-0.148***	-0.0685***
	(0.0009)	(0.0096)	(0.0016)	(0.0116)	(0.0060)
Loan Uniqueness	-0.0000830	-0.000981	-0.000823	-0.00715*	-0.000983
	(0.0002)	(0.0023)	(0.0005)	(0.0040)	(0.0018)
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes
N	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978
R^2	0.29	0.07	0.16	0.17	0.11

This table reports the analysis whether *Incoming Loans* exhibit lower loan performance than non-incoming loans. Variables are described in the appendix in Table 3. Clustered standard errors with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 11: Bank awareness analysis

	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PD	0.289^{***} (0.0820)							
LGD		0.00110 (0.0179)						
PD x LGD			1.216^{***} (0.1787)					
PD x Default				0.471^{***} (0.0891)				
PD x Default Amount					0.0521^{***} (0.0080)			
PD x Delinquency						0.114^{***} (0.0320)		
PD x Delinquent Amount							0.0161^{***} (0.0042)	
PD x Number of days in del.								0.0805^{***} (0.0165)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978
R^2	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

This table reports the analysis whether ex ante loan quality and the interaction effects of ex ante loan quality and ex post loan performance affects the probability of being added to already-securitized loan portfolios after the closing. Variables are described in the appendix in Table 3. Robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 12: Logit and probit regressions to estimate propensity scores

	Default	Default
	(1)	(2)
Interest Rate	0.00151	0.00130
	(0.00190)	(0.00192)
Collateralization	0.00677	0.00686
	(0.0430)	(0.0414)
Years since Loan Origination	-0.400***	-0.413***
	(0.0323)	(0.0312)
Loan Years to Maturity	0.121***	0.121***
	(0.00848)	(0.00825)
Current Balance	0.0128***	0.0137***
	(0.00245)	(0.00252)
Securitized Loan Ratio	-0.239***	-0.229***
	(0.0458)	(0.0456)
Pool Time	0.00938***	0.00931***
	(0.00244)	(0.00243)
Lending Relationship	-0.00805*	-0.00714
	(0.00428)	(0.00439)
Loan Uniqueness	-0.00971***	-0.0115***
	(0.00228)	(0.00212)
Reporting quarter x ABS portfolio FE	Yes	Yes
Loan origination year FE	Yes	Yes
Industry FE	Yes	Yes
Loan type FE	Yes	Yes
Borrower type FE	Yes	Yes
N	1,004,318	1,004,318
R^2	0.70	0.69
Estimation method	Logit	Probit

This table reports the logit and probit model to estimate propensity scores in our *Loan-level Sample*. Variables are described in the appendix in Table 3. Marginal effects are reported and robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 13: Test for mean differences in loan performance between *Incoming Loans* and *Outgoing Loans* based on propensity score matching

Estimator	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Delinquency
Nearest neighbor ($n = 1$)	0.0049***	0.0481***	0.0174***	0.0997***	0.0436***
	(0.0016)	(0.0171)	(0.0043)	(0.0331)	(0.0124)
Nearest neighbor ($n = 5$)	0.0043***	0.0467***	0.0187***	0.1100***	0.0453***
	(0.0012)	(0.0123)	(0.0032)	(0.0246)	(0.0093)
Nearest neighbor ($n = 10$)	0.0040***	0.0435***	0.0184***	0.1087***	0.0446***
	(0.0011)	(0.0114)	(0.0030)	(0.0232)	(0.0089)
Nearest neighbor ($n = 20$)	0.0040***	0.0430***	0.0186***	0.1091***	0.0442***
	(0.0012)	(0.0111)	(0.0030)	(0.0226)	(0.0087)
Nearest neighbor ($n = 50$)	0.0041***	0.0448***	0.0179***	0.1021***	0.0435***
	(0.0012)	(0.0108)	(0.0030)	(0.0224)	(0.0086)
N					1,004,318
Number of *Incoming Loans*					573,458
Number of *Outgoings Loans*					430,860

This table provides estimates of the mean differences of loan performance measures between *Incoming Loans* and similar *Outgoing Loans*, based on a propensity score matching. *Outgoing Loans* are defined as loans which are excluded from the ABS portfolio prior to ABS maturity. Propensity scores are estimated based on a logit regression, reported in Table 6 in the appendix, where the endogenous variable is the dummy *Default* described in Section IV. Variables are defined in Table 3 in the appendix. N refers to the number of observations. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 14: Test for mean differences in loan performance between *Incoming Loans* and *Outgoing Loans* based on propensity score matching (Robustness: Probit estimation)

Estimator	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Delinquency
Nearest neighbor ($n = 1$)	00027*	0.0318*	0.0142***	0.0714**	0.0407***
	(0.0016)	(0.0168)	(0.0042)	(0.0325)	(0.0122)
Nearest neighbor ($n = 5$)	0.0038***	0.0432***	0.0178***	0.1009***	0.0453***
	(0.0013)	(0.0134)	(0.0035)	(0.0266)	(0.0100)
Nearest neighbor ($n = 10$)	0.0036***	0.0427***	0.0176***	0.1004***	0.0428***
	(0.0013)	(0.0128)	(0.0033)	(0.0255)	(0.0096)
Nearest neighbor ($n = 20$)	0.0037***	0.0430***	0.0171***	0.0950***	0.0427***
	(0.0013)	(0.0124)	(0.0033)	(0.0249)	(0.0095)
Nearest neighbor ($n = 50$)	0.0033**	0.0352***	0.0180***	0.1013***	0.0440***
	(0.0013)	(0.0120)	(0.0033)	(0.0246)	(0.0094)
N					1,004,318
Number of *Incoming Loans*					573,458
Number of *Outgoings Loans*					430,860

This table provides estimates of the mean differences of loan performance measures between *Incoming Loans* and similar *Outgoing Loans*, based on a propensity score matching. *Outgoing Loans* are defined as loans which are excluded from the ABS portfolio prior to ABS maturity. Propensity scores are estimated based on a probit regression, reported in Table 12 in the appendix, where the endogenous variable is the dummy *Default* described in Section IV. Variables are defined in Table 3 in the appendix. N refers to the number of observations. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 15: Balance sheet effects analysis

	Percentage of Incoming Loans
	(1)
NPL Ratio	1.058* (0.5420)
Equity Ratio	-5.185*** (1.5767)
Bank Size	0.0378* (0.0210)
Loan Ratio	1.254** (0.4962)
Liquidity	0.498 (0.3760)
CIR	0.402** (0.1627)
RoE	0.843*** (0.2991)
Loan Growth	-0.0313 (0.2157)
Reporting year FE	Yes
N	167
R^2	0.19

This table reports the analysis whether there are common bank characteristics that drive originators to make use of portfolio replenishment in securitization, based on a fractional response regression model. Variables are described in the appendix in Table 7. Marginal effects are reported and robust standard errors that are clustered with respect to the originator of the ABS transaction are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 16: Analysis of ABS prospectuses

	Percentage of Incoming Loans	Percentage of Incoming Loans
	(1)	(2)
NPL Ratio	1.382**	1.422***
	(0.5373)	(0.4730)
Equity Ratio	-4.520***	-3.993**
	(1.5110)	(1.5793)
Replenishment	-0.208***	
	(0.0540)	
Eligibility Criteria		-0.326***
		(0.0791)
Bank Size	0.0418*	0.0363
	(0.0218)	(0.0239)
Loan Ratio	1.043**	0.852
	(0.4601)	(0.5205)
Liquidity	0.399	0.365
	(0.3893)	(0.3387)
CIR	0.550***	0.553***
	(0.1605)	(0.1683)
RoE	1.303***	1.227***
	(0.2825)	(0.2349)
Loan Growth	0.0209	-0.119
	(0.2098)	(0.1932)
Reporting year FE	Yes	Yes
N	163	163
R^2	0.25	0.25

This table reports the analysis whether details and requirements in ABS prospectuses affect the extent of portfolio replenishment, based on fractional response regression models. Variables are described in the appendix in Tables 7. Marginal effects are reported and robust standard errors that are clustered with respect to the originator of the ABS transaction are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 17: Loan performance of *Incoming Loans* (Robustness: Without Belgian loans)

	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Del.
	(1)	(2)	(3)	(4)	(5)
Incoming Loan	0.00981***	0.101***	0.0136***	0.0990***	0.0316***
	(0.0024)	(0.0256)	(0.0030)	(0.0253)	(0.0096)
Interest Rate	0.00891***	0.0874***	0.0270***	0.204***	0.0832***
	(0.0006)	(0.0066)	(0.0013)	(0.0101)	(0.0039)
Collateralization	0.00408	0.0890**	0.0514***	0.469***	0.117***
	(0.0031)	(0.0364)	(0.0066)	(0.0581)	(0.0180)
Years since Loan Origination	0.0145**	0.148**	0.0184*	0.154*	0.0542*
	(0.0063)	(0.0633)	(0.0100)	(0.0846)	(0.0327)
Loan Years to Maturity	-0.00473***	-0.0485***	0.00961***	-0.0193	0.0260***
	(0.0012)	(0.0117)	(0.0023)	(0.0176)	(0.0080)
Current Balance	0.00582***	0.0800***	0.00573***	0.113***	0.0193***
	(0.0008)	(0.0093)	(0.0007)	(0.0112)	(0.0029)
Securitized Loan Ratio	0.0260***	0.237***	0.0366***	0.351***	0.157***
	(0.0053)	(0.0531)	(0.0066)	(0.0574)	(0.0198)
Pool Time	0.000220	0.000253	0.00390***	0.0231***	0.00440**
	(0.0004)	(0.0038)	(0.0006)	(0.0051)	(0.0017)
Lending Relationship	0.00289*	0.0398**	-0.0126***	-0.0747***	-0.0211**
	(0.0017)	(0.0173)	(0.0024)	(0.0183)	(0.0083)
Loan Uniqueness	0.000886***	0.00785***	-0.00132**	-0.00618	-0.000333
	(0.0002)	(0.0023)	(0.0006)	(0.0050)	(0.0019)
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes
N	4,212,900	4,212,900	4,212,900	4,212,900	4,212,900
R^2	0.38	0.09	0.22	0.22	0.16

This table reports the analysis whether *Incoming Loans* exhibit lower loan performance excluding all observations from Belgium. Variables are described in the appendix in Table 3. Clustered standard errors with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 18: Bank awareness analysis (Robustness: Without Belgian loans)

	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PD	0.130^{**} (0.0520)							
LGD		-0.0241^{***} (0.0063)						
PD*LGD			0.525^{***} (0.1013)					
PD x Default				0.217^{***} (0.0550)				
PD x Default Amount					0.0275^{***} (0.0054)			
PD x Delinquency						0.0489^{***} (0.0134)		
PD x Delinquent Amount							0.00706^{***} (0.0018)	
PD x Number of Days in Del.								0.0403^{***} (0.0091)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,212,900	4,212,900	4,212,900	4,212,900	4,212,900	4,212,900	4,212,900	4,212,900
R^2	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79

This table reports the analysis whether ex ante loan quality and the interaction effects of ex ante loan quality and ex post loan performance affects the probability of being added to already-securitized loan portfolios after the closing, excluding all observations from Belgian loans. Variables are described in the appendix in Table 3. Robust standard errors that are clustered with respect to the ABS pool are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 19: Test for mean differences in loan performance between *Incoming Loans* and *Outgoing Loans* based on propensity score matching (Robustness: Without Belgian loans)

Estimator	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Delinquency
Nearest neighbor ($n = 1$)	0.0040	0.0462*	0.0223***	0.1393***	0.0439**
	(0.0027)	(0.0260)	(0.0055)	(0.0448)	(0.0175)
Nearest neighbor ($n = 5$)	0.0036	0.0463*	0.0222***	0.1366***	0.0425***
	(0.0025)	(0.0241)	(0.0050)	(0.0407)	(0.0159)
Nearest neighbor ($n = 10$)	0.0038	0.0511**	0.0215***	0.1328***	0.0413**
	(0.0026)	(0.0241)	(0.0051)	(0.0414)	(0.0161)
Nearest neighbor ($n = 20$)	0.0038	0.0488**	0.0215***	0.1330***	0.0412**
	(0.0026)	(0.0238)	(0.0051)	(0.0414)	(0.0160)
Nearest neighbor ($n = 50$)	0.0030	0.0375*	0.0206***	0.1260***	0.0407***
	(0.0026)	(0.0226)	(0.0050)	(0.0406)	(0.0157)
N					470,993
Number of *Incoming Loans*					310,963
Number of *Outgoings Loans*					160,030

This table provides estimates of the mean differences of loan performance measures between *Incoming Loans* and similar *Outgoing Loans*, based on a propensity score matching and only using observations from Belgian loans. *Outgoing Loans* are defined as loans which are excluded from the ABS portfolio prior to ABS maturity. Propensity scores are estimated based on a logit regression where the endogenous variable is the dummy *Default* described in Section IV. Variables are defined in Table 3 in the appendix. N refers to the number of observations. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 20: Loan performance of *Incoming Loans* (Robustness: ABS transaction closing within observation period)

	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Del.
	(1)	(2)	(3)	(4)	(5)
Incoming Loan	0.00637***	0.0626***	0.0150***	0.118***	0.0309**
	(0.0022)	(0.0217)	(0.0034)	(0.0270)	(0.0126)
Interest Rate	0.00802***	0.0769***	0.0259***	0.187***	0.0845***
	(0.0007)	(0.0070)	(0.0018)	(0.0129)	(0.0050)
Collateralization	0.00406***	0.0563***	0.0257***	0.198***	0.0768***
	(0.0014)	(0.0170)	(0.0041)	(0.0353)	(0.0095)
Years since Loan Origination	0.0150***	0.166***	-0.00461	-0.0101	-0.0184
	(0.0054)	(0.0536)	(0.0099)	(0.0838)	(0.0279)
Loan Years to Maturity	-0.0153***	-0.161***	-0.00573**	-0.136***	-0.0289***
	(0.0015)	(0.0161)	(0.0023)	(0.0203)	(0.0078)
Current Balance	0.00782***	0.0945***	0.00996***	0.140***	0.0353***
	(0.0008)	(0.0097)	(0.0013)	(0.0136)	(0.0041)
Securitized Loan Ratio	0.0389***	0.409***	0.0483***	0.447***	0.181***
	(0.0081)	(0.0825)	(0.0096)	(0.0836)	(0.0321)
Pool Time	-0.00148***	-0.0161***	-0.000314	-0.00530	-0.00494***
	(0.0004)	(0.0040)	(0.0006)	(0.0046)	(0.0018)
Lending Relationship	0.000886	0.0122	-0.0193***	-0.128***	-0.0576***
	(0.0014)	(0.0147)	(0.0025)	(0.0178)	(0.0090)
Loan Uniqueness	0.0000913	0.000596	0.000614	0.00334	0.00321
	(0.0004)	(0.0039)	(0.0007)	(0.0054)	(0.0025)
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes
N	3,854,205	3,854,205	3,854,205	3,854,205	3,854,205
R^2	0.26	0.07	0.16	0.17	0.11

This table reports the analysis whether *Incoming Loans* exhibit lower loan performance, only using observations from ABS portfolios for which the transaction closing is within our observation period. Variables are described in the appendix in Table 3. Clustered standard errors with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 21: Bank awareness analysis (Robustness: ABS transaction closing within observation period)

	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PD	0.175							
	(0.1356)							
LGD		0.0116						
		(0.0119)						
PD*LGD			1.208^{***}					
			(0.2953)					
PD x Default				0.632^{***}				
				(0.1684)				
PD x Default Amount					0.0695^{***}			
					(0.0142)			
PD x Delinquency						0.102^{*}		
						(0.0520)		
PD x Delinquent Amount							0.0166^{**}	
							(0.0074)	
PD x Number of Days in Del.								0.0776^{**}
								(0.0302)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,854,205	3,854,205	3,854,205	3,854,205	3,854,205	3,854,205	3,854,205	3,854,205
R^2	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67

This table reports the analysis whether ex ante loan quality and the interaction effect of ex ante loan quality and ex post loan performance affects the probability of being added to already-securitized loan portfolios after the closing, only using observations from ABS portfolios for which the transaction closing is within our observation period. Variables are described in the appendix in Table 3. Robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 22: Test for mean differences in loan performance between *Incoming Loans* and *Outgoing Loans* based on propensity score matching (Robustness: ABS transaction closing within observation period)

Estimator	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Delinquency
Nearest neighbor ($n = 1$)	0.0014	0.0090	0.0092*	0.7081*	0.0268*
	(0.0019)	(0.0197)	(0.0048)	(0.0369)	(0.0140)
Nearest neighbor ($n = 5$)	0.0011	0.0051	0.0083*	0.0629*	0.0246*
	(0.0016)	(0.0166)	(0.0043)	(0.0331)	(0.0127)
Nearest neighbor ($n = 10$)	0.0014	0.0088	0.0079*	0.0573*	0.0234*
	(0.0016)	(0.0160)	(0.0043)	(0.0329)	(0.0126)
Nearest neighbor ($n = 20$)	0.0014	0.0095	0.0083*	0.0597*	0.0250**
	(0.0016)	(0.0159)	(0.0044)	(0.0331)	(0.0127)
Nearest neighbor ($n = 50$)	0.0014	0.0088	0.0084*	0.0596*	0.0254**
	(0.0017)	(0.0158)	(0.0044)	(0.0335)	(0.0129)
N					383,654
Number of *Incoming Loans*					198,816
Number of *Outgoings Loans*					383,654

This table provides estimates of the mean differences of loan performance measures between *Incoming Loans* and similar *Outgoing Loans*, based on a propensity score matching and only using observation from ABS portfolios for which the transaction closing is within our observation period. *Outgoing Loans* are defined as loans which are excluded from the ABS portfolio prior to ABS maturity. Propensity scores are estimated based on a logit regression, where the endogenous variable is the dummy *Default* described in Section IV. Variables are defined in Table 3 in the appendix. N refers to the number of observations. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 23: Loan performance of *Incoming Loans* (Robustness: Loan term measures)

	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Del.
	(1)	(2)	(3)	(4)	(5)
Incoming Loan	0.00320**	0.0264**	0.0120***	0.0784***	0.0208**
	(0.0014)	(0.0134)	(0.0024)	(0.0193)	(0.0081)
Interest Rate	00764***	0.0728***	0.0247***	0.178***	0.0798***
	(0.0004)	(0.0040)	(0.0011)	(0.0080)	(0.0032)
Collateralization	0.00318***	0.0439***	0.0226***	0.170***	0.0653***
	(0.0010)	(0.0119)	(0.0026)	(0.0230)	(0.0066)
Years since Loan Origination	0.00197**	0.0279***	0.000173	0.00949	-0.00571
	(0.0009)	(0.0090)	(0.0022)	(0.0180)	(0.0060)
Years since Loan Origination^2	-0.000148***	-0.00178***	0.00000748	-0.000676	0.000285
	(0.0000)	(0.0005)	(0.0002)	(0.0014)	(0.0004)
Loan Years to Maturity	-0.00436***	-0.0469***	-0.00287***	-0.0493***	-0.0101***
	(0.0004)	(0.0047)	(0.0007)	(0.0060)	(0.0023)
Loan Years to Maturity^2	0.000198***	0.00217***	0.000228***	0.00276***	0.000748***
	(0.0000)	(0.0002)	(0.0000)	(0.0003)	(0.0001)
Current Balance	0.00577***	0.0745***	0.00874***	0.124***	0.0270***
	(0.0005)	(0.0055)	(0.0008)	(0.0086)	(0.0026)
Securitized Loan Ratio	0.0281***	0.292***	0.0434***	0.364***	0.162***
	(0.0037)	(0.0391)	(0.0057)	(0.0484)	(0.0196)
Pool Time	-0.00126***	-0.0143***	0.0000283	-0.00354	-0.00383***
	(0.0002)	(0.0024)	(0.0003)	(0.0028)	(0.0010)
Lending Relationship	-0.00155*	-0.0103	-0.0230***	-0.151***	-0.0697***
	(0.0009)	(0.0094)	(0.0016)	(0.0116)	(0.0060)
Loan Uniqueness	-0.000143	-0.00158	-0.000921*	-0.00788**	-0.00136
	(0.0002)	(0.0023)	(0.0005)	(0.0040)	(0.0018)
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes
N	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978
R^2	0.29	0.07	0.16	0.17	0.11

This table reports the analysis whether *Incoming Loans* exhibit lower loan performance, controlling for the non-logarithmized and squared years since loan origination and loan years to maturity. Variables are described in the appendix in Table 3. Clustered standard errors with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 24: Bank awareness analysis (Robustness: Loan term measures)

	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan	Inc. Loan
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PD	0.138*							
	(0.0820)							
LGD		-0.00362						
		(0.0184)						
PD*LGD			1.014***					
			(0.1804)					
PD x Default				0.362***				
				(0.0807)				
PD x Default Amount					0.0847***			
					(0.0123)			
PD x Delinquency						1.070***		
						(0.1342)		
PD x Delinquent Amount							0.0961***	
							(0.0127)	
PD x Number of Days in Del.								0.246***
								(0.0364)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Modified time controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rep. quarter x ABS portfolio FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan origination year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978	8,906,978
R^2	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69

This table reports the analysis whether ex ante loan quality and the interaction effect of ex ante loan quality and ex post loan performance affects the probability of being added to already-securitized loan portfolios after the closing, controlling for the non-logarithmized and squared years since loan origination and loan years to maturity. Variables are described in the appendix in Table 3. Robust standard errors that are clustered with respect to the interaction of reporting quarter and ABS portfolio are in parentheses. *, ** and *** denote significance at the 10 %, 5 %, and 1 % levels.

Table 25: Test for mean differences in loan performance between *Incoming Loans* and *Outgoing Loans* based on propensity score matching (Robustness: Loan term measures)

Estimator	Default	Default Amount	Delinquency	Delinquent Amount	Number of Days in Delinquency
Nearest neighbor ($n = 1$)	0.0034**	0.0379**	0.0148***	0.0886***	0.0303**
	(0.0016)	(0.0161)	(0.0040)	(0.0308)	(0.0120)
Nearest neighbor ($n = 5$)	0.0033***	0.0365***	0.0148***	0.0863***	0.0320***
	(0.0012)	(0.0121)	(0.0031)	(0.0238)	(0.0093)
Nearest neighbor ($n = 10$)	0.0035***	0.0395***	0.0153***	0.0903***	0.0341***
	(0.0012)	(0.0112)	(0.0030)	(0.0225)	(0.0087)
Nearest neighbor ($n = 20$)	0.0035***	0.0386***	0.0144***	0.0822***	0.0333***
	(0.0011)	(0.0105)	(0.0029)	(0.0217)	(0.0084)
Nearest neighbor ($n = 50$)	0.0033***	0.0368***	0.0146***	0.0848***	0.0346***
	(0.0011)	(0.0099)	(0.0028)	(0.0208)	(0.0080)
N					1,004,318
Number of *Incoming Loans*					573,458
Number of *Outgoings Loans*					430,860

This table provides estimates of the mean differences of loan performance measures between *Incoming Loans* and similar *Outgoing Loans*, based on a propensity score matching. *Outgoing Loans* are defined as loans which are excluded from the ABS portfolio prior to ABS maturity. Propensity scores are estimated based on a logit regression, where the endogenous variable is the dummy *Default* described in Section IV and where we control for the non-logarithmized and squared years since loan origination and loan years to maturity. Variables are defined in Table 3 in the appendix. N refers to the number of observations. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.