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Sarah Herwald & André Uhde *

Abstract: Employing a unique hand-collected sample of 881 securitization transactions issued by 59 stock-listed banks across the EU-13 plus Switzerland over the period from 1997 to 2010, this paper empirically investigates if and how market power in the loan and deposit market may influence European banks' incentives to engage in securitization activities. We construct product-specific residual Lerner Indices to measure market power in the loan and deposit market separately. Our results suggest that banks with higher loan and deposit market power securitize less, consistent with a reduced need for risk transfer and a reduced reliance on market-based funding. Various sensitivity analyses further show that these relationships vary across underlyings, issuance frequencies, and different time stages of securitization in Europe. Our findings contribute to the literature by disentangling loan and deposit market power as two further distinct determinants of securitization and thus, offer important insights regarding the ongoing policy debates on the consolidation of European banking markets and the revitalisation of the European securitization market.

Keywords: Securitization, market power, European banking

JEL Classification: G21, G28

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1. Motivation

Securitization allows banks to expand their funding sources, transfer credit risk and reduce economic and regulatory capital requirements (e.g., Michalak & Uhde, 2012). These factors enable banks to broaden their refinancing base, remove risks from their balance sheets and increase their lending capacity. However, due to the global financial crisis (GFC) in 2007/08, the European securitization market collapsed and has not fully recovered yet (AFME, 2018; AFME, 2024).

As a response, the EU introduced the Securitization Regulation in 2019, establishing a framework for simple, transparent, and standardized (STS) securitizations (European Commission, 2015). Although this framework aimed to restore investor confidence, improve transparency, and reduce information asymmetries, market activity has remained low and highly concentrated among large banks in a few countries (Joint Committee of the European Supervisory Authorities, 2025) since especially smaller banks face disproportionately high compliance costs due to extensive due diligence and reporting requirements when issuing STS securitizations (Joint Committee of the European Supervisory Authorities, 2025). Banking representatives acknowledge the reforms but argue that several provisions remain complex and may not go far enough to revitalize the market (AFME, 2024; AFME, 2025).

Against this background, a separate market for securitizations with significant risk transfer (SRT) has emerged in 2019. Like credit risk securitizations, these SRT transactions allow banks to achieve regulatory capital relief by transferring credit risk to potential investors, thereby reducing risk-weighted assets and freeing up capital for new loans. The SRT market has grown significantly in terms of transaction volumes and the number of active banks due to a stable, professional investor base and more established structuring practice (ESRB, 2023). Functionally, SRT securitizations thus operate as an alternative channel to obtain capital relief compared with traditional or STS securitizations and provide a market for predominantly large institutions with the necessary expertise and investor relationships (ESRB, 2023; TSI, 2024).

At the same time, and also triggered by the GFC, a recurring debate about the "optimal" structure of the European banking market is observed. Advocates of a stronger consolidation of the European banking market (e.g., CGFS, 2018; ECB, 2020; ECB, 2021) argue that greater market concentration may (i) reduce "overbanking" by decreasing the number of structurally weak banks and eliminating redundant capacity, (ii) leverage economies of scale and scope by spreading fixed costs across larger balance sheets, (iii) strengthen the capital base and loss absorbency, as larger banks generally have more diversified sources of income and better access to capital market financing and are therefore better able to absorb shocks, and (iv) improve the international competitiveness of European banks.

In contrast, supporters of a more competitive European banking market (e.g., European Parliament, 2025; OECD, 2025) argue that stronger competition and deeper market integration may (i) foster cost efficiency and better capital allocation, (ii) generate pricing pressure, resulting in lower lending and higher deposit rates, (iii) exert pressure to rationalize branch networks and modernize IT infrastructures in response to digital challengers, (iv) enhance market-based discipline and reduce the scope for "zombie" lending, thereby promoting the resolution of non-performing assets, (v) promote the integration of European capital markets and the development of non-bank financial intermediation, (vi) limit the market power of large incumbent firms, and (vii) may increase incentives for innovation in the financial sector by forcing banks to develop new business models, digital services, and sustainable financial products.

Although these two debates – on revitalising the European securitization market and an optimal European banking market structure – are treated separately in public, they might be linked closely. Understanding whether competition or market power promotes or restricts securitization activities provides insights that are important for both policy discussions. Accordingly, we first theoretically argue that the incentives for banks to engage in credit risk securitization may depend on the competitive conditions under which they operate and then empirically show that there is a

trade-off between an issuing bank's degree of loan and deposit market power and its incentive to engage in securitization activities.

To the best of our knowledge, only one study provided by McGowan et al. (2024) empirically links deposit market competition and credit risk securitization. The authors employ data from 13,011 US commercial and savings banks between 1994 and 2006. Deposit market competition is measured by exploiting the staggered removal of state-specific deposit market caps, which serves as an exogenous shock to competitive pressure. As a robustness check, competition is also proxied by the Herfindahl-Hirschman Index. Securitization activities are identified using banking supervisory reports and corresponding Home Mortgage Disclosure Act (HMDA) data on mortgage loan sales and servicing. The study initially reveals that the regulatory reform significantly increases competition for deposits. As a result, banks operating in a single state lose an average of 10 per cent of their deposit base and face higher refinancing costs, with deposit costs rising by 11 basis points. Subsequently, the study provides evidence that higher competitive pressure in the deposit market provokes an increase in the probability of securitizing mortgage loans by 7.1 percentage points, while this effect is most pronounced among banks that rely heavily on deposit financing.

The study at hand complements the study provided by McGowan et al. (2024) as follows. While their analysis exclusively focuses on deposit market competition as measured by the Herfindahl–Hirschman Index as a structural indicator as well as regulatory changes affecting competitive conditions, the study at hand follows a broader and more granular approach, measuring market power in the loan and deposit markets separately. Thus, employing non-structural and product-specific residual Lerner Indices enables us to capture the banks' pricing power in both markets, thereby distinguishing funding-related incentives from the risk transfer motive of securitization. In addition, we provide a more detailed view of the relationship between market power (competition) and credit risk securitization within a heterogeneous European

banking environment by analyzing a hand-collected dataset of 881 securitization transactions issued by 59 banks across the EU-13 plus Switzerland between 1997 and 2010 and by differentiating between true sale and synthetic structures as well as underlying asset classes.

The results from our empirical analysis suggest that stronger loan and deposit market power may have a significantly negative impact on a bank's incentive to engage in credit risk securitizations. This finding holds for true sale transactions, whereas no significant effects are found for synthetic securitizations. In addition, further sensitivity analyses reveal that the results are more pronounced for transactions backed by Residential Mortgage-Backed Securities (RMBS) and Collateralized Debt Obligations (CDOs). Furthermore, we provide evidence that the negative effect of market power on securitization is independent of the issuing frequency and can be described as a structural effect that is independent of timing or regime.

The remainder of the paper is organized as follows. Section 2 presents and discusses the relationship between loan and deposit market power and the incentive to engage in credit risk securitization. Section 3 describes the data and empirical model as used for the analysis at hand. The regression results are reported and discussed in Section 4. While Section 4.1 presents the results from our baseline analysis, Section 4.2 discusses evidence revealed by a variety of sensitivity analyses. Finally, Section 5 summarizes and provides important regulatory and policy implications.

2. Theoretical background

2.1 Securitization framework and motives

Credit (risk) securitization is described as the process by which banks transform illiquid loans into tradable securities. In a typical transaction, the originating bank transfers a loan portfolio to a special purpose vehicle (SPV), which refinances the transfer by issuing securities that are backed by the future cash flows of the underlying loans (Asset Backed Securities, ABS). As an

intermediary between the originator and external investors, the SPV forwards the proceeds from the issuance of securities to the originator and transfers interest and principal payments from the underlying loans to the investors. During a true sale securitization, the securitized loans are fully removed from the bank's balance sheet and transferred to the SPV. In contrast, the loans remain on the balance sheet during a synthetic securitization whereas the entire (or a part of the) credit risk is transferred to external investors by funded (e.g., credit-linked notes, CLN) or unfunded (e.g., credit default swaps, CDS) credit derivatives. Both securitization structures are commonly divided into senior, mezzanine, and equity tranches with individual risk-return characteristics and strict subordination. Hence, while the less risky mezzanine and the least subordinated senior tranches are usually transferred out of the bank's balance sheet, the riskiest "first-loss piece" is often retained by the originating bank acting as a "quality signal" towards less informed investors. In addition, the originating bank may provide credit support beyond its explicit obligations, which is known as "implicit recourse."

The relevant literature highlights two central motives for banks to engage in securitization.[1] To begin with, banks typically use securitization as a tool to transfer credit risk. Unlike the traditional "originate-to-hold" model suggesting that loans are originated and kept on the balance sheet until maturity, securitization involves an "originate-to-distribute" approach, which allows banks to remove loans from their balance sheets to improve loan portfolio quality and reduce their overall credit risk exposure (Gorton & Pennacchi, 1995; Minton et al., 2004; Duffie, 2008; Purnanandam, 2011). However, from a theoretical point of view, the impact of securitization on bank risk is not clear. Hence, it is argued that issuing banks usually retain the riskiest "first loss piece" on their balance sheet as a quality signal towards investors, provide implicit support to securitized pools in the event of portfolio stress ("implicit recourse") and have a lower incentive

[1] In addition to credit risk transfer and alternative funding, some studies discuss further motives of securitization, such as realizing a regulatory capital relief, conducting balance sheet and earnings management, realizing arbitrage opportunities, and benefitting from tax effects (e.g., Uhde, 2021; Calomiris & Mason, 2004; Dechow & Shakespeare, 2009).

to monitor borrowers once a substantial part of credit risk is transferred out by securitizations (Pennacchi, 1988; Dahiya et al., 2003; DeMarzo, 2005; Ambrose et al., 2005; Marsh, 2006; Hänsel & Krahnen, 2007; Jiangli et al., 2007; Duffie, 2008; Michalak & Uhde, 2012). Accordingly, evidence provided by related empirical studies in this context is mixed. While Michalak and Uhde (2012) as well as Martín-Oliver & Saurina (2007) find a negative impact of securitization on financial soundness for Spanish and a broader sample of European banks respectively, other studies reveal that banks exhibiting more risky loan portfolios (or even non-performing loans) are more likely to securitize credit risk and reduce their overall risk exposure (Bannier & Hänsel, 2008; Affinito & Tagliaferri, 2010; Cerrato et al., 2012; Bensalah & Fedhila, 2016; Wengerek et al., 2022).

Employing cash inflows from selling true sale securitizations as an alternative funding source next to the traditional deposit-funding describes another central motive for banks to engage in the ABS-business. The results provided by respective empirical studies in this context are clear. Martín-Oliver and Saurina (2007) and Cardone-Riportella et al. (2010) show that liquidity needs may have been the primary incentive to securitize for Spanish banks. Similar findings are reported for Italian banks in a study provided by Affinito and Tagliaferri (2010). In addition, Bannier and Hänsel (2008) as well as Cerrato et al. (2012) find that strengthening (weak) liquidity positions at issuing banks may be a significant determinant of credit risk securitization. Furthermore, Panetta and Pozzolo (2010) demonstrate that securitization can mitigate liquidity shocks and ensure a more stable financing structure. Finally, Almazan et al. (2015) show that securitization expands banks' funding possibilities and is used more intensively by institutions facing liquidity constraints or costly alternative funding sources, indicating that securitization can reduce their reliance on traditional funding instruments.

2.2. Securitization and market power

In this paper, we argue that both motives to engage in the securitization business as discussed in Section 2.1. may be influenced by the individual degree of market power that an issuing bank exhibits. Accordingly, loan market power may have an impact on the credit risk transfer-motive whereas deposit market power may affect the alternative funding-motive. In other words, we suggest that loan and deposit market power describe two further determinants that constitute whether and to what extent banks use securitization as a risk-transfer instrument or as an alternative funding source.

To begin with, banks exhibiting stronger loan market power are able to set loan prices above marginal costs. Indeed, prior empirical studies confirm that in more concentrated markets, banks tend to charge higher loan rates and generate more stable loan interest rate margins (Bretschger et al., 2012; Boyd et al., 2004). As a result, higher and more stable margins act as a buffer against potential credit losses, thereby reducing the need to use securitization as a tool for credit risk transfer. In addition, banks in more concentrated loan markets may benefit from advantages in credit monitoring and relationship lending (Uhde & Heimeshoff, 2009; Dell'Ariccia & Marquez, 2006; Petersen & Rajan, 1995). By screening borrowers more effectively, rationing credit and collecting private information, these banks tend to hold loan portfolios of a higher quality (Marquez, 2002; Boot & Thakor, 2000). Furthermore, larger banks with stronger loan market power may also be able to diversify portfolio risks more efficiently due to higher economies of scale and scope (Boyd & Prescott, 1986). Against this background, we hypothesize:

H1: *Banks with higher market power in the loan market engage less in securitization activities.*

Turning to the deposit market, it is shown that banks with stronger deposit market power may benefit from higher interest margins when charging deposit rates above marginal costs. In addition, these banks may achieve more stable deposit funding as they may rely on more loyal customer deposits and hence, a more predictable and less volatile funding source (Li et al., 2023).

In addition, such banks are able to access loyal and predictable customer deposits and to diversify their refinancing options by tapping into stable, cost-effective sources such as the interbank and bond markets. Against this background, larger banks with stronger deposit market power may generate sufficient liquidity internally and externally, thus reducing the need to use complex securitization transactions as an external refinancing tool (Loutskina & Strahan, 2009; Greenbaum & Thakor, 1987). Against this background, we hypothesize:

H2: *Banks with higher market power in the deposit market engage less in securitization activities.*

3. Empirical methodology

3.1. Data and sources

Figures 1 – 4 as well as Tables 1 and 2 provide a detailed overview of the securitization data as used for our analysis. Table 3 presents notes on variables and respective data sources while Table 4 provides the descriptive statistics. Finally, Table 5 shows the correlation matrix including variables from the regressions as presented in Tables 6 – 9.

3.2. Securitization data

Our unique hand-collected data on credit (risk) securitization is derived from offering circulars and presale reports provided by *Moody's, Standard & Poor's, and Fitch Ratings*. The dataset offers detailed information on securitization volumes, issuance dates, types, structures, and the underlying reference portfolios. The sample includes 881 credit risk securitization transactions issued by 59 stock-listed European banks operating in the EU-13 plus Switzerland[2]. The sample

[2] The EU-13 comprises Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and the United Kingdom. We omit securitization transactions from banks located in Finland and Luxembourg since we are not able to clearly assign securitization transactions to respective originating banks in these countries. We additionally include Switzerland for two reasons. First, even though Switzerland is not part of the EU / EMU the Swiss banking sector is strongly entangled with the European banking market. Second, several large securitization transactions are observed especially at UBS and Credit Suisse.

covers the period from 1997 to 2010[3] since a substantial transfer of credit risk through securitization in Europe did not emerge until 1997, and by 2010, the European securitization market had largely dried up due to the GFC beginning in 2007 and the onset of the European sovereign debt crisis in 2009. Still, the European securitization market has not yet fully recovered from the GFC (AFME, 2024).

The descriptive statistics of transaction types and the underlying asset portfolios are presented in Table 2. As shown, the cumulated volume of all securitization transactions in our sample amounts to €1,920.238 billion. As further indicated, our sample mainly consists of true sale securitizations (€1,267.795 billion) as compared to synthetic securitizations (€652.442 billion). Furthermore, the sample at hand is mainly represented by Residential Mortgage-Backed Securities (€1,081.963 billion), followed by Collateralized Debt Obligations (€609.900 billion).

Figures 1 and 2 show how securitization activity at European banks developed over the entire sample period in more detail. As mentioned before, significant securitization activity started in 1997. From then on, both the number and the volume of transactions grew steadily, with the exception of 2004, when the Basel II framework was announced including stronger regulations for securitization transactions. Market activity picked up again afterwards and reached the peak in 2006 and in early 2007. From that point forward, securitization activity dropped sharply, mainly as a result of the GFC starting in mid-2007 and the European sovereign debt crisis beginning in 2009.

The geographical distribution of securitizing banks, as outlined in Table 1, further shows that the number of securitizing banks is not equally distributed. Italy shows the highest number of

[3] Comprehensive and reliable data on securitization after 2010 are limited, which restricts the possibility of extending our sample beyond this period. Moreover, post-crisis regulatory reforms – in particular higher capital requirements and the introduction of STS standards – have reshaped the European securitization market and led to a noticeable decline in issuance volumes and market participation (EBA, 2020). Although the introduction of "simple, transparent, and standardized" (STS) securitizations from 2017 onwards, following frameworks such as EBA (2014) and BCBS (2015), resulted in a modest recovery, overall market activity remains low. Given these structural changes and the limited availability of post-2010 data, extending the analysis beyond this point would likely not provide sufficiently robust insights into the long-term dynamics of the securitization market.

securitizing banks, followed by Spain and the United Kingdom. Figures 3 and 4 further report that our sample includes banks that securitize more than once during the sample period. We control for the issuing frequency in a later sensitivity analysis in Section 4.2.

Finally, Table 4 reports the descriptive statistics of the securitization variables as used in our empirical analysis. We use the ratio of the cumulative volume of securitizations to the volume of issued loans (*Secvol*) as our dependent variable, since scaling by issued loans controls for the size of a bank's loan portfolio and thereby captures its effective opportunity to securitize credit risk. In line with Farruggio and Uhde (2015), banks without any securitization transactions in a given year are included with a securitization volume of zero. As shown, the mean of *Secvol* is at 0.016 with a standard deviation of 0.027 a minimum of 0 and a maximum of 0.182. Indicating that, on average, banks securitize around 1.6% of their loan portfolio in a given year, while a few banks reach substantially higher levels of securitization activity of around 18.2%. The mean of *True sale* is at 0.012 (standard deviation 0.024), with values ranging from 0 to 0.178, whereas *Synthetic* displays a lower mean at 0.0039 (standard deviation 0.014) and a minimum of 0 and a maximum of 0.0845, showing that true sale transactions dominate securitization activity in our sample. Across asset classes, *RMBS* (mean 0.010) and *CDO* (mean 0.005) represent the largest underlying asset classes in our sample, while *CMBS*, *CC*, *CL* and *Other* remain subordinate.

3.3. Product-specific Lerner Indices

We employ non-structural product-specific Lerner Indices to measure an issuing bank's power in the loan and deposit market respectively. We first argue why we prefer the Lerner Index over structural and alternative non-structural measures and subsequently explain in detail how to calculate and estimate product-specific Lerner Indices.

Structural (based on market structures) measures such as the *k-concentration ratio* or the *Herfindahl–Hirschman Index* (Herfindahl, 1950; Hirschman, 1964) are often used to describe the degree of market consolidation. While these measures provide information on the overall market

structure, they are only an indirect proxy for competitive behavior. Several arguments limit their suitability for our research. *First*, contestability theory (Baumol et al., 1983) questions the direct link between concentration and market power (competition), since even highly concentrated markets can behave competitively when entry and exit barriers are low. *Second,* concentration ratios may reflect market conditions rather than market power. High concentration might reflect economies of scale and not necessarily a decline in competition. In this case, structural measures overestimate market power and do not reflect the behavior of individual banks. *Third,* structural measures usually rely on the assumption that banks operating in the same market are homogeneous and therefore, market concentration affects the behavior of all banks in the same way (e.g., Dell'Ariccia, 2001). This assumption does not hold for our sample, as the European banking markets comprise institutions that differ in terms of their size, financing structures, and securitization activities. *Fourth*, as consolidation can also arise from strong competitive pressure, structural concentration measures can be affected by endogeneity in form of reverse causality. In such cases, concentration ratios provide only limited insights into banks' competitive behavior because they may reflect the outcome of competition rather than market power itself (Claessens & Laeven, 2004). *Finally,* previous empirical studies find only a weak relationship between structural concentration measures and direct indicators of competitive behavior (Carbó et al., 2009; De Guevara et al., 2005; Claessens & Laeven, 2005). This raises doubts about their ability to measure market power sufficiently.

To address these shortcomings, the New Empirical Industrial Organization (NEIO) literature has developed non-structural measures that identify market power directly from banks' pricing and output decisions. In this context, it is commonly argued that competitive behavior can often be better assessed using non-structural indicators at the bank level, which are based on banks' pricing decisions, rather than using market structures at the country level (e.g., Coccorese, 2014). Nevertheless, like structural measures, non-structural approaches face conceptual and practical limitations.

The non-structural measures include both conduct-based and performance-based indicators. Among the conduct-based indices, the *Panzar-Rosse H-statistic* (Panzar & Rosse, 1987) is defined as the sum of the elasticities of a bank's total revenue with respect to the bank's input prices. It captures how changes in input prices (such as funding or personnel costs) are passed through to bank revenues via pricing decisions, with this pass-through depending on the demand elasticity under the prevailing market structure (monopoly, monopolistic competition, or perfect competition). In practice, however, its interpretation is limited by (i) empirical implementation and measurement issues, (ii) strong identification and model assumptions, and (iii) theoretical non-uniqueness, since identical H-values can be generated by very different competitive environments (Shaffer & Spierdijk, 2015).

The *Boone Indicator* (Boone, 2008) is calculated as the elasticity of a bank's profit with respect to marginal costs. It captures competitive dynamics via efficiency differences, but empirical evidence suggests that its performance is highly sensitive to model specification, the choice of efficiency and cost proxies, and sample composition, so that the resulting estimates can be unstable and hard to interpret (Schiersch & Schmidt-Ehmcke, 2011).

As a performance-oriented measure, the Lerner Index (Lerner, 1934) indicates how much a bank can set its prices above marginal costs and hence, is a direct measure of pricing power. Like other non-structural indicators, however, the Lerner Index is not without limitations. In particular, it typically assumes competitive input markets and can misstate mark-ups when firms also exert market power on the input side (Hall, 2018; Syverson, 2019). To address this limitation, several banking studies adjust Lerner-type measures for cost efficiency, scale economies, and the treatment of funding costs (Koetter et al., 2012; Ariss, 2010; Spierdijka & Zaouras, 2018). Additionally, more recent work adapts the index to low-interest-rate environments (Igan et al., 2021).

Despite these limitations, the Lerner Index has one advantage that is useful for the analysis at hand. The index can be constructed at the level of specific bank-product markets and thus, allows

to measure market power for the loan and deposit market separately (e.g., Forssbæck & Shehzad, 2015; Jiménez et al., 2013). Since the empirical analysis at hand aims to examine whether and how market power in the loan and deposit market may influence a bank's motives to engage in credit risk securitization, the product-specific Lerner Index is the measure of first choice.

The product-specific Lerner Indices are derived from the Monti-Klein model (Freixas and Rochet, 2008) and measure the degree to which a bank can set prices (loan and deposit interest rates) above marginal costs. It is assumed that a bank has two outputs - deposits and loans - and three types of inputs - funds, labour, and fixed capital. The marginal costs of the two outputs are obtained by estimating the following translog cost function (TCF) for each bank *i* and year *t*:

$$\begin{aligned}\ln(TC_{i,t}) = {} & \alpha_0 + \beta_L \ln(L_{i,t}) + \beta_D \ln(D_{i,t}) + \frac{1}{2}\beta_{LL}(\ln(L_{i,t}))^2 + \frac{1}{2}\beta_{DD}(\ln(D_{i,t}))^2 \\ & + \frac{1}{2}\beta_{LD} \ln(L_{i,t})\, ln(D_{i,t}) \\ & + \sum_{k=1}^{3} \gamma_k \ln(w_{k,i,t}) + \sum_{k=1}^{3}\sum_{m=1}^{3} \frac{1}{2}\delta_{km} \ln(w_{k,i,t}) \ln(w_{m,i,t}) \\ & + \sum_{k=1}^{3} \eta_{kL} \ln(w_{k,i,t}) \ln(L_{i,t}) \\ & + \sum_{k=1}^{3} \theta_{kD} \ln(w_{k,i,t}) \ln(D_{i,t}) + \lambda_1 T + \lambda_2 T^2 \\ & + \sum_{k=1}^{3} \lambda_{kw} \ln(w_{k,i,t})\, T + \lambda_L \ln(L_{i,t})\, T + \lambda_D \ln(D_{i,t})\, T + \varphi \ln(E_{i,t}) \\ & + \varepsilon_{i,t}.\end{aligned} \tag{1}$$

Total costs (TC) are measured as the natural logarithm of the sum of a bank's annual interest expenses and operating expenses. α_0 is a constant term. Loans $(L_{i,t})$ are proxied by the natural logarithm of a bank's accounting value of total interest-earning assets per year, while deposits $(D_{i,t})$ are calculated as the natural logarithm of a bank's accounting value of average interest-bearing liabilities per year.

The three input prices ($w_{k,i,t}$) – for funding, labor, and physical capital – are derived from the following bank-year specific ratios: interest expenses relative to average interest-bearing liabilities (cost of funding), personnel expenses relative to total assets (cost of labor), and operating expenses relative to fixed assets (cost of physical capital).

Technological change and shifts in the production function over time are captured through a linear time trend T, which starts with the value of 1 in 1997 and increases annually until it reaches the value of 14 in 2010. The logarithm of a bank's total equity ($E_{i,t}$) is included since equity can be used as a substitute for deposits during the funding process. To allow for nonlinearities, the model includes squared terms of the explanatory variables. Interaction terms are incorporated to capture potential interdependencies among input prices and between outputs and input prices in shaping total costs.

We estimate the TCF for the entire sample per year.[4] In order to ensure comparability, we apply constrained linear regressions, as outlined by Huang et al. (2018), and implement five restrictions to guarantee first-degree homogeneity in input prices and the symmetry of cross-price effects.[5]

The marginal costs for both outputs, loans ($MC_{i,t}^{L}$) and deposits ($MC_{i,t}^{D}$), for each bank *i* and *t* are calculated by multiplying the derivative by the ratio of total costs (TC) to the respective output variable ($L_{i,t}; D_{i,t}$), as follows:

$$MC_{i,t}^{L} = \left[\beta_L + \beta_{LL}\ln(L_{i,t}) + 0.5 * \beta_{LD}\ln(D_{i,t}) + \sum_{k=1}^{3}\eta_{kL}\ln(w_{k,i,t}) + \lambda_L T\right]\frac{TC_{i,t}}{L_{i,t}}, \qquad (2)$$

[4] Due to limited within-country variation, particularly in cases where only a single bank per country is available, the model was estimated at the aggregate level rather than at the individual country level.

[5] Following Huang et al. (2018) we applied the constraints as follows: $\sum_{k=1}^{3}\gamma_k = 1$ restricts the sum of coefficients of the input prices to be equal to one. Imposing $\sum_{k=1}^{3}\eta_{kL} = 0$ and $\sum_{k=1}^{3}\theta_{kD} = 0$ constraints the coefficients of the interaction between the input prices and the outputs to be zero. In addition, the coefficients of the input price interactions and of the interaction between time trend and input prices must sum up to zero, which is assured by $\sum_{k=1}^{3}\sum_{m=1}^{3}\frac{1}{2}\delta_{km} = 0$ and $\sum_{k=3}^{5}\lambda_k = 0$.

$$MC_{i,t}^{D} = \left[\beta_D + \beta_{DD}\ln\left(D_{i,t}\right) + 0.5 * \beta_{LD}\ln\left(L_{i,t}\right) + \sum_{k=1}^{3}\theta_{kD}\ln\left(w_{k,i,t}\right) + \lambda_D T\right]\frac{TC_{i,t}}{D_{i,t}}. \quad (3)$$

Finally, the product-specific Lerner Indices are calculated as follows:

$$LI(L)_{i,t} = \frac{r_{i,t}^{L} - r_{j,t} - MC_{i,t}^{L}}{r_{i,t}^{L}} = \frac{1}{\varepsilon^{L}\left(r_{i,t}^{L}\right)}, \quad (4)$$

$$LI(D)_{i,t} = \frac{r_{j,t} - r_{i,t}^{D} - MC_{i,t}^{D}}{r_{i,t}^{D}} = \frac{1}{\varepsilon^{D}\left(r_{i,t}^{D}\right)}, \quad (5)$$

where $r_{i,t}^{L}$ and $r_{i,t}^{D}$ are the lending and deposit rates. The lending rate $r_{i,t}^{L}$ is calculated as the ratio of the accounting value of total interest income to total interest-earning assets per bank *i* and year *t*. The deposit rate $r_{i,t}^{D}$ is calculated as the ratio of total interest expense to interest-bearing liabilities per bank *i* and year *t*. $r_{j,t}$ is the local money market rate, proxied by the 12-month EONIA for 1997 and 1998, and the 12-month EURIBOR for 1999 to 2010 provided by the *ECB's Statistical Data Warehouse*. Obviously, higher values of each Lerner Index suggest higher price-marginal costs-differences and thus, stronger market power in the loan and deposit market respectively and as a consequence, less competitive pressure.

When employing product-specific Lerner Indices for an empirical analysis it should be noted that market power in the loan and deposit market may condition each other, i.e. a bank's market power in one market might influence its market position in the other market (e.g., Li et al., 2023; ECB, 2024). For example, stronger market power in the deposit market may allow banks to refinance loans at better conditions and strengthen their position in the loan market (Li et al., 2023; ECB, 2024). At the same time, a large and loyal depositor base enhances funding stability and cross-selling opportunities, enabling banks to expand lending more flexibly (Basten & Juelsrud, 2023). In turn, stronger market power in the loan market may strengthen the position in the deposit

market through long-term creditor relationships and cross-selling potential, as borrowers tend to keep their deposits within the financing bank (Basten & Juelsrud, 2023).

To address this conditionality, we employ residual components of each product-specific Lerner Index in our empirical analysis. We obtain the residuals by estimating the following regression specifications:

$$LI(L)_{i,t} = \alpha_0 + \alpha_1 LI(D)_{i,t} + u_{i,t}, \quad (6)$$

$$LI(D)_{i,t} = \beta_0 + \beta_1 LI(L)_{i,t} + v_{i,t}, \quad (7)$$

where $LI(L)_{i,t}$ and $LI(D)_{i,t}$ denote the product-specific Lerner Index for the loan and deposit market of bank *i* in year *t,* respectively and $u_{i,t}$ and $v_{i,t}$ denote the error terms. We define the residual components as:

$$LI(L)_{i,t}^{res} = \hat{u}_{i,t}, \quad (8)$$

$$LI(D)_{i,t}^{res} = \hat{v}_{i,t}. \quad (9)$$

As a result, $LI(L)_{i,t}^{res}$ expresses loan market power that is not influenced by deposit market power, while the opposite holds for $LI(D)_{i,t}^{res}$. Thus, the residual Lerner Indices capture the part of market power that is specifically attributed to the respective product market (loan or deposit) and not explained by the bank's pricing power that is exerted on the other market respectively.

As shown by Table 4, the mean of the lagged residual Lerner Index for the loan market is at –0.015 with a standard deviation of 0.205, while we observe a maximum value of 0.606 and a minimum value of –1.291. The mean of the lagged residual Lerner Index for the deposit market is at –0.015 with a standard deviation of 0.288, while its maximum is at 1.111 and the minimum value is at –0.676.

3.4. Control variables

When examining the effect of market power on securitization it is imperative to control for bank-, macroeconomic, regulatory and institutional factors that are likely to affect securitizations and hence, help mitigate omitted variable biases (Farruggio & Uhde, 2015). The bank-specific data is obtained from the *BankFocus* (formerly *BankScope*) *database* compiled by *Moody's Analytical* and provided by *Bureau van Dijk*. The macroeconomic control variable is retrieved from *LSEG Workspace* (formerly *Refinitiv*), the regulatory data is collected from *World Bank's Banking Regulation Surveys* as well as *Barth et al.* (2001, 2004, 2008, 2013) and the data for the institutional environment is obtained from the *World Bank*.

Bank-specific variables

We include two bank-specific variables to control for a bank's incentives to engage in the securitization business as discussed in detail in Section 2.1.

To begin with, we use the one-period lagged ratio of loan loss reserves to gross loans per bank and year (*LL reserve* $_{(t-1)}$) to account for the overall risk profile of a bank's loan portfolio. Although banks primarily employ securitization to transfer credit risk to third investors and thus, diversify their overall credit risk portfolio, the relationship between loan quality and securitization is ambiguous. On the one hand, as higher loan loss reserves may indicate potential losses from loans and thus, stronger regulatory capital requirements, decreasing credit portfolio quality should set an incentive to transfer problem loans out of the balance sheet through securitization (Bannier & Hänsel, 2008; Bouvatier & Lepetit, 2008; Affinito & Tagliaferri, 2010; Beatty & Liao, 2011). On the other hand, higher loan loss reserves may signal significant credit risk to potential investors, keeping them from purchasing loan-backed securities. Indeed, Demiroglu & James (2012) provide evidence that an increasing level of credit risk impedes securitization, as investor confidence in risky portfolios may not exist.

Furthermore, we measure a bank's liquidity position as the one-period lagged ratio of liquid assets to total assets, calculated as 1 minus the ratio of net loans to total assets per bank and year (*Liquidity* $_{t-1}$). Previous empirical studies provide clear evidence that an originating bank's liquidity position sets a strong incentive to engage in securitization activities since banks use true sale securitizations as an alternative funding source by transforming loans into cash. In particular, these studies show that banks with lower liquidity levels are more likely to engage in securitization transactions to improve their liquidity positions by transferring loans out of their balance sheet (Affinito & Tagliaferri, 2010; Uhde & Michalak, 2010). Almazan et al. (2015) show that banks with tighter liquidity constraints and more expensive alternative funding sources are more likely to engage in securitization to meet their financing needs. Similarly, Affinito and Tagliaferri (2010) observe that Italian banks with higher liquidity needs are more likely to use securitization as a funding instrument. Finally, Bannier and Hänsel (2008) provide evidence that European banks with weaker liquidity positions are more likely to engage in securitization activities to improve their liquidity positions.

Macroeconomic variable

Next to bank-specific variables, we employ the annual *change of the slope of the yield curve* (*ΔYield Curve*) to control for a country's macroeconomic environment. This measure is calculated as 10-year minus 2-year government bond yields per country and year. The yield curve is a widely accepted indicator concerning expectations of economic growth (Estrella and Hardouvelis, 1991; Wheelock and Wohar, 2009; Adrian et al., 2010). In line with previous related studies, we expect a positive impact of the yield curve on securitization. As economic growth is ordinarily associated with an increase in investment opportunities, securitization enables banks to generate the liquidity to meet the increasing demand for loans during periods of economic prosperity (Adrian et al., 2010). Furthermore, numerous studies have emphasized the adverse effect of economic growth on lending standards (Maddaloni & Peydró, 2011; Dell'Ariccia et al.,

2012). In this context, it is proposed that financial institutions will increase lending to riskier borrowers, thereby strengthening their motivation to restructure their asset portfolios through securitization (Bannier & Hänsel, 2008; Michalak & Uhde, 2012).

Regulatory variable

We additionally control for the regulatory environment under which banks operate by including the *capital regulatory index* (*Capital Regulation*) as proposed by Barth et al. (2001, 2004, 2008, 2013). This index measures the overall capital stringency with higher index values indicating stricter capital requirements. The relationship between stricter capital requirements and securitization is ambiguous. On the one hand, higher requirements may increase securitization as banks use securitization to reduce risk-weighted assets and improve capital ratios (Uhde & Heimeshoff, 2009). On the other hand, the implementation of more stringent requirements may result in securitization becoming less appealing due to increased regulatory scrutiny and higher capital requirements for retained securitization tranches (Michalak & Uhde, 2012; DeMarzo, 2005).

Institutional environment

Finally, we employ *stock market capitalization* (*SMC*) to control for a country's stock market development. This variable is built as the ratio of the value of listed shares to real GDP. We expect a positive relationship between stock market development and securitization activity, as more developed capital markets facilitate securitization through greater demand by a more sophisticated and improved market infrastructure (Pinto & Alves, 2016).

3.5. Empirical model

We employ a linear model on panel data to empirically investigate the relationship between market power and securitization. Based on the theoretical framework in Section 2.2, we test two

hypotheses: *H1*, that banks with higher loan market power securitize less due to a reduced need for credit risk transfer, and *H2*, that banks with higher deposit market power securitize less due to a reduced need for alternative funding sources. Equation (10) empirically assesses *H1* by including the residual Lerner Index for the loan market $LI(L)^{res}$ as an explanatory variable, whereas equation (11) assesses *H2* by employing the residual Lerner Index for the deposit market $LI(D)^{res}$:

$$\begin{aligned} SECVOL_{i,t} = \; & \alpha_i + \beta_1 LI(L)^{res}_{i,t-1} \\ & + \beta_2 Liquidity_{i,t-1} + \beta_3 LLreserves_{i,t-1} + \beta_4 \Delta YieldCurve_{i,t} \\ & + \beta_5 CapitalRegulation_{i,t} + \beta_6 SMC_{i,t}, + \epsilon_{i,t,} \end{aligned} \tag{10}$$

$$\begin{aligned} SECVOL_{i,t} = \; & \alpha_i + \beta_1 LI(D)^{res}_{i,t-1} \\ & + \beta_2 Liquidity_{i,t-1} + \beta_3 LLreserves_{i,t-1} + \beta_4 \Delta YieldCurve_{i,t} \\ & + \beta_5 CapitalRegulation_{i,t} + \beta_6 SMC_{i,t} + \epsilon_{i,t,} \end{aligned} \tag{11}$$

where $SECVOL_{i,t}$ denotes the ratio of a bank's cumulative volume of securitization to the volume of issued loans of bank *i* in year *t,* respectively. LI denotes the residuals of the product-specific Lerner Index for the loan $LI(L)^{res}$ and deposit $LI(D)^{res}$ market for bank *i* in year *t*. We lag the residual Lerner Index to address potential endogeneity. The additional control variables include bank-specific, macroeconomic, regulatory and institutional measures as described in detail in Section 3.4. The error term $\epsilon_{i,t}$ is assumed to be independently and identically distributed. The coefficients α_i and β_i represent the parameters to be estimated.

We use a fixed-effects model to control for unobserved, time-invariant heterogeneity across banks and to ensure that the estimates reflect within-bank variation over time. The Hausman test (Hausman, 1978) clearly rejects the null hypothesis that the difference in coefficients between the fixed effects and random effects models is not systematic at $p < 0.05$, indicating that a fixed effects model is adequate. This result holds for both baseline specifications using $LI(L)^{res}$ and $LI(D)^{res}$ as explanatory variables. Since the Hausman test (Hausman, 1987) is biased under

heteroskedasticity, we additionally perform a test of overidentifying restrictions as proposed by Arellano (1993). The Arellano test also rejects the null hypothesis that the random effects estimator is consistent ($p < 0.05$), confirming that a fixed effects model is appropriate for both baseline regressions.

Time dummies are included to control for time-specific effects that may affect banks in our sample in a given year, such as common shocks, institutional or regulatory changes in the European banking market. A joint F-test confirms the rejection of the null hypothesis that the coefficients of the time dummies are jointly equal to zero ($p < 0.000$) in both models. We cluster standard errors at the bank level to account for potential serial correlation and heteroskedasticity within banks over time. The modified Wald test strongly rejects the null hypothesis of homoscedastic error variances across banks ($\rho < 0.000$), indicating heterogeneity. By clustering at the bank level, we ensure that the standard errors are not systematically underestimated, which could otherwise lead to inflated t-statistics and incorrect inference. It also corrects for serial correlation within banks over time, as the residuals are likely to be dependent across years. Finally, we test for multicollinearity between the explanatory variables using the Variance Inflation Factor (VIF). The mean VIF is below 2.5 in both models suggesting that our results are not biased by multicollinearity issues.

4. Empirical results

The results from our regressions and robustness checks are presented in Tables 6 – 9.

4.1. The impact of market power on securitization

As reported by Table 6, regression specifications (1a) and (1b), the residual Lerner Index for the loan market ($LI(L)^{res}$) and deposit market ($LI(D)^{res}$) enter the regression significantly negative at the one and five percent level, respectively. Our results support hypotheses *H1* and *H2*, suggesting that banks with stronger market power in either market are less engaged in

securitization. In addition, our results are in line with theoretical arguments as discussed in Section 2.2. Hence, banks exhibiting higher loan market power may have a weaker incentive or need to engage in credit risk securitization since these banks (i) typically realize higher loan margins acting as a buffer against potential credit losses (Bretschger et al., 2012; Gropp et al., 2011; Boyd et al., 2004; Matutes & Vives, 2000), (ii) improve the quality of their loan portfolios due to advantages in credit monitoring and relationship lending (Uhde & Heimeshoff, 2009; Dell'Ariccia & Marquez, 2006; Marquez, 2002; Boot & Thakor, 2000; Petersen & Rajan, 1995) and (iii) diversify their loan portfolio risk more efficiently due to stronger economies of scale and scope (Boyd & Prescott, 1986). Similarly, banks exhibiting stronger deposit market power may have a weaker incentive or need to securitize since these banks (i) typically have a more stable deposit base and hence, operate under a less volatile funding environment (Li et al., 2023) and (ii) are more likely to use cheaper and less complex sources of refinancing (e.g., the interbank market or bond market) as compared to cash flows from securitization transactions (Loutskina & Strahan, 2009; Greenbaum & Thakor, 1987).

In a next step, we split our entire sample of securitizations into two sub-samples, i.e. a sub-sample of true sale and a subsample of synthetic transactions. Subsequently, we repeat our baseline regressions for these subsamples. As reported by Table 6, regression specifications (2a) and (2b), we provide evidence for a significantly negative impact of loan and deposit market power on the volume of true sale transactions whereas we observe a negative but insignificant effect of market power on the volume of synthetic transactions (regression specifications (3a) and (3b)). Accordingly, findings from the true sale subsample correspond to our baseline findings whereas these findings are not supported by regressions including the synthetic subsample. Overall, these results were expected since true sale transactions are employed as a credit risk transfer and funding tool whereas synthetic securitization serves as a risk-transfer instrument only. Moreover, it is important to acknowledge that the proportion of synthetic securitizations in our entire sample is significantly smaller than the share of true sale securitizations.

Turning to the control variables, Table 6 initially reports that *Liquidity* exhibits a significantly negative impact on European bank's securitization activities except for synthetic securitization transactions. Our result is in line with theoretical arguments (Gorton & Pennacchi, 1995; Greenbaum & Thakor, 1987; Duffie, 2008) and findings from previous empirical studies (Martín-Oliver & Saurina, 2007; Cerrato et al., 2012) suggesting that banks with stronger liquidity positions are less likely to employ true sale securitizations as an alternative funding source. Moreover, an insignificant relationship between bank liquidity and synthetic securitizations was expected since it is evident that synthetic securitizations serve exclusively for the purpose of risk transfer.

As further shown, *ΔYield Curve* enters all regression specifications significantly positive, indicating that a prospering economy may spur securitization activities by European banks. This finding corresponds to previous studies suggesting that securitization enables banks to create necessary liquidity to serve the higher demand for loans during economic boom phases (Adrian et al., 2010). Considering in this context that increased lending during economic boom phases may have a negative impact on lending standards (Maddaloni & Peydró, 2011; Dell'Ariccia et al., 2012) banks may also have a stronger incentive to restructure their riskier asset portfolios by means of securitization (Bannier & Hänsel, 2008; Michalak & Uhde, 2012).

Introducing *Capital Regulation*, this variable turns out to be significantly negative in case of synthetic transactions only. Although prior studies suggest that stricter regulation generally reduces the attractiveness of securitizations (e.g., Michalak & Uhde, 2012; DeMarzo, 2005), we do not provide evidence for this argument in case of true sale securitizations. Rather, we argue that stricter banking and capital market regulations place a greater burden on synthetic securitizations since they are based on off-balance sheet risk transfer via derivatives, which is more difficult to recognize from a regulatory perspective, creates additional counterparty default risks, and entails more complex compliance requirements. True sale securitizations, on the other hand, benefit from

a clear sale of receivables, which makes it easier for regulators to recognize the risk transfer and the reduction in capital requirements.

Finally, the coefficient of the stock market capitalization *(SMC)* turns out to be significantly positive for synthetic securitization transactions indicating that a better capital market development promotes synthetic securitizations. Our finding is in line with previous studies suggesting that synthetic securitizations typically require an active and sophisticated institutional investor-base, liquid and transparent derivative markets as well as established legal and institutional frameworks to promote an effective risk transfer and investor confidence (EBA, 2020; IMF, 2006).

4.2. Sensitivity analyses

In the following, we present and discuss results from different sensitivity analyses. The aim is to investigate the relationship between market power and securitization in more detail focusing on (i) the different underlyings of securitization transactions, (ii) the issuing frequency of securitizing banks and (iii) different time periods of credit risk securitization in Europe.

Underlyings

We perform a more granular analysis by differentiating between the respective underlying reference portfolios of the securitization transactions in our sample. As shown by Tables 7a and 7b, we observe a significantly negative impact of market power in particular for Collateralized Debt Obligations (CDOs) and Residential Mortgage-Backed Securities (RMBS) transactions.

Considering the results from regression specifications (1) and (1b) we argue that CDOs are highly complex structured products that bundle multiple tranches of credit risk. Their structure incurs high fixed costs (arrangement, rating, legal structuring) and requires special expertise. Thus, only banks with high margin pressure in the loan market or strong refinancing needs have an incentive to bear these costs.

Introducing RMBS, regression specification (2a) initially reports a significantly negative impact of loan market power on RMBS-securitizations. Considering that RMBS are less costly and more standardized transactions as compared to CDOs, we do not suggest that cost efficiency issues drive our finding. Rather, we argue that especially benefits from relationship lending and a higher credit rating of borrowers at larger monopolistic banks reduce the incentive to securitize lower and better diversified credit risk from RMBS. As further shown by regression specification (2b), we do not provide evidence for a negative effect of deposit market power on RMBS-transactions. This finding is surprising since RMBS primarily serve to raise liquidity and refinancing via the capital market.

Issuing Frequency

As displayed by Figures 3 and 4, our sample includes banks that securitize more than once during the sample period. Therefore, we examine whether multiple securitizations combined with higher market power in the loan and deposit market may have different effects on credit risk securitization activities. Doing so, we split the entire sample into two sub-samples either including banks with frequent securitizations (FI) or non-frequent securitizations (Non-FI). Our classification is based on the transaction volume (FI_{Vol} and Non-FI_{Vol}) and the number of securitization transactions (FI_{TA} and Non-FI_{TA}), respectively.

Overall, the results presented in Tables 8a and 8b demonstrate that the adverse effect of loan and deposit market power on securitization remains irrespective of a bank's issuing frequency. Our results initially suggest that market power is considered as a fundamental component of a bank's business model and strategic orientation. Hence, even if banks have already successfully securitized in the past, they continue to (i) have stable deposits and customer bases, (ii) experience lower margin pressure and (iii) benefit from high information rents. These factors do not change significantly over time as long as the market structure remains stable. In addition, opportunity costs of securitization (e.g., loss of relationship or information rents) may outweigh

the cost advantage through multiple securitization under such conditions. Similarly, the marginal benefit of more frequent securitization (e.g., liquidity or capital cost savings) is typically low for banks with market power, whereas it is substantial for banking institutions with limited power.

Stages

In a final sensitivity analysis, we control whether our baseline results change during different time periods of securitization activities in Europe. Following Farruggio and Uhde (2015) and in line with Figure 2, we define (i) the onset stage (1997-2001) as the beginning of securitization activities in Europe, (ii) the boom phase of securitization (2002-2007) and (iii) the securitization period during and after the GFC (2008-2010). Subsequently, we build three dummy variables (*Onset, Boom, Crisis*), that take on the value of one for the years in a respective stage, and zero otherwise, and employ interaction terms of these dummy variables and the Lerner Indices.

As shown by Table 9, except for regression (1a), we do not provide any evidence for a (negative) impact of market power on securitization during the different time periods. Overall, our results suggest that the effect of loan and deposit market power on securitization may not depend on timing or regime but rather has an average effect over longer periods (structural effect), while temporary phases are primarily determined by external market conditions. Accordingly, the influence of market power recedes into the background, while the importance of other factors increases.

During the onset phase of securitizations in Europe, effects from stronger market power are likely to have been overlaid by a selection mechanism. Hence, the securitization market was characterized by substantial entry barriers, including high fixed costs, complex legal documentation, the need for rating agency involvement, and specialized internal expertise (Fender & Mitchell, 2005; Franke & Krahnen, 2007; Franke et al., 2012). Empirical evidence further shows that only banks with the necessary technical infrastructure and organizational capacity engaged in securitization during the early years, as these transactions required sophisticated risk-management

systems and established investor relationships (Bannier & Hänsel, 2008; Uhde & Michalak, 2010; ECB, 2011). As a result, securitization activity in the onset stage primarily reflected which institutions were capable of executing such transactions, rather than banks' competitive conditions or their degree of market power.

During the boom phase, capital market-driven incentives (e.g., extremely favourable refinancing, high demand for securitized assets, rating-driven incentives, Basel II arbitrage) are likely to have dominated. Consequently, market power had only a minor effect since even banks with market power were able to use securitizations to optimize margins or regulatory capital.

Finally, during the crisis phase, a massive loss of confidence in securitizations by capital market investors was observed. As a result, *all* banks massively reduced their securitization activities, rendering market power irrelevant.

5. Summary and implications

Employing a unique hand-collected sample of 881 securitization transactions issued by 59 stock-listed banks operating in the EU-13 plus Switzerland over the period between 1997 and 2010, this paper empirically analyses the impact of the banks' loan and deposit market power on their incentives to enter the securitization market.

The analysis reveals that loan and deposit market power negatively impacts securitization, suggesting that banks with stronger market power may be less incentivised to use securitization to transfer credit risk and as an alternative funding source. Further analyses show that the negative relationship is evident for CDO and RMBS transactions, independent of the issuing frequency, and rather described as a structural effect that is independent of timing or regime.

Our analysis reveals a fundamental policy trade-off between the debate on revitalising the European securitization market and the simultaneous demand for a stronger consolidation of the European banking sector. Our findings suggest that banks with higher market power in the loan or

deposit market are less incentivised to use securitization. Consequently, efforts to revitalise the European securitization market would require a competitive banking environment.

However, although greater competition, as emphasised in current policy debates (European Parliament, 2025; OECD, 2025), has positive arguments such as increased efficiency, incentives for innovation and market discipline, it might also lead to lower margins and less stable refinancing through deposits. Lower margins, in turn, can induce banks to engage in riskier "search for yield" activities, reduce their resilience to shocks, and limit economies of scale and diversification benefits.

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Appendix

Table 1: Geographical distribution of securitizing banks

Country	Bank	
Austria	Erste Group Bank AG	
Belgium	Dexia SA	
Denmark	Danske Bank A/S	Sydbank A/S
France	BNP Paribas	Natixis SA
	Crédit Agricole SA	Société Générale SA
Germany	Bayerische Hypo- und Vereinsbank (UniCredit Bank AG)	Deutsche Bank AG
	Commerzbank AG	Deutsche Postbank AG
		Dresdner Bank AG
Greece	EFG Eurobank Ergasias SA	Piraeus Bank SA
Ireland	Allied Irish Banks Plc	Bank of Ireland
Italy	Banca Antonvenata	Banca Popolare Italiana/di Lodi
	Banca Carige SpA	Capitalia Group/Banca di Roma
	Banca Lombarda e Piemontese	Intesa Sanpaolo/Banca Intesa
	Banca Monte Die Paschi di Siena SpA	Mediobanca SpA
	Banca Nazionale del Lavoro SpA	Sanpaolo IMI
	Banca Popolare di Milano SCaRL	UniCredit SpA
Netherlands	ABN Amro (RBS Holding NV)	ING Groep NV
	Fortis Bank	SNS Reaal NV
Portugal	Banco BPI SA	Banco Commercial Português, SA
	Banco Espirito Santo SA	
Spain	Banco Bilbao Cizcaya Argentaria SA	Banco Popular Espanol SA
	Banco de Sabadell SA	Banco Santander SA
	Banco de Valencia SA	Bankinter SA
	Banco Espanol de Crédito SA	Caja de Ahorros del Mediterraneo
	Banco Pastor SA	
Sweden	Nordea Bank AG	Swedbank AB
	Skandinaviska Enskilda Banken AB	
Switzerland	Credit Suisse Group AG	UBS AG
United Kingdom	Abbey National (Santander UK Plc)	HSBC Holdings Olc
	Alliance & Leicester Plc	Lloyds TSB Group Plc (Lloyds Banking Group Plc)
	Barclays Plc	
	Bradford & Bingley PLC	Royal Bank of Scotland Group Plc
	HBOS Plc	Standard Chartered Plc

Table 2: Descriptive statistics of securitization transactions in the sample (in billion €)

Variable	N	Total Volume	Mean	Std. dev.	Min	Max
True Sale Securitization	639	1,267.795	5.204	8.518	0.006	92.288
Synthetic Securitization	242	652.442	4.869	7.762	0.058	59.451
Total Securitization Transactions	881	1,920.238	4.184	6.436	0.006	59.674
Underlying Loan Portfolio						
Collateralized Debt Obligations	264	609.900	3.360	6.158	0.058	57.408
Residential Mortgage-Backed Securities	387	1,081.963	4.668	6.893	0.006	59.674
Commercial Mortgage-Backed Securities	83	84.290	2.161	2.218	0.223	9.775
Credit Card Receivables	24	28.890	1.926	2.778	0.056	10.296
Consumer Loans	59	49.566	1.078	1.413	0.025	7.189
Others	64	64.629	1.319	1.123	0.028	5.086

Figure 1: Development of the number of transactions per year

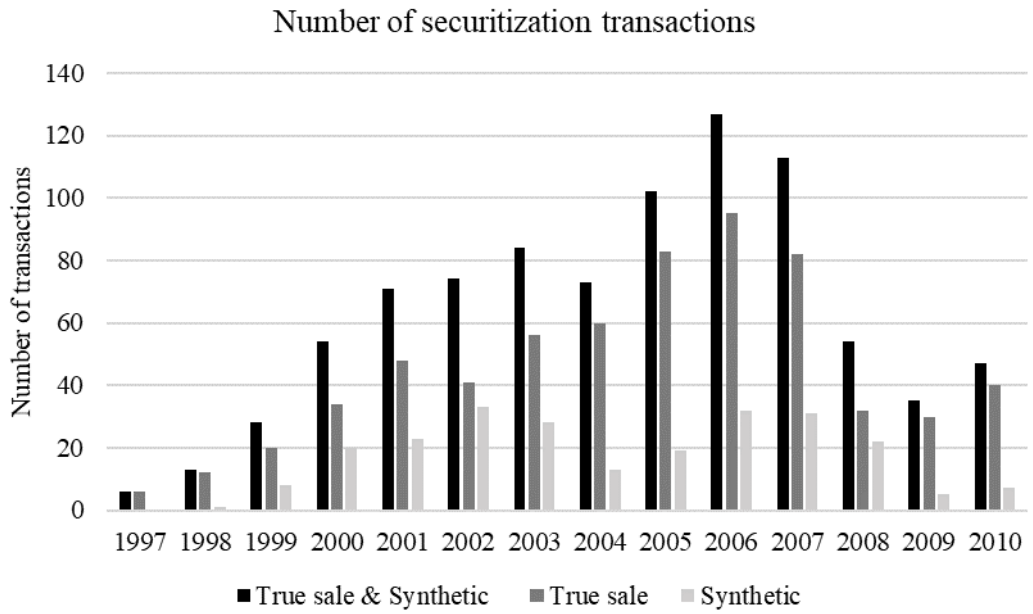

Figure 2: Development of the transaction volume per year

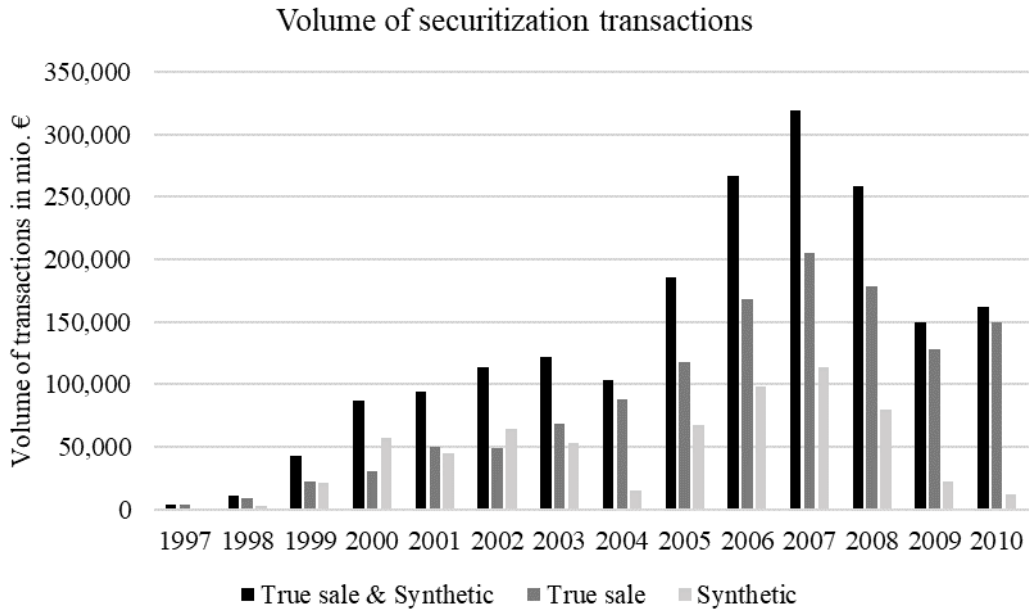

Figure 3: Frequently securitizing banks by number of transactions

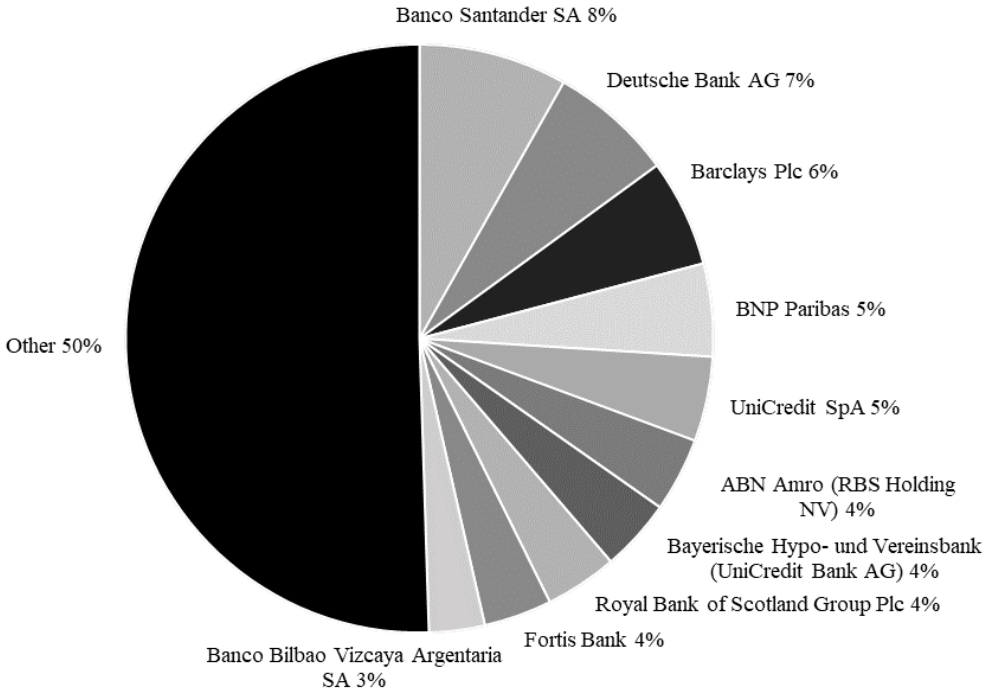

Figure 4: Frequently securitizing banks by transaction volume

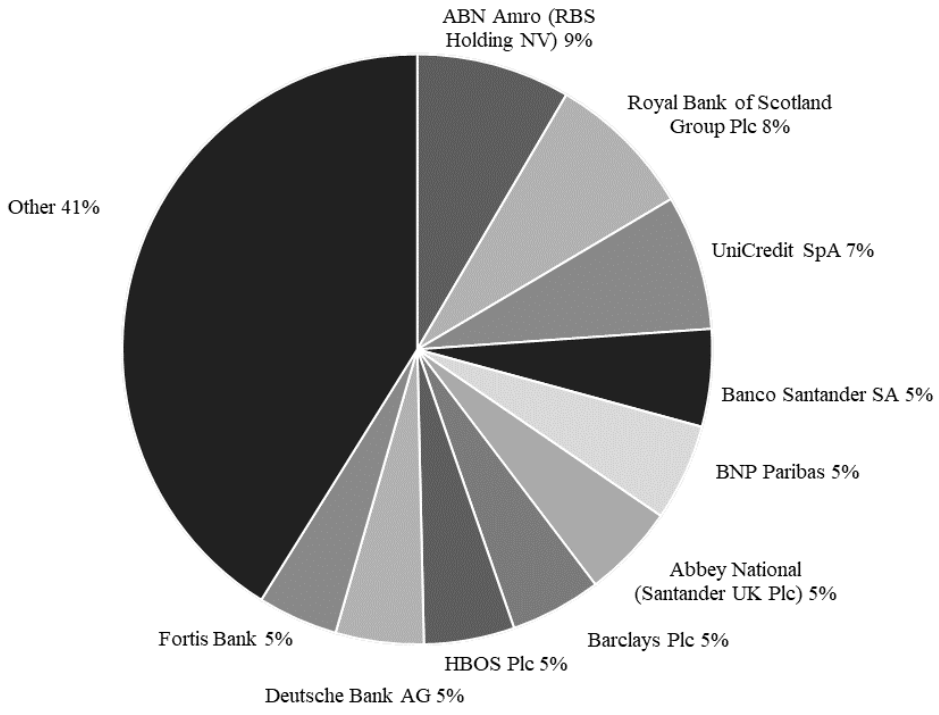

Table 3: Notes on variables and data sources

Variable	Description	Data Source
Securitization variables		
Secvol	Ratio of a banks' cumulated volume of securitizations to the volume of issued loans.	Moody's, Standard & Poor's, FitchRatings, own calc.
True Sale	Ratio of a bank's cumulated volume of true sale securitizations per year to the volume of issued loans.	
Synthetic	Ratio of a banks' cumulated volume of synthetic securitization per year to the volume of issued loans.	
CDO	One period lagged ratio of a banks' cumulated volume of Collateralized Debt Obligations (CDOs) per year to the volume of issued loans.	
RMBS	One period lagged ratio of a banks' cumulated volume of Residential Mortgage-Backed Securities (RMBS) per year to the volume of issued loans.	
CMBS	One period lagged ratio of a banks' cumulated volume of Commercial Mortgage-Backed Securities (CMBS) per year to the volume of issued loans.	
CC	One period lagged ratio of a banks' cumulated volume of Credit Card Receivables (CCs) per year to the volume of issued loans.	
CL	One period lagged ratio of a banks' cumulated volume of Consumer Loans (CL) per year to the volume of issued loans.	
Other	One period lagged ratio of a banks' cumulated volume of securitizations based on other underlyings per year to the volume of issued loans.	
Bank-specific variables		
LI (L) ^{res} $_{(t-1)}$	Residual component of the Lerner Index for the loan market per bank and year. Captures product-specific market power in the loan market, orthogonal to deposit market power. Higher values indicate greater market power in the loan market and thus lower competition.	BankScope, own cal.
LI (D) ^{res} $_{(t-1)}$	Residual component of the Lerner Index for the deposit market per bank and year. Captures product-specific market power in the deposit market, orthogonal to loan market power. Higher values indicate greater market power in the deposit market and thus lower competition.	
Liquidity $_{(t-1)}$	Lagged ratio of liquid assets to total assets, calculated as 1 minus the ratio of net loans to total assets per bank and year. Higher values indicate higher liquidity buffers.	
LL reserves $_{(t-1)}$	One-period lagged ratio of reserves for impaired loans to gross loans per bank and year. Higher values indicate a higher level of credit risk in the loan portfolio.	
Macroeconomic variable		
ΔYield Curve	The annual change of the slope of the yield curve is calculated as 10-year minus 2-year government bond yields per country and year. A higher value indicates a prospering economy.	Refinitiv's Eikon, own calc.
Regulatory and institutional environment		
Capital Regulation	The capital regulatory index measures overall capital stringency and is constructed using principal component analysis of initial and overall capital stringency. Higher values of the index reflect stricter capital requirements, with values ranging from 0 to 10.	World Bank, Barth et al. (2001, 2004, 2008, 2013a)
SMC	Stock market capitalization as a proxy for capital market development. It is calculated as the ratio of the value of listed shares to deflated GDP per country and year.	World Bank
Time variables		
Onset	Dummy variable that takes on the value of 1 for the years 1997-2001 (onset stage), and 0 otherwise.	Own calc.
Boom	Dummy variable that takes on the value of 1 for the years 2002-2007 (boom stage), and 0 otherwise.	
Crisis	Dummy variable that takes on the value of 1 for the years 2008-2010 (crisis stage), and 0 otherwise.	

Table 4: Descriptive Statistics

Variable	N	Mean	Std. dev.	Min	Max
Securitization variables					
Secvol	775	0.0159	0.0271	0	0.1815
True Sale	775	0.0120	0.0235	0	0.1815
Synthetic	775	0.0039	0.0137	0	0.1481
CDO	775	0.0045	0.0126	0	0.1105
RMBS	775	0.0095	0.0218	0	0.1815
CMBS	775	0.0005	0.0033	0	0.0540
CC	775	0.0002	0.0018	0	0.0287
CL	775	0.0005	0.0027	0	0.0302
Other	775	0.0008	0.0040	0	0.0397
Bank-specific variables					
LI (L) $^{res}_{(t-1)}$	684	–0.0149	0.2048	–1.2908	0.6059
LI (D) $^{res}_{(t-1)}$	684	–0.0145	0.2882	–0.6757	1.1108
Liquidity $_{(t-1)}$	727	0.4502	0.1610	0.1559	0.8632
LL reserves $_{(t-1)}$	666	0.0231	0.0167	0.0014	0.1105
Macroeconomic variable					
ΔYield Curve	789	0.0105	0.0079	–0.0091	0.0369
Regulatory environment					
Capital Regulation	805	6.2298	1.9820	2	9
Institutional environment					
SMC	805	0.7737	0.4482	0.1356	2.6511
Time variables					
Onset	826	0.3571	0.4794	0	1
Boom	826	0.4286	0.4952	0	1
Crisis	826	0.2143	0.4106	0	1

Table 5: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Secvol	1.00									
(2) True Sale	0.86***	1.00								
(3) Synthetic	0.50***	–0.01	1.00							
(4) LI (L) $^{res}_{(t-1)}$	0.00	0.02	–0.05	1.00						
(5) LI (D) $^{res}_{(t-1)}$	0.04	0.07*	–0.05	0.68***	1.00					
(6) Liquidity $_{(t-1)}$	–0.16***	–0.25***	0.11***	–0.39***	–0.28***	1.00				
(7) LL reserves $_{(t-1)}$	–0.12***	–0.14***	0.01	0.18***	0.08**	0.16***	1.00			
(8) ΔYield Curve	–0.05	–0.04	–0.03	–0.11***	–0.02	–0.02	0.10***	1.00		
(9) Capital Regulation	0.16***	0.19***	–0.02	0.10**	0.14***	–0.12***	–0.17***	–0.09***	1.00	
(10) SMC	0.04	0.04	0.01	–0.12***	–0.06	0.23***	–0.28***	–0.40***	0.23***	1.00

***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 6: Baseline regressions

	(1a) Secvol	(1b) Secvol	(2a) True sale	(2b) True sale	(3a) Synthetic	(3b) Synthetic
LI (L) ^{res} $_{(t-1)}$	–0.0263***		–0.0225***		–0.0038	
	(0.004)		(0.005)		(0.283)	
LI (D) ^{res} $_{(t-1)}$		–0.0147**		–0.0100*		–0.0048
		(0.018)		(0.073)		(0.199)
Liquidity $_{(t-1)}$	–0.0427**	–0.0356*	–0.0410**	–0.0343*	–0.0017	–0.0013
	(0.038)	(0.071)	(0.040)	(0.068)	(0.815)	(0.862)
LLreserves $_{(t-1)}$	–0.0570	–0.0687	–0.0520	–0.0595	–0.0051	–0.0089
	(0.580)	(0.499)	(0.545)	(0.487)	(0.922)	(0.863)
ΔYield Curve	1.2429***	1.3196***	0.9848***	1.0436***	0.2582**	0.2760**
	(0.001)	(0.000)	(0.003)	(0.002)	(0.032)	(0.020)
Capital Regulation	–0.0014	–0.0012	–0.0001	–0.0001	–0.0012*	–0.0011*
	(0.161)	(0.212)	(0.836)	(0.936)	(0.072)	(0.080)
SMC	0.0050	0.0028	–0.0053	–0.0064	0.0107**	0.0092*
	(0.494)	(0.751)	(0.440)	(0.417)	(0.020)	(0.051)
Cluster at bank-level	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES
No. of obs.	618	618	618	618	618	618
No. of banks	59	59	59	59	59	59
Adj. R^2	0.1214	0.1139	0.1308	0.1173	0.0089	0.0132

The fixed effects panel model estimated by regression specification (1a) is $Secvol_{i,t} = \alpha_i + \beta_1 LI(L)^{res}_{i,t-1} + \beta_2 Liquidity_{i,t-1} + \beta_3 LL\ reserves_{i,t-1} + \beta_4 \Delta Yield\ Curve + \beta_5 Capital\ Regulation + \beta_6 SMC + \varepsilon_{i,t}$. In specification (1b), the residual Lerner Index for the loan market (LI (L) ^{res}) is replaced by the residual Lerner Index for the deposit market (LI (D) ^{res}). We estimate this model separately for total securitizations (regressions 1a and 1b), true sale securitizations (regressions 2a and 2b), and synthetic securitizations (regressions 3a and 3b). The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 7a: Underlyings

	(1a) CDO	(1b) CDO	(2a) RMBS	(2b) RMBS	(3a) CMBS	(3b) CMBS
LI (L) $^{res}_{(t-1)}$	–0.0095**		–0.0140*		0.0004	
	(0.021)		(0.065)		(0.648)	
LI (D) $^{res}_{(t-1)}$		–0.0054*		–0.0079		–0.0011
		(0.086)		(0.121)		(0.295)
Liquidity $_{(t-1)}$	–0.0237***	–0.0211**	–0.0255	–0.0218	0.0088	0.0084
	(0.006)	(0.016)	(0.113)	(0.151)	(0.141)	(0.125)
LLreserves $_{(t-1)}$	0.0090	0.0049	–0.0463	–0.0524	–0.0134	–0.0143
	(0.837)	(0.910)	(0.537)	(0.478)	(0.327)	(0.320)
ΔYield Curve	0.3174***	0.3453***	0.8036**	0.8446***	0.0067	0.0091
	(0.004)	(0.001)	(0.013)	(0.009)	(0.928)	(0.901)
Capital Regulation	–0.0009*	–0.0008*	–0.0003	–0.0002	–0.0001	–0.0001
	(0.063)	(0.074)	(0.701)	(0.801)	(0.316)	(0.415)
SMC	0.0122**	0.0112**	–0.0132*	–0.0146*	0.0018	0.0013
	(0.018)	(0.032)	(0.061)	(0.060)	(0.538)	(0.681)
Cluster at bank-level	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES
No. of obs.	618	618	618	618	618	618
No. of banks	59	59	59	59	59	59
Adj. R^2	0.0091	0.0119	0.0580	0.0482	0.0812	0.0829

The linear fixed effects panel model and estimation parameters are defined in Table 6. The securitization volume is replaced by the different types of securitizations based on their underlying reference portfolios including Collateralized Debt Obligations (CDOs) in regressions (1a) and (1b), Residential Mortgage-Backed Securities (RMBs) in regressions (2a) and (2b), Commercial Mortgage-Backed Securities (CMBs) in regressions (3a) and (3b). The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 7b: Underlyings - continued

	(4a) CC	(4b) CC	(5a) CL	(5b) CL	(6a) Other	(6b) Other
LI (L) ^{res} $_{(t-1)}$	–0.0004		–0.0010		–0.0018*	
	(0.479)		(0.327)		(0.099)	
LI (D) ^{res} $_{(t-1)}$		–0.0004		0.0002		–0.0001
		(0.170)		(0.738)		(0.772)
Liquidity $_{(t-1)}$	–0.0019	–0.0019	0.0009	0.0013	–0.0012	–0.0005
	(0.135)	(0.121)	(0.436)	(0.244)	(0.436)	(0.703)
LLreserves $_{(t-1)}$	–0.0005	–0.0008	–0.0156	–0.0154*	0.0097	0.0097
	(0.849)	(0.776)	(0.101)	(0.097)	(0.654)	(0.652)
ΔYield Curve	0.0286	0.0301	0.0247	0.0256	0.0619**	0.0648**
	(0.217)	(0.202)	(0.250)	(0.253)	(0.019)	(0.021)
Capital Regulation	0.0001	0.0001	–0.0002**	–0.0002**	0.0000	0.0000
	(0.439)	(0.400)	(0.041)	(0.036)	(0.712)	(0.756)
SMC	0.0006	0.0005	0.0013	0.0016	0.0027***	0.0029***
	(0.338)	(0.475)	(0.190)	(0.115)	(0.008)	(0.005)
Cluster at bank-level	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES
No. of obs.	618	618	618	618	618	618
No. of banks	59	59	59	59	59	59
Adj. R^2	0.0083	0.0082	0.0005	0.0007	0.0000	0.0000

The linear fixed effects panel model and estimation parameters are defined in Table 6. The securitization volume is replaced by the different types of securitizations based on their underlying reference portfolios including Credit Card Receivables (CCs) in regressions (4a) and (4b), Consumer Loans (CLs) in regressions (5a) and (5b) and other unspecified Other Assets (Other) in regressions (6a) and (7b). The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 8a: Issuing frequency

	(1a) Secvol FI_{Vol}	(1b) Secvol FI_{Vol}	(2a) Secvol Non-FI_{Vol}	(2b) Secvol Non-FI_{Vol}
LI (L) ^{res} $_{(t-1)}$	–0.0145 (0.523)		–0.0393*** (0.003)	
LI (D) ^{res} $_{(t-1)}$		–0.0256* (0.083)		–0.0120 (0.109)
Liquidity $_{(t-1)}$	–0.0155 (0.679)	–0.0214 (0.602)	–0.0626** (0.013)	–0.0509** (0.046)
LLreserves $_{(t-1)}$	0.8255 (0.389)	0.8121 (0.392)	–0.0698 (0.486)	–0.0807 (0.420)
ΔYield Curve	–0.2479 (0.833)	–0.1108 (0.913)	1.5365*** (0.001)	1.4869*** (0.001)
Capital Regulation	–0.0069** (0.011)	–0.0060** (0.036)	–0.0010 (0.347)	–0.0009 (0.381)
SMC	–0.0020 (0.925)	–0.0092 (0.653)	0.0015 (0.883)	0.0042 (0.700)
Cluster at bank-level	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES
No. of obs.	102	102	516	516
No. of banks	10	10	49	49
Adj. R^2	0.1316	0.1536	0.1545	0.1615

The linear fixed effects panel model and estimation parameters are defined in Table 6. Regression specifications (1a) to (2b) include frequently and non-frequently issuing banks with regard to the transaction volumes ($FI_{Vol,}$ Non-FI_{Vol}). The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 8b: Issuing frequency – continued

	(3a) Secvol FI_{TA}	(3b) Secvol FI_{TA}	(4a) Secvol Non-FI_{TA}	(4b) Secvol Non-FI_{TA}
LI (L) ^{res} $_{(t-1)}$	–0.0270**		–0.0329**	
	(0.021)		(0.030)	
LI (D) ^{res} $_{(t-1)}$		–0.0305***		–0.0136*
		(0.008)		(0.057)
Liquidity $_{(t-1)}$	–0.0242	–0.0313	–0.0567**	–0.0484*
	(0.380)	(0.300)	(0.037)	(0.061)
LLreserves $_{(t-1)}$	0.9089	0.9705	–0.0854	–0.0940
	(0.185)	(0.131)	(0.381)	(0.332)
ΔYield Curve	–0.2588	0.1816	1.4481***	1.4577***
	(0.780)	(0.806)	(0.000)	(0.000)
Capital Regulation	–0.0079***	–0.0070**	–0.0010	–0.0009
	(0.004)	(0.018)	(0.365)	(0.422)
SMC	0.0195	0.0111	–0.0002	–0.0003
	(0.222)	(0.507)	(0.982)	(0.976)
Cluster at bank-level	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES
No. of obs.	100	100	518	518
No. of banks	10	10	49	49
Adj. R^2	0.1808	0.2206	0.1339	0.1297

The linear fixed effects panel model and estimation parameters are defined in Table 6. Regression specifications (1a) to (2b) include frequently and non-frequently issuing banks with regard to the number of transactions ($FI_{TA,}$ Non-FI_{TA}). The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.

Table 9: Stages

	(1a) Secvol Onset	(1b) Secvol Onset	(2a) Secvol Boom	(2b) Secvol Boom	(3a) Secvol Crisis	(3b) Secvol Crisis
LI (L) $^{res}_{(t-1)}$	–0.0042 (0.671)		–0.0153** (0.017)		–0.0053 (0.631)	
LI (D) $^{res}_{(t-1)}$		0.0035 (0.745)		–0.0096 (0.142)		0.0049 (0.484)
$Dummy_{Onset}$	–0.0098*** (0.000)	–0.0097*** (0.000)				
$Dummy_{Boom}$			0.0141*** (0.000)	0.0145*** (0.000)		
$Dummy_{Crisis}$					–0.0151*** (0.001)	–0.0151*** (0.001)
LI (L) $^{res}_{(t-1)}$ * $Dummy_{Onset\ (t-1)}$	–0.0312** (0.039)					
LI (D) $^{res}_{(t-1)}$ * $Dummy_{Onset\ (t-1)}$		–0.0158 (0.167)				
LI (L) $^{res}_{(t-1)}$ * $Dummy_{Boom\ (t-1)}$			0.0126 (0.404)			
LI (D) $^{res}_{(t-1)}$ * $Dummy_{Boom\ (t-1)}$				0.0092 (0.397)		
LI (L) $^{res}_{(t-1)}$ * $Dummy_{Crisis\ (t-1)}$					0.0002 (0.987)	
LI (D) $^{res}_{(t-1)}$ * $Dummy_{Crisis\ (t-1)}$						–0.0001 (0.989)
Liquidity $_{(t-1)}$	–0.0020 (0.923)	–0.0042 (0.842)	–0.0113 (0.529)	–0.0092 (0.640)	–0.0372 (0.117)	–0.0337 (0.163)
LLreserves $_{(t-1)}$	–0.1341 (0.145)	–0.1570* (0.081)	–0.0540 (0.570)	–0.0865 (0.330)	–0.1227 (0.188)	–0.1398 (0.128)
ΔYield Curve	–0.2314 (0.263)	–0.1529 (0.452)	0.2017 (0.302)	0.2618 (0.211)	0.2004 (0.390)	0.2549 (0.294)
Capital Regulation	–0.0022** (0.032)	–0.0023** (0.027)	–0.0022** (0.029)	–0.0021** (0.037)	–0.0019* (0.087)	–0.0019* (0.079)
SMC	0.0148 (0.109)	0.0171* (0.066)	0.0200** (0.016)	0.0199** (0.019)	0.0069 (0.467)	0.0100 (0.294)
Cluster at bank-level	YES	YES	YES	YES	YES	YES
Time dummies	NO	NO	NO	NO	NO	NO
No. of obs.	618	618	618	618	618	618
No. of banks	59	59	59	59	59	59
Adj. R^2	0.0042	0.0043	0.0220	0.0228	0.0249	0.0229

The linear fixed effects panel model and estimation parameters are defined in Table 6. Regression specifications (1a) to (3b) analyze the relationship between securitization and the banks' market power during different time periods (onset stage (1997-2001), boom phase (2002-2007), crisis period (2008-2010)) of securitization activities in Europe by employing interaction variables. The constant term is included but not reported. Heteroscedasticity consistent p-values are in parentheses. ***, **, * indicate statistical significance at the one-, five- and ten-percent level.