The 'Security Pacific Letter':

Estimating the Causal Effect of Securitization on Banks' Systemic Exposure

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Abstract

This paper aims to test the hypothesis of the 'Safe Asset narrative' which states that banks became manufacturers of pseudo safe assets to meet a global shortage of safe assets in the pre-crisis period. In this narrative, securitization is the mechanism which enables banks to become underwriters of safe assets. This paper takes this hypothesis to the data and attempts to estimate the causal effect of securitization on banks' systemic exposure. In particular, this paper exploits a regulatory change that occurred in 1987 when the OCC expanded the scope of assets US national banks could securitize. By using state-chartered banks as a control group and estimating a diff-in-diff model, I find that securitization significantly increased banks' systemic exposure. I then provide evidence on changes of banks' balance sheet features to pinpoint a direct channel through which securitization may have increased banks' systemic exposure.

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Introduction

Both the subprime mortgage crisis and Eurozone sovereign-debt crisis can be understood as crises of pseudo-safe assets engineered by the private sector in the US and issued by fiscally-weak countries in Europe. The 'Safe Asset narrative' assumes that a global shortage of safe assets facilitated the excessive issuance of debt instruments during the pre-crisis period. In such a scheme, the development of securitization may have been a channel through which the safe-asset shortage materialized in the real economy. Indeed, securitization allowed banks to engineer pseudo-safe assets by transforming pools of illiquid assets (mortgage, commercial and retail loans) into liquid (tradable) securities. The resulting assets were labelled as "safe" prior to the crisis even though they could not insure against systemic risk.

This paper aims to test the hypothesis that banks engaged in securitization as a response to a safe assets shortage, thus becoming manufacturers of 'safe assets' and underwriters of insurance against systemic risk. In particular, I deliver causal evidence on the effects of securitization on banks' systemic exposure. Assessing the impact of securitization on banks' exposure to systemic risk presents an empirical challenge as securitization indirectly fueled the growth of a national real estate mortgage market, thus indirectly exposing banks to systemic shocks. I overcome this identification challenge by estimating the causal impact of a regulatory change that affected US banks independently from their connections to the real estate market. By exploiting a regulatory change to the range of permissible assets that national banks could securitize and using state-chartered banks as a control group, I find that securitization significantly increased banks' systemic exposure.

Having established a causal link between securitization and banks' systemic exposure, I provide further evidence on structural changes to banks' balance sheets so as to identify the

channel through which national banks increased their exposure to systemic risk. In doing so, I test the empirical prediction of the 'Safe Assets narrative'. In the new 'Originate and distribute' banking model that developed after 1990, banks were allowed to originate assets and redistribute the associated risks through securitization instead of keeping those assets on their balance sheets. I find that national banks significantly decreased the share of their loans financed by deposits, which implies that banks increased their reliance on alternative sources of funding to finance their lending activities. This evidence is consistent with my initial hypothesis and pinpoints a channel through which securitization may have increased banks' systemic exposure. Had securitization been aimed at merely diversifying the banks' funding structure, we would not observe such increase in systemic exposure.

The rest of the paper is structured as follows: Section 2 reviews the existing economic literature on the 'Safe Asset narrative' and provide theoretical motivation for my empirical hypothesis. Section 3 presents my identification strategy and Section 4 describes the data. Section 5 and 6 present the results of my diff-in-diff estimation and further evidence of changes to banks' balance sheet features. Section 7 concludes.

Literature Review & Theoretical Motivation

The 'Safe Asset Narrative' of Financial Crises

A recent strand of economic literature on the demand and supply of monetary aggregates has emerged to explain the cyclical over-issuance of debt instruments leading to debt crises.[i] In this framework, monetary aggregates – the so-called 'safe assets'- encompass money and money-like financial instruments that are used as cash and transacted without much concern for adverse selection in financial markets. Unlike the 'Minskyan approach' which emphasizes the role of

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agents' expectations about the value of liquidity,[ii] the 'Safe Asset narrative' focuses on the global asymmetric issuance of safe assets and assumes that a global shortage of safe assets during the pre-crisis period facilitated the excessive issuance of debt instruments in advanced economies who were suppliers of those scare assets. In this framework, the subprime mortgage crisis can be comprehended as a crisis of pseudo-safe assets engineered by the private sector in the US to meet the needs of a globally integrated financial system.

In spite of its intuitive explanatory power, this narrative is difficult to test empirically. In this regard, Gorton, Lewellen and Metrick provide some evidence of a structural change to the manufacturing of safe assets. While the share of safe assets has remained constant over the last 30 years, the authors point at the change in the components of this share. Governments and banks – traditional manufacturers of safe assets through sovereign debt issuance and banks' deposits certificates – have been replaced by the "shadow banking" sector, which now produces a substantial fraction of those assets. Indeed, money market mutual funds shares, commercial papers, repurchase agreements and securitized debt are all money-like instruments that can be used as collateral in financial markets.

The 'Safe Asset Narrative' in Practice: Securitization and Systemic Risk

Focusing on the rise of structured finance is therefore key to test the validity of the 'Safe Asset narrative'. Indeed, this narrative implicitly assumes that the development of a new 'Originate and distribute' banking model was a response to the growing demand for safe assets from global investors. In this model, banks originate loans and resell them to outside investors instead of keeping those assets on their balance sheets. This process effectively distributes the associated risks to the rest of the financial sector and release banks from the constraint of keeping illiquid

assets on their balance sheet. This new model essentially offers alternative funding sources to the banks who are no longer dependent on their customers' deposits. If the development of the 'Originate and distribute' funding model was a response to the safe asset shortage, the banks' manufacturing of new financial instruments would be tantamount to the underwriting of insurance against systemic risk. In this regard, securitization was a channel trough which banks financed the origination of illiquid loans through the issuance of liquid, thus tradable securities. It is both a risk transfer and liquidity transformation mechanism whose resulting securitized products were bought for their perceived safety prior to the crisis.[iii]

According to the 'Safe Asset narrative', the development of securitization should therefore be concomitant to an increase of banks' systemic exposure. In their survey of the economic literature on the effect of growing interconnectedness and increased contagion risk in financial networks, Paul Glasserman and H. Peyton Young highlight the unsolved question of whether more interconnectedness tend to amplify or dampen systemic shocks. The ambiguous role played by securitization is at the heart of this tradeoff. On the one hand, banks can diversify their funding, thus better insuring themselves against systemic risk. On the other hand, securitization creates new obligations and increases the dominance of funding liquidity on market liquidity. The bank lending activity is more subject to adverse shocks as its financing depends on third agents' perception of the resulting security liquidity.

Glasserman and Young illustrate the groundwork for models of interconnected balance sheets with a basic intuitive scheme. Figure 1 show the stylized balance sheet of a bank i who has two categories of assets. 'Outside assets' c_i are claims on non-financial entities such as households or corporations while 'In-network assets' p_{ik} are claims on any financial entity k such as banks or

asset managers. Likewise, the bank has 'Outside liabilities' b_i towards depositors and 'In-network liabilities' p_{ik} towards financial entities.

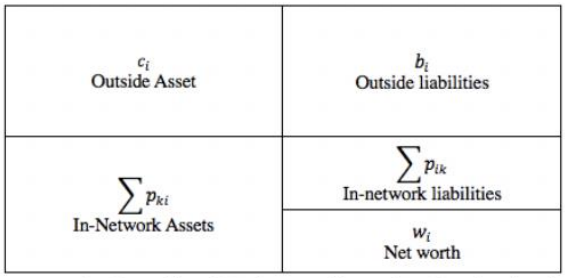

Figure 1: A stylized Balance Sheet for Bank i in the traditional banking model

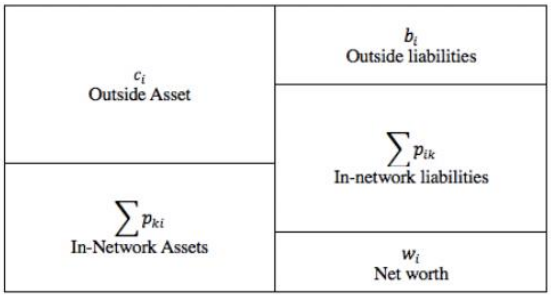

Figure 2: A stylized Balance Sheet for Bank i in the "Originate and distribute model"

I used their stylized representation of banks' balance sheets to contrast the 'traditional banking' model with the 'Originate and distribute' model. The two figures represent the structural features of a bank's balance sheet in the two distinctive banking models. In the traditional banking model, the bank finances the origination of its outside assets with outside liabilities, thus somehow isolating its traditional lending business from market fluctuations. In the 'Originate and distribute model', the bank combines outside liabilities and in-network liabilities to finance its outside assets. Implicitly, this structure increases the bank's financing liquidity and allows the bank to increase the size of its outside assets. Consequently, this stylized representation of a bank's balance sheet sheds light on the new risk of asymmetry caused by securitization. The origination of bank assets is made increasingly dependent on the liquidity of asset-backed securities and their perceived safety.

Estimating the effect of securitization on banks' systemic exposure is therefore key to explore the tradeoff between better risk diversification and increased dominance of the safe asset liquidity on the banks' origination business. Indeed, securitization may have been a channel

through which the safe asset global shortage materialized. Before the financial crisis of 2007, the general consensus was that securitization supported financial stability.[iv] This view was prevalent among policy makers such as the Office of the Comptroller of the Currency (OCC), which recognized the benefits of securitization:

> *The need for liquidity and the ability to engage in sound asset-liability management practices is all the more important to the maintenance of a safe and sound banking system.*[v]

Securitization was aimed to cater investors' need for safe assets as the payments *tranching* allowed to meet several liquidity needs:

> *Structural credit enhancement and diversified asset pool free investors of the need to obtain a detailed understanding of the underlying loans.*[vi]

Consequently, the development of securitization can be viewed as a 'safe asset' engine. If securitization was adopted to create a safe asset, thus turning banks into underwriters of systemic risk insurance, we should observe an increase in treated banks' systemic exposure. Testing this hypothesis could shed light on the role played by bank regulation in enabling this structural change.

Identification: The 'Security Pacific Letter'

Identification

This paper aims to estimate the causal effect of securitization as a new funding source on banks' systemic exposure. Disentangling the effect of securitization as a new funding source from contemporaneous changes in banks' systemic exposure represents an empirical challenge. Indeed, the effect of securitization is twofold. On the asset side, securitization can indirectly increase a bank's exposure to systemic risk if the greater amount of assets originated are highly correlated with systemic events. In the US, securitization fueled the growth of mortgage-backed securities.[vii]

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Together with other government policies that encouraged home ownership through various tax subsidies and home finance programs, securitization turned the real-estate market into a national one and strengthened the transmission line between a shock to the real economy and a bank crisis. Analyzing the role played by securitization in the increase of banks' systemic exposure could therefore lead to overestimation. The aim of my identification strategy is thus to test the direct effect of securitization as an alternative funding source for banks, independently from its indirect effects on the underlying assets markets. I overcome this identification challenge by exploiting a regulatory change regarding securitization which is independent from the story of the real estate mortgages in the US.

The 'Security Pacific Letter'

In this section, I argue that the 1987 'Security Pacific Letter' constitutes a valid natural experiment to test the causal effect of securitization on banks' systemic exposure by differentiating between national commercial banks and state-chartered banks responses.

In the 1980s, the process of securitizing bank assets became much easier.[viii] In a 1987 letter to Security Pacific National Bank – the so-called 'Security Pacific Letter'–, the OCC expanded the scope of permissible assets national bank could resell as securitized products. In spite of the applicable Glass Steagall Act, the OCC allowed the underwriting of securitized assets by stating that national banks could securitize and sell 'any of their […] lawfully acquired assets'. The supervisor of federal-chartered banks assumed that the pass-through certificates – representing claims on the trust holding the underlying illiquid assets - were not 'securities' within the meaning of Glass-Steagall Act and that securitization did not consist in the securities underwriting of the securities business. The Comptroller's ruling was challenged by the Securities Industry

Association which argued that the OCC's decision allowed national banks to deal in securities, thus creating a breach to the GSA which clearly separated the banking business from the securities business. The U.S. Court of Appeals upheld the OCC ruling in 1989. The court stated that:

> *If the activity constitutes the "business of banking," then the Glass-Steagall Act prohibitions … do not apply. (885 F. 2d 1034, 1048)*

Hence, the court's decision sanctioned the sale by a national bank of any type of securitized assets, including the banks' own consumer credit card receivables, automobile and boat loans, commercial loans and leases.[ix] Following this court ruling, the OCC started approving many securitization programs of national banks after 1989.

I propose to use this regulatory cutoff to isolate the effect that securitization had on national banks, independently from the underlying securitized assets. This regulatory change represents an empirical setting where I can differentiate between a treatment and control group, thus satisfying an essential condition of causal inference in observational studies. In this setting, state-chartered banks constitute an ideal control group as they were subject to the Glass-Steagall Act (GSA) but not to the OCC ruling. Indeed, the GSA provisions applied to all FDIC insured banks, be they state-chartered or federally-supervised while OCC rulings only applied to national banks. Given that both state-chartered banks and national banks were subject to the GSA, I propose to use state-chartered banks as a control in this natural experiment. My identification strategy therefore consists in estimating the change in a bank's systemic exposure following the regulatory change, based on whether or not the FDIC insured bank was a state-chartered bank (control) or a national bank (treatment).

Data & Methodology

The banks' betas are used as proxies for their systemic exposure. A bank beta (β_i) arises from co-movements of the stock price with the market and therefore captures the systemic component of a firm's stock price as opposed to its idiosyncratic component.

I obtained the lists of all FDIC insured banks from 1982 to 1992 from the Federal Deposit Insurance Corporation website. Estimating my model using FDIC-insured banks only – be they state-chartered (control) or OCC-chartered (treatment) – was key to ensure that they were subject to the same regulations prior to 1987. The FDIC dataset indicates whether each affiliated bank was supervised by the OCC or had a state charter. I matched this dataset with the banks' betas time series that I retrieved from the Bloomberg database. To do so, I used the FDIC variable indicating whether the individual bank was held by a holding company and obtained a list of state-chartered banks and OCC-chartered banks at the consolidated level. Given that each bank in the control group needs to be state-chartered and that the outcome variable is observed at the level of the holding company ('consolidated') only, matching the data at the consolidated level avoids identifying treated banks as state-chartered (control) in situations where the holding company of different state-chartered banks has an OCC-charter and should therefore be considered as treated.

	Consolidated level
FDIC banks	13,204
State-chartered banks	9,757 (73%)
OCC-chartered banks	3,447 (27%)

Table 1: FDIC dataset

Using a market-based measure of systemic risk puts a constraint on my sample. Indeed, many of the affiliated banks, be they national or state-chartered, were privately held. In order to obtain the most accurate measure of national and state-chartered banks' systemic risk, I decided to remove all holding companies' whose subsidiaries were not only banks but also insurance companies or other financial firms ('diversified financials'). Indeed, the other lines of businesses of such companies would have created uninformative noise to my response variable. I also checked that each of my sample bank did not change its regulatory status during my period of interest (1982-1992).

Publicly traded banks (1982-1992)	482
State-chartered banks	264 (54%)
OCC-chartered banks	218 (46%)

Table 2 : Bloomberg dataset

Lastly, I retrieved data on some of my sample banks' total assets, total loans, total deposits and total liabilities from Mergent Online, a database of corporate information covering US and foreign companies from 1982 onward. A first overview of the differences in banks' systemic exposure before and after the 1987 regulatory cutoff date is provided below. The changes in the distribution of the OCC-chartered banks' betas should serve as a preliminary guess regarding the sign and magnitude of the causal effect of securitization.

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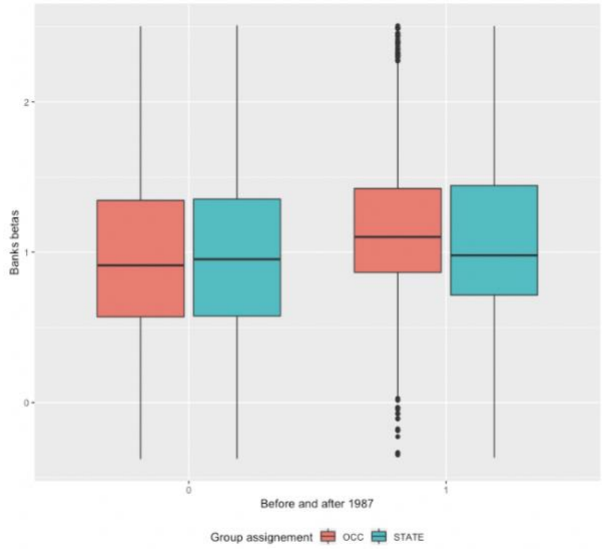

Figure 3 : Differences in means before and after 1987 across the treatment and control group

To assess the internal validity of my empirical strategy, I first used my sample to test the parallel trend assumption, which is critical to any diff-in-diff identification strategy. Ensuring that both the control and treatment group have parallel trends in their outcomes values prior to the treatment should support the appropriateness of the chosen control group as a counterfactual. I therefore plotted the moving average of each bank's stock beta time series, covering the period from 1982 to 1992. Figure 3 shows the moving average trend of each bank group – national and state-chartered banks.

Consistent with my identification assumption, Figure 3 shows that state-chartered and national banks' betas followed the same trend prior to 1987 when the OCC released the 'Security

Pacific Letter'. I formally tested the robustness of this identification assumption in section 5.C.

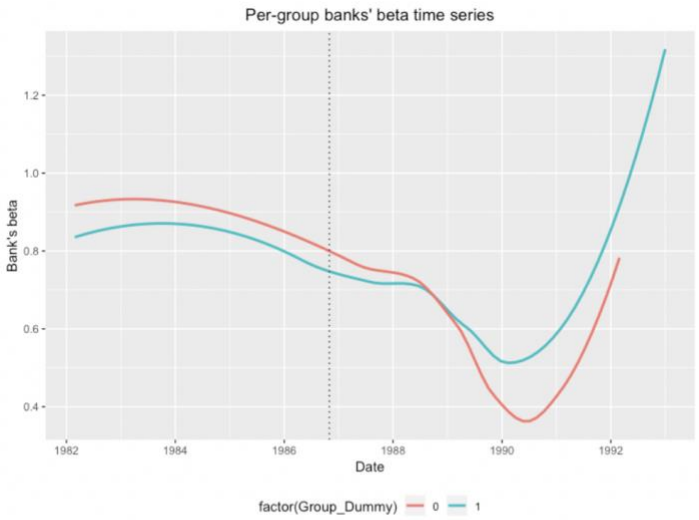

Figure 4 : Per-group moving average of banks' betas.

The Effect of Securitization on Banks' Systemic Exposure

Model Specification

I used the banks panel data to estimate the following diff-in-diff model:

$$\beta_{it} = \alpha_i + s_t + \theta D_{it} + \varepsilon_{it} \quad (1)$$

In this model, each bank i's beta at time t – thereafter denoted β_{it} – is regressed on its entity fixed effects α_i, time fixed effects s_t and a treatment dummy D_{it}.

$$D_{it} = \begin{cases} = 1, & bank\ i\ is\ a\ national\ bank\ after\ 1987 \\ = 0, & otherwise \end{cases}$$

Note that the coefficient of interest in this regression model is θ, whose sign and magnitude indicates whether the regulatory shock increased or decreased national banks' systemic exposure.

Results

	Dependent variable:	
	OLS	*OLS with Standard clustered errors*
	(1)	(2)
Treatment θ	0.067***	0.067***
	(0.014)	(0.015)
Constant	0.683*	0.683*
	(0.407)	(0.407)
Time fixed effects	YES	YES
Entity fixed effects	YES	YES
Observations	27,639	27,639
R2	0.491	0.490
Adjusted R2	0.480	0.479
Residual Std. Error	0.404 (df = 27067)	
F Statistic (df = 571; 27067)	45.672***	45.672***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 1: The 'Security Pacific Letter' effect on national banks' systemic exposure

Table 1 reports the main results from the estimated model. Column 1 shows the point estimates derived using Ordinary Least Squares (OLS). Column 2 shows the point estimates of the same model estimated with standard errors clustered at the bank level.

The two estimated coefficients have high statistical significance (one percent) and are robust to clustered standard errors. The point estimates on the treatment dummy variable are pretty consistent across all estimated models and robust to outlying values. The above estimated model thus suggests that the OCC decision increased national banks' systemic exposure by 0.07. The tables consequently support the view that exposure to securitization increased banks' systemic exposure.

Robustness of Parallel Trend Assumption

In order to assess the robustness of my identification assumption, I estimated the following model:

$$\beta_{it} = \alpha_i + s_t + \sum_i \rho_t (G_i \times s_t) + \varepsilon_{it} \quad (2)$$

In this model, I regress banks' betas on time and entity fixed effects and an interaction term between time fixed effects s_t and a dummy variable G_i indicating whether the bank i belonged to the treatment group (national bank) or control group (state-chartered bank).

$$G_i = \begin{cases} = 1, & bank\ i\ is\ a\ national\ bank \\ = 0, & bank\ i\ is\ a\ state\ chartered\ bank \end{cases}$$

This model aims at testing the parallel trend assumption, which is a necessary condition to estimate causality in a difference-in-differences empirical setting. In particular, estimating the difference in the mean response of the treatment and control group implies that the assignment of treatment should be insignificant before the treatment date. The coefficients of interest in this specification are therefore the series of coefficients on the interaction term between group

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assignment and time fixed effects ρ_t. In the hypothesis that state-chartered banks constitute a valid control group, the series of ρ_t should equal 0 before the regulatory cutoff date and be significantly different from 0 after the treatment.

The time series of ρ_t and their 99% confidence intervals are plotted in figure 4.

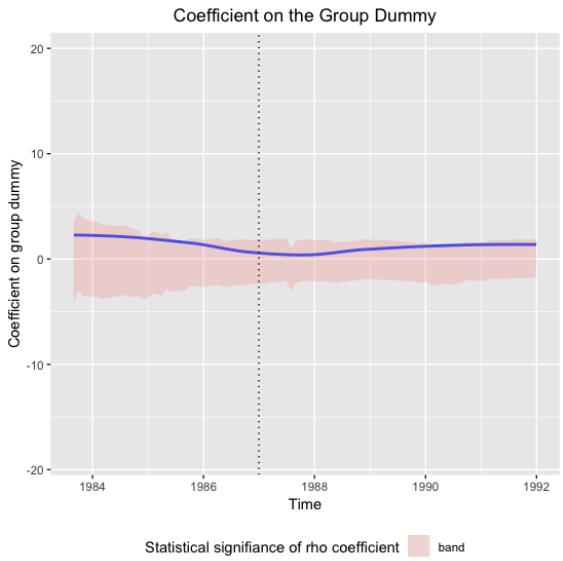

Figure 5 : Time series of the Group assignment statistical significance

Figure 4 supports the parallel trend assumption of this empirical setting. The point estimates are statistically insignificant before 1987 and present statistical significance after 1990.

Discussion: Identification of a potential direct channel

My results consequently point at an indirect effect of securitization on banks' systemic exposure. However, this empirical setting does not allow me to pinpoint the direct channel through which the regulation impacted banks' balance sheet and therefore their systemic exposure. To identify the potential channel explaining the estimated indirect effect, I used the panel data on banks' balance sheets retrieved from Mergent online. Based on random sample of 50 banks, I

found data on only 25 banks' balance sheets. I then computed the Loan to Deposits ratio of each bank in 1986 and 1992. I propose this ratio as a proxy for the share of a bank's lending activity that is financed through deposits. In a traditional banking model, this ratio should therefore be close to 1 as the bank only uses outside liabilities (deposits) to fund the origination of outside assets (loans). Table 3 shows the growth rate of the Loan to Deposits Ratios for both national and state-chartered banks between 1986 and 1992.

	Growth rate of the ratio $^{Total\ Loans_i}/_{Total\ Deposits_i}$ in % (1986-1992)
National Banks	(-16%)
State-chartered banks	(-5%)

Table 3 : Growth rate of Loan to Deposits ratios

I decided not to run any formal diff-in-diff model because of the small sample size. Instead, this data is only aimed at giving a hint of the direct mechanism at stake and should serve as a basis for future research using this empirical setting. Both national and state-chartered banks decreased their loan to deposits ratios. Hence, the share of outside assets financed by outside liabilities decreased for both groups of banks, thus explaining a common upward trend of in their systemic exposure. Furthermore, the difference in percentage growth shed light on the effect of securitization on banks' systemic exposure. The decline in the share of outside assets funded by outside liabilities between 1986 and 1992 is significantly higher for national banks. This result suggests that national banks were able to increase the size of their loan portfolio through In-network liabilities, thus increasing their exposure to systemic risk.

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These results are consistent with the 'Safe Asset narrative'. In particular, the causal increase in banks' systemic risk as a result of securitization validates a key prediction of the safe asset framework. Indeed, had the banks engaged in securitization for other reasons than meeting a shortage of safe assets through the engineering of liquid securities, we would not necessarily have observed an increase in their systemic risk. Securitization would have merely resulted in a change in the funding structure of the banks and the better diversification of their funding sources may have resulted even in lower systemic risk. Instead, my results pinpoint at a mechanism that is accounted for in the 'safe asset narrative'. Securitization did not only result in a change in the funding structure of banks but also incentivized them to originate new outside assets so as to sell pseudo safe securities to in-network investors. Hence, the increase in banks' systemic risk puts in evidence a change in banks' incentives and their engagement in a new business aimed at catering a growing demand for safe assets. Instead of attempting to measure changes in global investors' demand for safe assets in order to validate the 'safe asset narrative', my approach thus looks for evidence on the sell-side of new incentives created by a safe asset shortage.

Conclusion

This paper presents new evidence on the causal effect of bank deregulation on banks' systemic exposure. By using state-chartered banks as a control group and exploiting a regulatory change to the permissibility of securitization, I find that securitization significantly increased banks' systemic exposure.

These findings provide further empirical evidence for the validity of the 'Safe Asset narrative'. Consistently with the intuition of this narrative, banks seemed to have increased the underwriting of safe assets through securitization, thus mechanically increasing their exposure to

systemic risk. While the estimated causal effect shows that securitization has an indirect effect on banks' systemic exposure, I use banks' balance sheet data to pinpoint the structural changes at the bank level that drove this result. I find that banks that were able to securitize their assets significantly increased the share of in-network liabilities used to finance the origination of assets. Thus, securitization seems to act as an alternative funding source for banks, thereby increasing their systemic exposure by reinforcing the dominance of funding liquidity on their lending business.

Notes

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[viii] Fein, Melanie L. *Securities Activities of Banks*. New York, Wolters Kluwer Law & Business, Aspen Publishers, 2012, pp. 13.
[ix] *Ibid.*