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Less Bank Regulation, More Non-Bank Lending*

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Abstract

Bank deregulation in the form of the repeal of the Glass-Steagall Act facilitated the entry of non-bank lenders into the market for syndicated loans during the pre-2008 credit boom. Institutional investors disproportionately purchase tranches of loans originated by universal banks able to cross-sell loans and underwriting services to firms (as permitted by the repeal). A shock to cross-selling intensity increases loan liquidity at origination and over time. The mechanism is that non-loan exposures ensure monitoring even when banks retain small loan shares. Our findings complement the conventional view that regulatory arbitrage caused the rise of non-bank lenders.

JEL classification: G20, G21, G23, G28

Keywords: Non-bank lending, bank deregulation, credit supply, loan liquidity, industrial organization of financial markets

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1 Introduction

The credit boom that culminated in the 2008 financial crisis was driven in part by the growing participation of non-bank institutional investors in capital markets (sometimes referred to as shadow banks), including the rise of securitization (Ivashina and Sun, 2011; Gorton and Metrick, 2013). In the market for corporate credit, these developments were most dramatic in the context of syndicated lending, where institutional investors increasingly bought and securitized loan tranches originated by banks.[1]

From the perspective of traditional financial intermediation theory, the entry of non-banks as passive lenders in corporate lending markets presents a puzzle. In the traditional view, monitoring by an informed intermediary is essential to lending. Hence, bank loans are hard to sell to other market participants with lower holding costs because banks have no incentive to monitor loans once they are sold. Why were institutional investors increasingly willing to buy bank loans despite these concerns? A common explanation is regulatory arbitrage: since banks are subject to costly regulations, there are gains from trade with institutions that do not face these constraints (Irani, Iyer, Meisenzahl, and Peydró, 2021). Thus, regulatory bank-capital constraints tipped the balance towards more participation by passive lenders despite the drawbacks of worse monitoring.

In this paper, we argue that the regulatory-arbitrage view may not explain the full extent of non-bank entry. We use data from the Shared National Credit (SNC) program to show that bank *de*-regulation in the form of the repeal of the Glass-Steagall Act facilitated the entry of non-bank intermediaries into the market for corporate credit during the pre-2008 credit boom. More specifically, we argue that the repeal permitted the formation of universal banks that can efficiently monitor even when they retain relatively low loan shares because they realize economies of scope across lending and underwriting services. Institutional investors may therefore trust universal banks to monitor borrowers at loan shares at which they would not trust a stand-alone commercial bank to do so. Thus, our main insight is that specific forms of deregulation may increase, rather than decrease, the degree of complementarity in credit provision between banks and non-bank financial

[1] Ivashina and Sun (2011) estimate that nearly 70% of the increase in syndicated-loan issuance during the 2001-2007 credit boom is accounted for by institutional funding. Nadauld and Weisbach (2012) show that term-loan B facilities, which represent a majority of the syndicated-loan tranches obtained by institutional investors, were much more frequently securitized than other facilities. Therefore, institutional investment in syndicated loans is an important step in the securitization process.

institutions. This leads to a more nuanced view of the effects of regulation on gains from trade across financial institutions.

On the theoretical side, we develop this argument using a simple repeated version of the Holmström and Tirole (1997) model of informed lending, where the scope for repeated interactions improves monitoring efficiency by reducing the cost of collecting information over time. An increase in monitoring efficiency then allows universal banks to sell larger loan shares to uninformed investors, such as institutional investors, without compromising monitoring and loan quality. Testing these implications for loan liquidity requires exogenous variation in economies of scope. According to our proposed mechanism, this can be achieved using a shock to cross-selling opportunities, which serve to broaden intermediation relationships (Drucker and Puri, 2005). Such a shock is provided by a particular deregulatory event in 1996, namely the removal of informational firewalls between investment and commercial banking divisions among existing universal banks (Neuhann and Saidi, 2018), leading to a sharp increase in cross-selling intensity.

Accordingly, we use this deregulatory episode to test whether after the shock to cross-selling, there was an increase in loan liquidity at origination and over time for universal-bank originated loans, but not for loans arranged by other types of financial institutions, such as pure-play commercial banks. Documenting such an effect convincingly requires data on the entire life cycle of loans. This is because many non-bank investors purchase stakes in syndicated loans in the secondary market, shortly after the initial syndication process (Lee, Li, Meisenzahl, and Sicilian, 2019). Hence, we use Shared National Credit (SNC) data, allowing us to track loan shares over time (as in, for instance, Irani and Meisenzahl, 2017; Bruche, Malherbe, and Meisenzahl, 2020). This dataset also offers the best available coverage of loan shares at issuance, which overcomes a crucial weakness of more common datasets on syndicated loans, typically DealScan, that has hindered research on loan-contracting mechanisms that need to be tested using lead and participant shares as outcome variables.

Overall, we estimate bank-scope deregulation to have generated additional liquidity in the syndicated-loan market amounting up to $388bn, and at least $119bn even when holding credit demand fixed, over the period 1996-2008. This is sizable compared to the 2008 total amount of approximately $1.9tn (all in 2023 dollars) of corporate bonds outstanding on the books of some of the largest institutional investors, namely life and P&C

insurers (Becker, Opp, and Saidi, 2022).[2]

We establish this finding in two steps. First, we focus on syndicate formation at origination. To estimate the treatment effect of expanding lead arrangers' banking scope, we estimate a difference-in-differences specification at the loan level. In doing so, we compare the distribution of loan shares in syndicates arranged by at least one universal-bank lead arranger as compared to loans not arranged by any universal banks before and after 1996. Our key finding is that following the 1996 deregulation, universal banks (UBs) retained around five-percentage-point smaller lead shares than did commercial banks (CBs), thereby freeing up space for institutional investors to enter as participants.

To strengthen the link to our theoretical mechanism, we turn to the cross-section of loans at origination. Our theory builds on differences in the cost of monitoring. This suggests that the effect should be particularly pronounced for firms with high ex-ante monitoring costs (where potential efficiency gains are large). We find this to be true: the drop in universal banks' lead shares after 1996 amounts to ten percentage points (i.e., twice as large as our baseline effect) for borrower firms with higher sales-growth volatility (as a measure of ex-ante risk), and is non-existent in the subsample of safe firms. We also distinguish between term loans and credit lines. While the estimated effect on average lead shares is similar across credit lines and term loans, we find a stronger effect on total lead shares, i.e., the sum of all lead arrangers' shares, for term loans. This partially reflects the fact that term loans tend to have more lead arrangers on average, but also points to an increase in the overall liquidity of such syndicated loans by increasing the total participant share by 6.5 percentage points—larger than our baseline estimate. Term loans could thus be viewed as the natural point of entry for institutional investors as participants in syndicated loans, and particularly so after the 1996 deregulation.

The second step is to evaluate the composition of syndicates over time. To do this, we exploit the fact that our data cover the trading of syndicated loans on the secondary market, and move our analysis to the more granular loan-year by lender category level. This also enables us to control for time-varying unobserved heterogeneity at the loan level, including borrowers' demand and loan quality (Irani and Meisenzahl, 2017). Consistent with the view that universal bank-originated loans are more liquid, we find that universal banks sell more of their lead share over time. Interestingly, the institution

[2]Note that extrapolating from our results, it seems plausible that the advent of universal banking may have increased also the extensive margin of credit supply, but we cannot estimate this directly.

playing the role of lead arranger is more likely to switch over time as well: institutional investors are more likely to become lead arrangers over the life of the loan if the original loan was arranged by a universal bank.

More specifically, we estimate that this way institutional investors gain, on average, 0.9 percentage points in universal bank-originated syndicated loans, as opposed to syndicated loans arranged by other types of financial institutions, per year since the issuance of a loan. This estimate increases to 1.1 percentage points per year for credit lines. This can be rationalized when firms' observed behavior during the run-time of the loan produces information that can be used to monitor it more easily over time. In the case of credit lines, such valuable information is generated by firms' draw-down behavior.

In contrast to lead shares, institutional investors' participant shares of universal bank-originated loans do not increase as much over time (0.6 percentage points per year on average). In line with our findings for the cross-section of loans at the time of origination, however, we find a much stronger effect for term loans, such that institutional investors' participant share increases by 1.5 percentage points per year for universal bank-originated term loans. This confirms our conjecture that term loans are the natural point of entry for institutional investors as participants in syndicated loans.

Overall, we find clear support for the hypothesis that loans originated by universal-bank lead arrangers are substantially more liquid. The advent of universal banking thus presents a crucial entry point for institutional investors in the market for corporate credit. Our findings suggest a visceral role for bank scope in determining the overall industrial organization of corporate credit markets.

Related literature

Our paper is most closely related to the literature linking changes in bank regulation to the entry of non-bank financial intermediaries (such as so-called *shadow banks*). Buchak, Matvos, Piskorski, and Seru (2018) study the market for residential mortgages and find that regulation accounts for roughly 60% of shadow banking growth, while Irani, Iyer, Meisenzahl, and Peydró (2021) argue that bank capital regulation induces less-capitalized banks to reduce loan retention in the market for corporate credit. These papers have in common the notion that tighter regulation leads to more migration of financial intermediation to the non-bank sector. We complement this view by arguing that certain forms of

de-regulation may induce such behavior as well. More broadly, Begenau and Landvoigt (2022), Buchak, Matvos, Piskorski, and Seru (2022), and Jiang (2023) consider the evolution of bank boundaries relative to shadow banks under various forms of regulation.

Our specific focus is on the market for syndicated corporate loans. In this context, our paper is closely related to Blickle, Fleckenstein, Hillenbrand, and Saunders (2021) who also use SNC data to show that lead arrangers sometimes sell their entire lead shares, without any adverse consequences for loan performance. Our evidence is consistent with theirs, and our proposed mechanism provides a theory of *why* lead arrangers can sell their loan shares, namely that they have repeated interactions with the borrower firm. In this context, our results can be interpreted as showing why universal banks were the key entry point into lending by non-bank intermediaries.

Our paper is also related to multiple strands of the literature on credit markets and heterogeneous financial intermediaries. First, we contribute to the literature documenting circumstances that favor non-bank entry, such as split control rights that mitigate bargaining frictions (Berlin, Nini, and Yu, 2020), and exit into lending, such as loan renegotiation (Beyhaghi, Nguyen, and Wald, 2019). Fleckenstein, Gopal, Gutiérrez, and Hillenbrand (2021) point to the cyclicality of non-bank lending, while Aldasoro, Doerr, and Zhou (2022) show that non-banks finance riskier firms globally.

In contrast to these papers, we focus on variation that allows to ascertain a channel through which banking deregulation facilitates non-bank lending. The key enabler is the effect of the deregulation of bank scope, and the subsequent rise of universal banking (see, among others, the seminal work by Puri, 1996; Gande, Puri, Saunders, and Walter, 1997; Drucker and Puri, 2005), on the distribution of shares retained by syndicate lenders—a relevant object of study already in early papers on syndicated loans (e.g., Sufi, 2007; Ivashina, 2009). The most important advance that we attempt to make is to account for heterogeneity in bank scope among syndicate lenders, differentiating at the very least between universal and pure commercial/investment banks.

Our main theoretical conjecture relates to universal banks' monitoring efficiency in their role as lead arrangers. As such, our paper relates to previous work studying informed lenders in syndicated loans (e.g., Gustafson, Ivanov, and Meisenzahl, 2021, using similar data as we do) and the effect of their presence on loan liquidity (Santos and Shao, 2018). By linking this monitoring advantage by universal banks to the entry of non-

bank lenders into the market for syndicated loans, our proposed mechanism is related to supply-side driven explanations that can rationalize lower lead shares, and subsequently larger residual participant shares, at origination (as in our model) or loan sales after origination (for which we provide empirical evidence that is consistent with related theoretical work, such as Gryglewicz, Mayer, and Morellec, 2022). Also related is Hu and Varas (2022), who consider a dynamic version of the Holmström and Tirole (1997) model with limited commitment to loan retention. They show that banks may sell loan stakes and monitor less over time. In contrast to our paper, they do not consider bank heterogeneity in monitoring expertise driven by economies of scope.

Our focus on the supply side of loans complements studies that focus on demand-side factors determining what firms borrow from non-banks (most notably Chernenko, Erel, and Prilmeier, 2022). Importantly, in our analysis of loan dynamics over the life cycle, we explicitly control for time-varying unobserved heterogeneity at the loan level, capturing borrower-level loan demand, and estimate differential effects for institutional (non-bank) investors vs. banks.

2 Theoretical Framework

We now introduce a simple model of informed lending based on Holmström and Tirole (1997) and use it to derive empirical predictions. There is a firm with capital A_f which requires $I - A_f$ in external funding to finance a project of size I. The project yields a return of R if it is successful and 0 if it fails. The firm is run by an entrepreneur who can deliberately reduce the probability of success to enjoy a private benefit B. Shirking reduces the probability of success to p_L from p_H, with $\Delta p = p_H - p_L > 0$. The firm can obtain financing from two sources: *outside investors*, who are uninformed in the sense that they do not possess any monitoring expertise, and *intermediaries*, who can reduce the private benefit of shirking from B to b by exerting privately costly effort. The outside option for outside investors and intermediaries is an investment with net rate of return γ.

To allow for relationships and economies of scope, we repeat the model twice and let intermediaries become more efficient monitors over time. The cost of monitoring is c_H if the intermediary has not monitored the firm in the past, and $c_L < c_H$ if it has. An intermediary that has monitored the firm in the past is said to be *experienced*.

Firms, intermediaries, and investors receive an endowment of A_f, A_m, and A_u, respectively, at the beginning of each period and consume at the end of each period. Contracts are short-term, and the firm applies for funding anew at the beginning of each period. A_u is large enough such that outside investors can supply all required funds that are not supplied by intermediaries, but outside investors are not willing to invest unless the firm is monitored by an intermediary, the lead arranger.

We start our analysis in the second period. Let the project's payoffs be divided up so that $R_f + R_m + R_u = R$, where R_f, R_m, and R_u denote the returns accruing to the firm, the intermediary, and outside investors, respectively. Assuming that the firm is monitored by an intermediary, the firm's incentive constraint is $R_f \geq \frac{b}{\Delta p}$, while an intermediary with cost $c \in \{c_L, c_H\}$ prefers to monitor if $R_m \geq \frac{c}{\Delta p}$.

Let I_m denote the capital lent to the firm by the intermediary. Since monitoring is costly, firms prefer uninformed to informed intermediary capital if possible and borrow just enough from intermediaries in order to ensure monitoring incentives. In the context of syndicated lending, I_m can be interpreted as the lead arranger's loan share, or lead share. If there are no experienced intermediaries, perfect competition among intermediaries implies that the participation constraint binds. Hence, the lead share is $I_m^H = \frac{p_L c_H}{\gamma \Delta p}$ and the promised payment is $R_m^H = \frac{c_H}{\Delta p}$.

Plentiful intermediary capital is not sufficient to dissipate all rents when there is an experienced intermediary since she can use her cost advantage to undercut all competitors and still earn excess profits. The worst case for the firm is that the experienced intermediary acts as a monopolist and offers exactly the same terms as an inexperienced intermediary, retaining all rents for herself. In this case, the incentive constraint is slack and the rent is equal to the difference in monitoring costs, $\Delta c \equiv c_H - c_L$. The best case is that she behaves competitively and invests $I_m^L = \frac{p_L c_L}{\gamma \Delta}$ in exchange for payment $R_m^L = \frac{c_L}{\Delta p}$. The exact division of the surplus is immaterial to our analysis. Hence, we assume that the experienced intermediary offers a weighted average of the "monopolist" and "perfect-competition" contracts, with her bargaining power $0 < \mu < 1$ determining the weight on the monopolist contract:

$$I_m^* = \frac{p_H(c_L + \mu \Delta c)}{\gamma \Delta p} \qquad \text{and} \qquad R_m(\mu) = \frac{c_L + \mu \Delta c}{\Delta p}.$$

This contract delivers rents $\mu \Delta c$ to the experienced intermediary, and it lowers the lead

share because the experienced intermediary is a more efficient monitor. Lending experience thus makes bank loans cheaper and more liquid.

We now turn to the first period where all intermediaries face monitoring cost c_H. The firm's problem is the same as above. However, intermediaries take into account that being experienced tomorrow has the promise of additional rents which we summarize by $v(\mu)$. We parameterize the intermediary's probability of being the firm's monitor tomorrow conditional on monitoring the firm today by $\alpha \in [0,1]$. We use α to reflect the probability of repeated interactions, and interpret universal banking as a positive shock to α. Since this raises the value of monitoring, the scope for relationship banking leads to a lower effective cost of monitoring, $\hat{c}(\alpha) = c_H - \alpha\mu\Delta c$. The intermediation contract and the incentive constraint are then given by:

$$I_m^{**} = \frac{p_L \hat{c}}{\gamma \Delta p} \qquad \text{and} \qquad R_m^{**} \geq \frac{\hat{c}}{\Delta p}.$$

Hence, the promise of future rents relaxes financial constraints for the firm *today*, and makes bank loans more liquid by reducing the lead share.

2.1 Empirical Predictions

We now describe the model's empirical content. We consider banks to be informed intermediaries and institutional investors (non-bank intermediaries) to be uninformed investors. Hence, the lead share is I_m, and the participant share is $I - A_f - I_m$. We interpret the advent of universal banking and subsequent deregulation of bank scope as a shock to α, the probability of repeated interactions for an informed intermediary. The treatment effect of universal banking in a given period is

$$\frac{\partial I_m^{**}}{\partial \alpha} = -\frac{p_L \mu \Delta c}{\gamma \Delta p}.$$

We refer to loans where a universal bank is the lead arranger as *UB-led*, and those where a commercial (or any non-universal) bank is the lead arranger as *CB-led*. We then have the following empirical predictions at origination.

Empirical Prediction 1 (Loan shares at origination) *Relative to CB-led loans,*

(i) UB-led loans have lower lead shares and higher (total) participant shares.

(ii) The UB treatment effect is larger for risky firms with high default risk, p_L, and for opaque firms where economies scope in monitoring, Δc, are particularly large.

Repeated interactions are more likely to occur over longer time horizons, and economies of scope in monitoring accumulate as lending relationships deepen. This suggests that Δc increases disproportionately over time for UB-led loans, allowing uninformed investors such as institutional investors to increase their loan share over time.

Empirical Prediction 2 (Life cycle) *The participation (in any capacity) by institutional investors in loans initially arranged by UBs increases over time.*

Unless the total size of the loan varies during its run-time, the fact that an increase in Δc due to universal banking leads to a smaller lead share I_m can be interpreted as a transfer of lead shares from universal banks to a (new) group of institutional investors. Alternatively, it can be interpreted as reflecting improved liquidity of participant shares, even compared to primary market trading. This would, in turn, imply a transfer of participant shares from equally uninformed lenders—even if they are universal banks because they were not lead arrangers—to institutional investors.

An important source of heterogeneity between loans is whether the loan is a term loan or a credit line. A term loan is more likely to require monitoring of specific firm actions, while a credit line is more likely to require monitoring of the firm as a whole. A credit line that has not yet been drawn down can be considered otherwise equivalent to a term loan. As firms draw down on their credit lines over time, this discloses additional information. Thus, it should become easier to monitor the firm over time as its fundamental type is revealed (Botsch and Vanasco, 2019). This suggests that universal banks can disproportionately reduce their lead share in credit lines over time, and previously uninformed investors that have observed the firm over time can take over their lead shares, whereas these institutional investors are more likely to enter term loans as participants.

Empirical Prediction 3 (Life-cycle heterogeneity) *Lead shares initially held by UBs drop over time, and more so for credit lines than for term loans. Institutional investors are more likely to buy lead shares of UB-arranged loans in credit lines, whereas they increase their participant share in term loans over time.*

3 Empirical Strategy and Data

We next discuss our identification strategy based on the bank-scope deregulation following the stepwise repeal of the Glass-Steagall Act. Then, we will describe our administrative data on syndicated loans and sample selection.

3.1 Identification Strategy

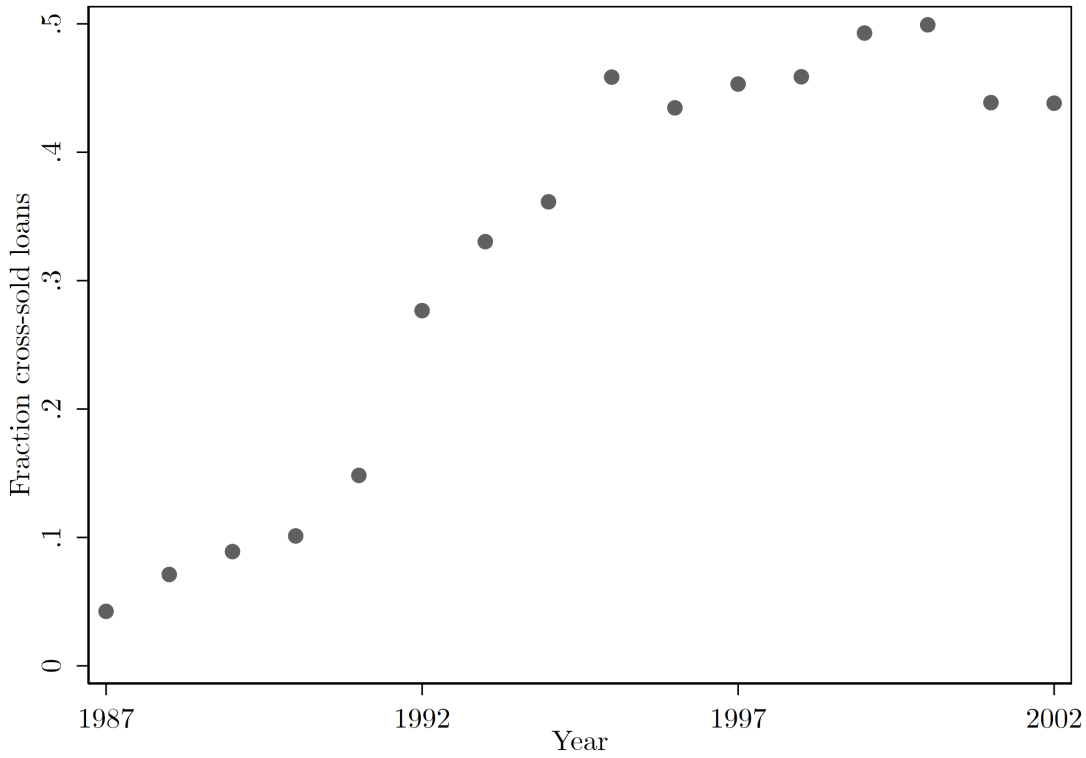
An important prerequisite for estimating the impact of bank scope on syndicate structures is a setting that provides variation in bank scope. The stepwise repeal of the Glass-Steagall Act constitutes such a setting (Neuhann and Saidi, 2018). The Glass-Steagall Act of 1933 imposed a separation of commercial banking (deposit taking and lending) and investment banking (especially underwriting of corporate securities).

Starting April 30, 1987, commercial banks were allowed to become universal banks, and generate up to 5% of their gross revenues from underwriting and dealing in securities *other than* corporate debt and equity. The first major step of the repeal took place in January and September 1989, which is when commercial banks could generate a higher fraction (10% in 1989, which increased to 25% in 1996) of their revenues through underwriting activities, *including* underwriting of corporate debt and equity. Commercial banks became universal banks typically by opening so-called Section 20 subsidiaries for these purposes. Another possibility was to acquire an investment bank.

While this first step towards universal banking led to an increase in bank size by allowing banks to engage in both commercial and investment banking, firewalls separating the two activities remained in place. Some of the informational and financial firewalls within bank-holding companies were, however, abolished by the Federal Reserve Board in a second step on August 1, 1996. The elimination of these firewalls between commercial banking and securities divisions enabled universal banks to cross-sell loans and non-loan products, which used to be severely restricted, not to say forbidden, under the Federal Reserve Act (Sections 23A and B). Furthermore, the removal of informational firewalls allowed for the possibility of sharing non-public customer information between commercial banking and securities divisions.

We wish to test whether banks of wider (deregulated) scope retain smaller shares when arranging syndicated loans. In our model, the underlying mechanism is that uni-

Figure 1: **Fraction of Syndicated Loans Cross-sold by Universal Banks**



Notes: This figure plots for each year from 1987 to 2002 the fraction of syndicated loans arranged by at least one universal bank (from DealScan) that is observed to have also served as the lead underwriter of any equity or debt offering (as recorded in SDC) by the same borrower firms anytime from the same year the loan was issued up until the end of the fourth year thereafter.

versal banks have deeper bank-firm relationships, for example through cross-selling loans and non-loan products. Thus, we hypothesize that universal, rather than commercial or investment, banks retain smaller shares of loans when their ability to enter deeper bank-firm relationships is strengthened.

We use the 1996 deregulation as a shock to universal banks' ability to cross-sell loans and underwriting services and reap informational economies of scope this way. As argued in Neuhann and Saidi (2018), the proportion of cross-sold loans increased significantly for universal banks, rather than investment banks, after the 1996 deregulation. We use Refinitiv DealScan and Securities Data Company (SDC) Platinum data to validate this assumption.[3] Figure 1 shows that the proportion of syndicated loans with a universal-

[3]Data are from Refinitiv, Dealscan and LoanConnector, Wharton Research Data Services, https:/wrds-web.wharton.upenn.edu/wrds/; and Refinitiv, Thomson ONE Investment Banking and Deals module and SDC Platinum, http://www.thomsonone.com/.

bank lead arranger granted to firms whose debt or equity was underwritten by the same universal bank in the subsequent five years (from t until year-end $t+4$) increased substantially around 1990, shortly after the revenue limit was elevated for the first time, and then again around the mid-1990s.[4]

Against this background, we employ a difference-in-differences strategy akin to Neuhann and Saidi (2018) around 1996 for treated universal banks vs. other banks that were unaffected in their scope of banking activities. In a first step, we analyze the syndicate structure of loans arranged by these different groups of banks. Each syndicated loan is a package that consists of one or multiple facilities which, in turn, consist of loan shares provided by one or multiple syndicate lenders. To estimate the effect on total or average lead shares (across all arrangers a) at the package level l (representing a syndicated loan l granted at date t to firm f in industry $i(f)$), we estimate the following regression specification:

$$\begin{aligned} \textit{Lead share}_l \;=\; & \beta_1 \textit{Arranged by universal bank}_l \times After(1996)_t \\ & + \beta_2 \textit{Arranged by universal bank}_l + \mu_a + \delta_{j(f)t} + \epsilon_l, \end{aligned} \tag{1}$$

where the dependent variable is either the total or the average share (in %) of the loan retained by all lead arrangers, *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance, $After(1996)_t$ is an indicator for whether the loan was issued after 1996, μ_a denotes bank fixed effects for all lead arrangers of loan l, and $\delta_{j(f)t}$ denotes borrower firm f's (two-digit) industry by year fixed effects. Standard errors are clustered at the level of all lead arrangers.

As *Arranged by universal bank*$_l$ is a loan-level characteristic that reflects whether any one of the lead arrangers is a universal bank, we can separately include fixed effects for each lead arranger associated with loan l. Even in the (common) case of a syndicated loan having only one lead arranger, we can estimate a coefficient on *Arranged by universal bank*$_l$ in the presence of arranger fixed effects because we track commercial banks that may have opted to become universal banks after their first loan transaction in the data. As a result, *Arranged by universal bank*$_l$ can vary within certain types of arrangers, namely commercial banks that eventually become universal banks. The difference-in-differences estimate

[4] We would not expect to find a clear effect in 1996 or 1997, however, as one can only noisily infer the actual timing of cross-selling loans and underwriting services from the issue dates of the two types of financial assets.

β_1 is then identified using commercial banks that became universal banks prior to the deregulation and, therefore, experienced an expansion in the scope of their activities in 1996. That is, to estimate β_1 and β_2, a given lead arranger a needs to be observed in at least three instances: when it was still a commercial bank (captured by the arranger fixed effects), after it opted to become a universal bank but before the 1996 deregulation (β_2) and, finally, as a universal bank after the 1996 deregulation (β_1). The omitted category consists of other types of lenders, including commercial and investment banks but also institutional lenders, whose scope did not increase following the 1996 deregulation.

As our data cover secondary-market trading of syndicated loans, we can also analyze the development of loan shares held over time, and differentiate by three types of lenders: universal banks, other banks, and institutional investors (or non-banks). In particular, we are interested in the development of shares held by institutional investors of loans initially arranged by universal banks. To this end, we estimate the following regression specification at the loan-year by lender category level lit:

$$\begin{aligned} Share_{lit} \;=\; & \beta_1 Institutional\ investor_i \times Arranged\ by\ universal\ bank_l \times Years\ since\ issue_{lt} \\ & + \beta_2 Institutional\ investor_i \times Arranged\ by\ universal\ bank_l \\ & + \beta_3 Institutional\ investor_i \times Years\ since\ issue_{lt} + \theta_{lt} + \phi_{it} + \epsilon_{lit}, \end{aligned} \tag{2}$$

where the dependent variable is the total share (in %) of loan l retained by participants or lead arrangers in lender category i in year t, $Institutional\ investor_i$ is an indicator variable for loan shares held by institutional investors, as opposed to the remaining two categories of lenders (universal and non-universal banks), $Arranged\ by\ universal\ bank_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance, $Years\ since\ issue_{lt}$ is the difference in years between t and the year in which loan l is issued, θ_{lt} and ϕ_{it} denote, respectively, loan by year and lender category by year fixed effects. Standard errors are clustered at the level of all lead arrangers.

3.2 Data Description

Our main object of analysis relates to the distribution of loan shares within syndicates, at origination as well as over time. As pointed out by, among others, Bruche, Malherbe, and Meisenzahl (2020), loan shares are poorly filled in the standard database on syn-

dicated loans, DealScan. What is more, the DealScan database covers only the primary syndicated-loan market and, as such, does not track loan shares that are eventually traded in the secondary market. This is of particular relevance for institutional investors, many of which enter syndicated loans through acquiring loan shares of term loans in the secondary market (Ivashina and Sun, 2011; Nadauld and Weisbach, 2012).

To address these challenges, we use data from the Shared National Credit (SNC) program, which was established in 1977 by the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency to facilitate reviews of large syndicated loans. Up until 2017, SNC included loans larger than $20 million that are shared by three or more supervised institutions.[5] Information about a loan is provided by a designated bank—usually an agent bank. One or more agent banks are generally responsible for coordinating participating lenders, negotiating the contractual details, and preparing adequate loan documentation. Once the loan is made, agent banks are also responsible for loan servicing.

We use annual data with report dates from 1992 to 2012. Starting in 1992, the data are available in a consistent format. After 2012 the behavior of agent banks and institutional lenders in the syndicated-loan market was heavily influenced by the Leveraged Lending Guidance (Calem, Correa, and Lee, 2020; Aramonte, Lee, and Stebunovs, 2022). As of the end of 2012, the SNC database covered approximately 9,300 syndicated loans to 5,800 borrowers, for a total of $3 trillion in drawn credit and commitments (commitment is the maximum amount lenders agree to provide).

The SNC database includes the full syndicate membership for each recorded loan as well as each lead arranger's and each participant's outstanding and committed shares of the loan. Moreover, because regulators collect the same loan across time, syndicate membership changes can be observed in these data.[6] Since some loans are reported once but reviewed multiple times, we only keep the observations with the most recent review date. We group SNC loan types into "Term," "Revolver" and "Other," and we drop loans classified as "Other." We drop any observations that have a different loan type than the loan type at origination. We drop loan-years that do not have any identified lead arrangers. We also drop loan-lender-year observations with negative loan amounts.

[5]Starting in 2018, the threshold increased to $100 million and the frequency of data submissions moved to quarterly.

[6]Loan amounts are inflation adjusted to 1992 dollars.

Finally, we drop loans with origination dates that occur after the report date.

We distinguish between commercial/investment and universal banks by matching, using the R package fedmatch (Cohen, Dice, Friedrichs, Gupta, Hayes, Kitschelt, Lee, Marsh, Mislang, Shaton, Sicilian, and Webster, 2021), names of SNC lenders and names of top holders of SNC lenders to a list of names of all commercial banks and the dates they became universal (from Neuhann and Saidi, 2018). This enables us to classify lenders in the syndicated-loan market as commercial banks that were not yet universal banks at the time of loan issuance, universal banks, commercial banks that never became universal banks, investment banks, and non-banks. We use the DealScan lender IDs of universal banks, so we augment our universal-bank indicator using a DealScan-SNC lender match. If any of these methods matches to the list and the report date is after the date the bank became universal, then the lender is marked as a universal bank in the SNC data. SNC also has general entity types that categorize lenders on a syndicate as a U.S. bank, a foreign bank, or a non-bank. We use this broad definition to assume that non-banks are institutional investors.[7]

We use a random forest model to predict lead arrangers in SNC. The verified data (training data) of 15,515 loan-level observations is from a SNC-DealScan match and uses the lead-arranger information in DealScan. If a lender is not a domestic bank, foreign bank, finance company, or broker-dealer, we assume that it is not a lead arranger. The independent variables of the model are SNC entity type, commitment share, commitment total, a dummy for recession during origination, origination year, report year, time difference between report date and origination, and a dummy for whether the lender was ever a lead arranger for the borrower on another loan. We make some changes to the SNC entity type based on our own entity categorizations. If we classify a lender as a domestic bank, foreign bank, finance company, or broker-dealer, but a more granular form of SNC entity type categorizes it as a "Domestic Entity Other" (DEO) or "Foreign Entity Other" (FEO), then we change the SNC entity type to "National Bank" (NAT), "Foreign Bank" (FBK), "Finance Company" (FNC), or "Securities Broker/Dealer" (SBD), respectively.

We classify lead arrangers using a decision threshold of a false positive rate of 0.1. Therefore, we are conservative in limiting false positives, or identifying a lender as a lead arranger when it is not. Agent banks in the SNC data are automatically classified as lead

[7]Similar distinctions are made in Calem, Correa, and Lee (2020) and Aramonte, Lee, and Stebunovs (2022).

arrangers outside of the model (given a model prediction of 1). We take only the top ten lead arrangers by model prediction. In the verified set, the largest number of lead arrangers for one loan was 29, but there were only 58 out of 15,515 with more than ten lead arrangers.

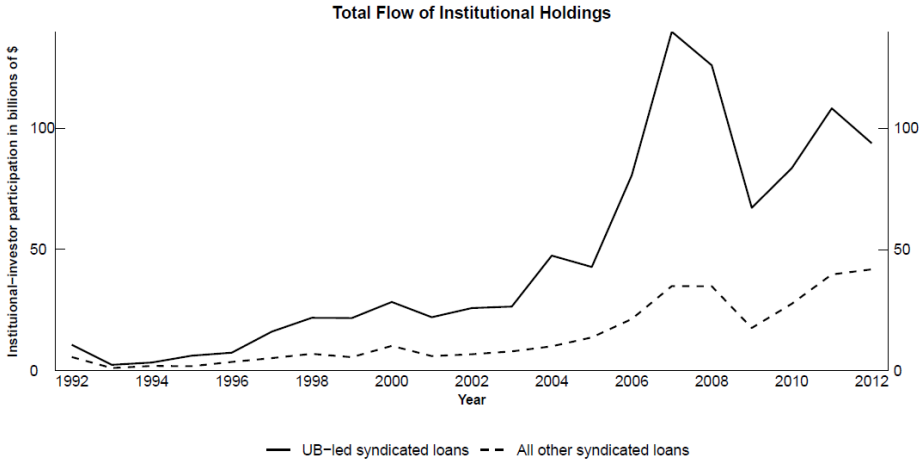
Finally, we estimate separate models for term loans and revolver loans (credit lines). For the verified data, the model correctly identifies most of the actual lead arrangers for term loans. This is more difficult to achieve for revolvers because they attract predominantly banks, rather than other types of investors, and banks are more likely to be lead arrangers. However, increasing the false positive rate does not lead to material changes in our results at the granular loan-year by lender category level (see (2)) because the institutional shares of the loans do not change much depending on the false-positive-rate threshold.

Summary statistics

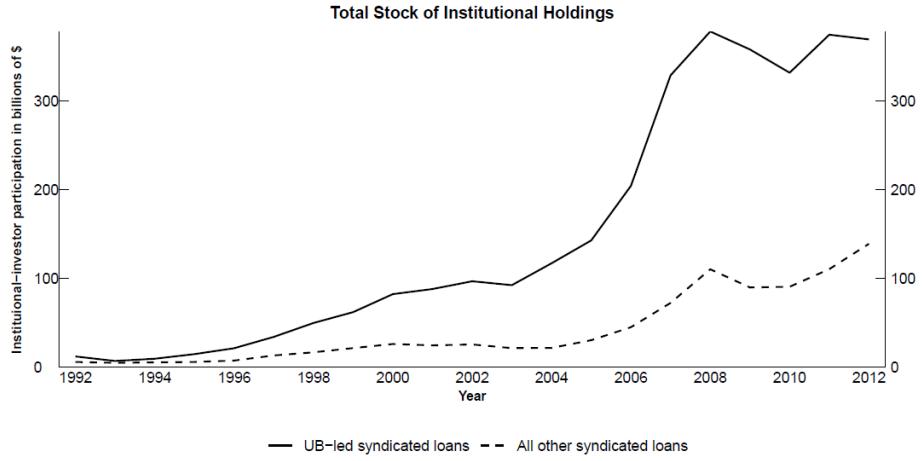
Table 1 presents summary statistics for both levels of analysis. In the top panel, we include summary statistics for variables employed in our loan-level (or package-level l) analysis. The average lead share per institution is somewhat smaller than the average share retained by all lead arrangers of a given loan, reflecting the fact that the average number of lead arrangers per syndicated loan is greater than one (1.5). Out of all loans during our sample period from 1992 to 2012, 78.7% have at least one lead arranger that is a universal bank at the time of issuance.

In the bottom panel, we consider the more granular (and dynamic) loan-year by lender category level lit. As we summarize total lead or participant shares for each lender category separately, a given observation can indicate a zero share if no such lender participates in any capacity in a given loan. As such, the average values for total lead and participant shares are naturally smaller (and do not add up to 100% either) than they are in our loan-level dataset. In contrast, the summary statistics for *Arranged by universal bank*$_l$ remain roughly similar across the two levels of observation.

Figure 2: **Total Flow and Stock of Institutional Holdings of Syndicated Loans**



(a) Flow



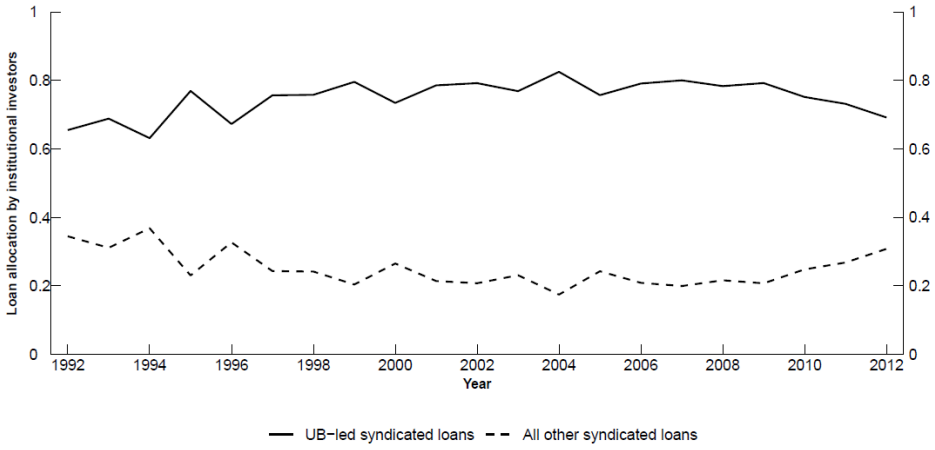
(b) Stock

Notes: The top panel plots the dollar volume of SNC loans held by institutional investors for those loans originated during each year from 1992 to 2012 by whether the syndicated loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans). The bottom panel plots the dollar volume of SNC loans held by institutional investors at year-end from 1992 to 2012 by whether the syndicated loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans).

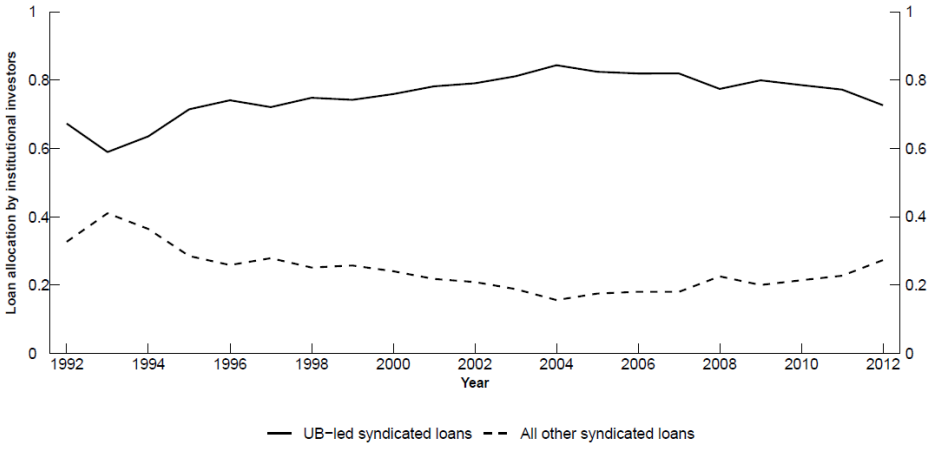
4 Results

We start with graphical evidence. The top panel of Figure 2 shows that the flow participation (in any capacity) by institutional investors in syndicated loans has been steadily increasing since the late 1990s up until the Great Financial Crisis, after which it showcases some cyclicality (Fleckenstein, Gopal, Gutiérrez, and Hillenbrand, 2021). In terms of the stock of such institutional holdings, the maximum was reached around the Great

Figure 3: **Flow and Stock of UB-led vs. Other Syndicated-loan Holdings out of Institutional Syndicated-loan Portfolio**



(a) Flow



(b) Stock

Notes: The top panel plots the share of universal bank (UB) led syndicated loans and the share of other syndicated loans in institutional investors' syndicated-loan portfolio for SNC loans originated during each year from 1992 to 2012. The shares add up to one each year. The bottom panel plots the share of universal bank (UB) led syndicated loans and the share of other syndicated loans in institutional investors' syndicated-loan portfolio for SNC loans at the end of each year from 1992 to 2012. The shares add up to one each year.

Financial Crisis in our sample (see bottom panel of Figure 2). In both instances, the trends pertain to universal bank-arranged syndicated loans rather than loans arranged by other types of financial institutions. Our empirical evidence speaks to these developments insofar as the 1996 deregulation enabled universal banks to arrange syndicated loans at smaller lead shares, thereby freeing up space for institutional investors to participate.

The share of UB-led syndicates in institutional investors' syndicated-loan portfolio is roughly stable since 1996 (see Figure 3). In conjunction with the fact that institutional-

investor participation in any syndicated loans increased during the same period, this suggests that institutional investors' *demand* for UB-led loans was constant, while the *supply* thereof increased around the 1996 deregulation.

We next turn to formal tests. To shed light on the supply-driven explanation for increased institutional participation, we estimate specification (1) at the loan level on our sample of syndicated loans, and use the time window from 1992 to 2002 around the 1996 deregulation. We start in 1992 so as to exclude the two preceding deregulatory events that relaxed universal banks' revenue limits on underwriting and, thus, cross-selling loans and non-loan products.

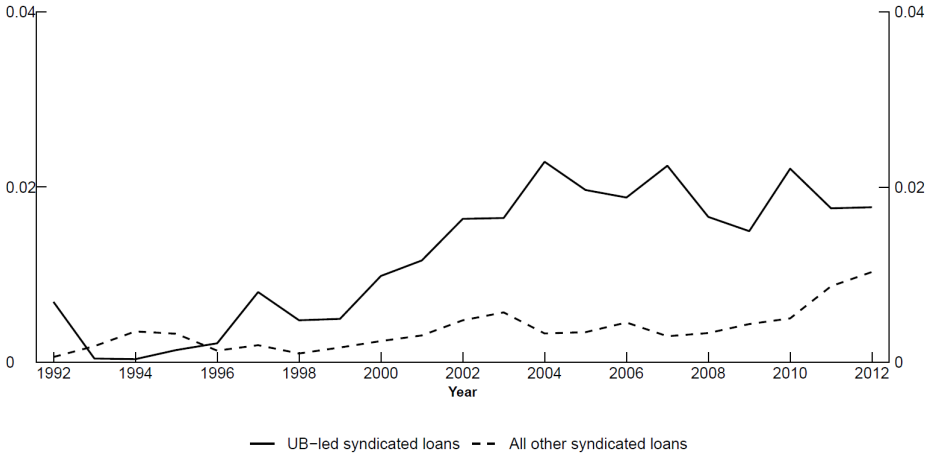
Table 2 presents the results. In line with the first part of Empirical Prediction 1, we find that loans arranged by any universal bank(s) carry a five percentage-point smaller total and average lead share after the 1996 deregulation (columns 1 and 2). These estimates hold up to including industry-year fixed effects in columns 3 and 4. Compared to sample averages, total and average lead shares in UB-led loans are lower by approximately 13.7% and 17.5%, respectively. This represents a substantial increase in loan liquidity in the aftermath of the 1996 deregulation, amounting to $388bn (in 2023 dollars) over the period 1996-2008,[8] if one assumes that this freed-up space is used entirely by non-banks.

Note that the positive coefficient on *Arranged by universal bank*$_l$ is estimated using commercial banks that chose to become a universal bank before the 1996 deregulation. As such, their taking larger shares reflects their increased lending capacity associated with their expansion in bank size and operations. Importantly, before 1996 informational firewalls are still in place, which greatly inhibit universal banks' ability to benefit from informational economies of scope by cross-selling loans and non-loan products. The effect of the latter is reflected solely by the coefficient on the interaction term, β_1 in (1), controlling for (and, thus, conditional on) all other properties of universal banks that come into existence when commercial banks decided to switch to universal banking before 1996.

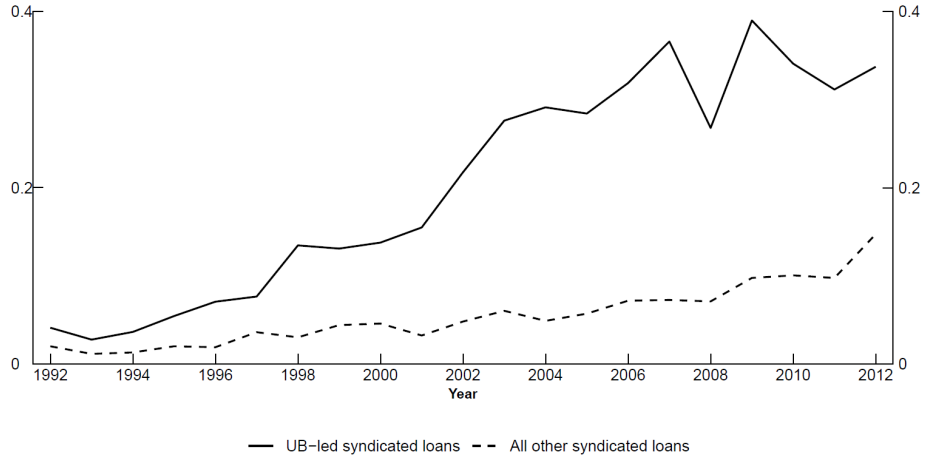
The estimated effects for total and average lead shares are relatively similar because most syndicated loans in the U.S. have only one lead arranger. This is particularly true for credit lines, which we consider in columns 1 and 2 of Table 3. For term loans, we instead find a particularly large effect on *total* lead shares (see columns 3 and 4 of the

[8]To arrive at this estimate, we multiply for each loan issued during the relevant time period the total volume with an indicator for whether any one of the lead arrangers was a universal bank and then with 5.0%, corresponding to our estimate in Table 2.

Figure 4: **Loan Shares Held by Institutional Investors by Year for All Syndicated Loans**



(a) Lead Arrangers



(b) Participants

Notes: The top panel plots the fraction of SNC loans held by institutional investors as lead arrangers of those loans originated during each year from 1992 to 2012 by whether the loans were initially arranged by at least one universal bank (UB-led) or not (all other syndicated loans). The bottom panel plots the fraction of SNC loans held by institutional investors as participants of those loans originated during each year from 1992 to 2012 by whether the loans were initially arranged by at least one universal bank (UB-led) or not (all other syndicated loans).

same table). Since the estimated effect for average lead shares is similar for credit lines and term loans, the difference in the effect on total lead shares is accounted for by the fact that term loans tend to have a higher number of lead arrangers on average. Since the overall liquidity of syndicated loans is determined by the total participant share, our findings thus indicate that term loans are the natural point of entry for institutional investors,

and particularly so after the 1996 deregulation.

The second part of Empirical Prediction 1 implies that treatment effects should be particularly large for risky and opaque firms for which monitoring costs are high ex ante. Consistent with this prediction, we find the lead share-reducing effect of universal banks to exist only for risky borrowers, as measured by the latter's six-year sales-growth volatility (see columns 1 and 2 vs. columns 3 and 4 in Table 4). For risky borrowers, UB-led syndicates see a decline in their total and average lead shares by nine to ten percentage points following the 1996 deregulation. This indicates a substantial increase in loan liquidity for the types of firms that were previously particularly difficult to syndicate.

Next, we turn to the evolution of lead and participant shares over time, which are tracked at an annual frequency in our data. Empirical Prediction 2 suggests that lead arrangers in UB-led loans may reduce their loan shares over time, thereby further increasing loan liquidity. This can occur in two ways: either by sales of lead shares to new lenders who remain lead arrangers (thus leaving lead shares unchanged at the loan level), or by sales to new lenders who act as participants (thereby reducing the overall lead share).

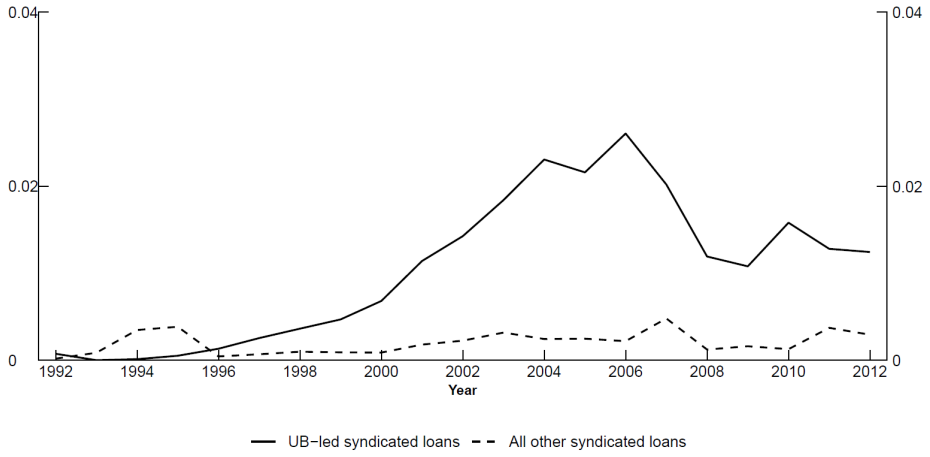
Tables 5 and 6 examine the evolution of total and average lead shares over a five-year horizon using the same regression specification as above. We estimate virtually constant difference-in-differences estimates across all five years. This indicates that the treatment effect on lead and participant shares does not vary over time. In particular, lead shares are not converted to additional participant shares over time.

This leaves the possibility that lead shares themselves become more liquid when the loan is originated by a universal-bank lead arranger. Figure 4 shows that institutional investors enter UB-led syndicates both as lead arrangers and participants, though the share as lead arrangers is quite small.

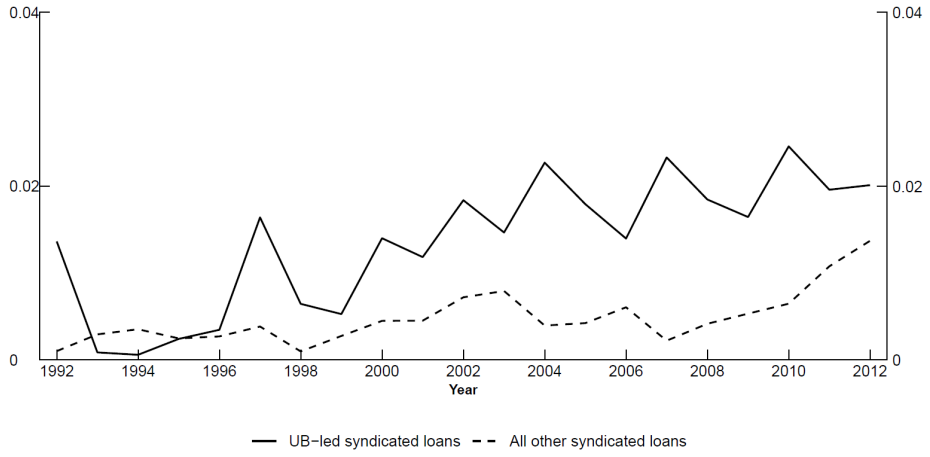
To investigate this further, we estimate (2) at the granular loan-year by lender category level. In these regressions, we can control for time-varying unobserved heterogeneity at the loan level, subsuming any developments that may affect all lenders in a syndicated loan equally, including borrower-level shocks and loan quality (Irani and Meisenzahl, 2017). We also control for lender category by year fixed effects. This rules out that our results are driven by unobserved shocks affecting all investments by a given lender.

In Table 7, we test whether institutional investors purchase lead shares in initially

Figure 5: **Lead Shares Held by Institutional Investors by Year**



(a) Syndicated Revolvers

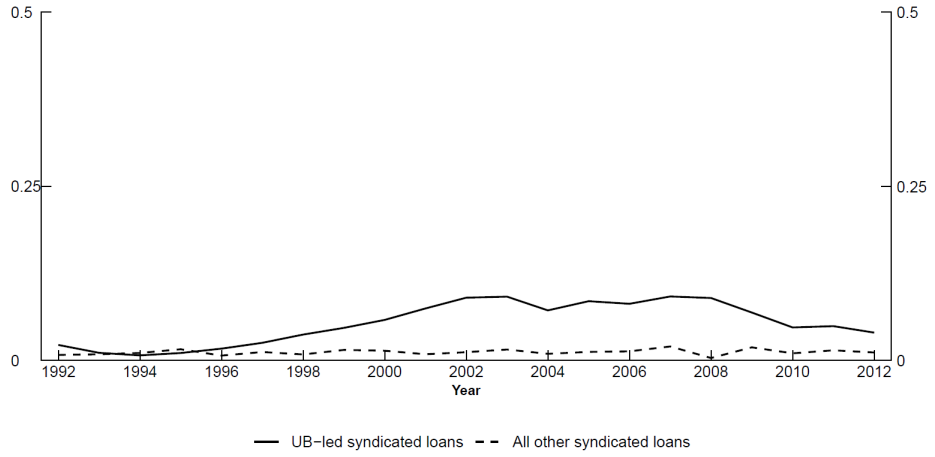


(b) Syndicated Term Loans

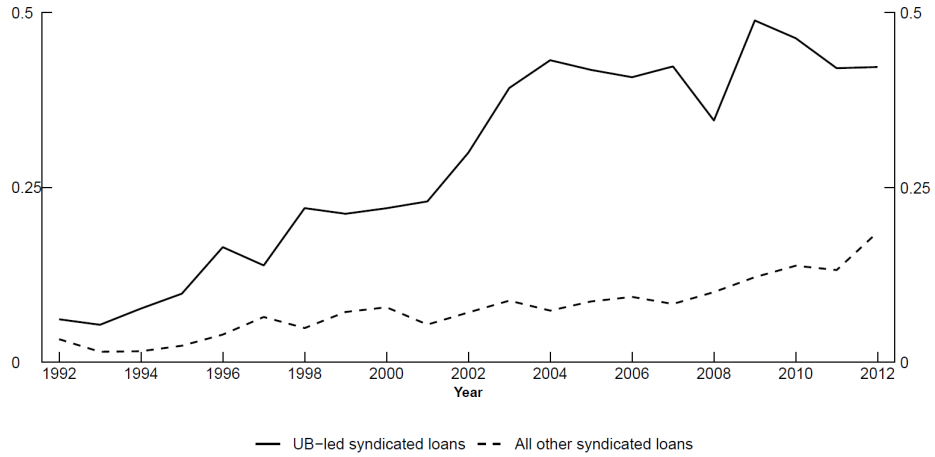
Notes: The top panel plots the fraction of SNC revolver loans held by institutional investors as lead arrangers of those loans originated during each year from 1992 to 2012 by whether the loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans). The bottom panel plots the fraction of SNC term loans held by institutional investors as lead arrangers of those loans originated during each year from 1992 to 2012 by whether the loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans).

UB-led loans over time. We find that institutional investors join as lead arrangers later during the loan's run-time, with a non-negligible intensity at almost one percentage point for each year after loan issuance, as reflected by the coefficient on the triple interaction in column 1. That is, the share arranged by universal banks drops over time, allowing institutional investors to step in as lead arrangers. This is in line with the phenomenon that lead arrangers at times sell their shares in the secondary market (Blickle, Fleckenstein,

Figure 6: **Participant Shares Held by Institutional Investors by Year**



(a) Syndicated Revolvers



(b) Syndicated Term Loans

Notes: The top panel plots the fraction of SNC revolver loans held by institutional investors as participants of those loans originated during each year from 1992 to 2012 by whether the loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans). The bottom panel plots the fraction of SNC term loans held by institutional investors as participants of those loans originated during each year from 1992 to 2012 by whether the loans were arranged by at least one universal bank (UB-led) or not (all other syndicated loans).

Hillenbrand, and Saunders, 2021), which we complement by pointing out that the deregulation of bank scope enables institutional investors, and not just other banks, to purchase them as well.

Empirical Prediction 3 further suggests that the loan type (term loan or credit line) is an important determinant of whether institutional investors enter a syndicate as lead arrangers or participants. Figures 5 and 6 show that institutional investors enter syn-

dicates initially arranged by universal banks as lead arrangers slightly more for credit lines (though the shares are very small), and as participants predominantly more for term loans. In line with the graphical evidence, the coefficient on the triple interaction in Table 7 is larger for credit lines than for term loans (columns 2 and 3), and for riskier borrowers (columns 4 and 5). The latter reflects our conjecture in Section 2.1 that observing firms that borrow from universal-bank lead arrangers reduces asymmetric information over time especially for credit lines with firms' observable draw-down behavior. This is especially valuable if the borrower is risky (as I_m^{**} is decreasing in Δc at a greater rate for higher levels of p_L in our model).

In Table 8, we then consider participant instead of lead shares. The coefficient on the triple interaction in column 1 indicates that the total participant share, i.e., the sum of all participant shares, in UB-led loans held by institutional investors does not increase much over time. At a rate of 0.56 percentage points per year, one would require a run-time of nine years to match the reduction in the lead share (of 5 percentage points) in Table 2 where we, however, do not control for borrowers' demand as we do in Table 8 by including loan by year fixed effects.

This estimate lends support to the idea that if institutional investors step in as participants, they tend to do so shortly after the initial syndication process (Lee, Li, Meisenzahl, and Sicilian, 2019). In line with our Empirical Prediction 3, this is different for term loans (column 3), where institutional investors tend to hold larger participant shares in UB-led loans over time than is the case for credit lines (column 2). We also find a stronger, albeit borderline insignificant, effect for risky borrowers (columns 4 and 5).

Using these more conservative estimates, and accounting for the possibility that institutional investors may not only enter syndicated loans as participants but can also take over as lead arrangers, we assess bank-scope deregulation to have generated additional liquidity amounting to at least $119bn (in 2023 dollars) over the period 1996-2008. This figure incorporates the average time of entry by institutional investors, assuming that it is uniformly distributed over the run-time of the loan.[9]

[9] In particular, we multiply for each loan issued during the relevant time period the total volume with an indicator for whether any one of the lead arrangers was a universal bank, with 1.48%, which corresponds to the sum of the two coefficients in the first column of Tables 7 and 8, and finally with the maximum run-time of a given loan in the data divided by two.

5 Conclusion

Banking deregulation in the form of the repeal of the Glass-Steagall Act was instrumental in driving the growth of non-bank lenders in the market for corporate credit. The formation of universal banks created economies of scope in bank lending that allowed passive investors to buy larger loan shares without compromising loan quality. Our findings complement the conventional view that the rise of non-bank lenders was driven by regulatory arbitrage due to tight banking regulations. More broadly, our results indicate that regulation shapes the industrial organization of lending markets in complex ways, so that the tightness of regulation is not a sufficient statistic for predicting the migration of specific activities to the non-bank sector. Thus, our findings offer important insights for the design for systemic policies.

References

ALDASORO, I., S. DOERR, AND H. ZHOU (2022): "Non-bank Lending During Financial Crises," *BIS Working Paper*.

ARAMONTE, S., S. J. LEE, AND V. STEBUNOVS (2022): "Risk Taking and Low Longer-Term Interest Rates: Evidence from the U.S. Syndicated Term Loan Market," *Journal of Banking & Finance*, 138, 105511.

BECKER, B., M. M. OPP, AND F. SAIDI (2022): "Regulatory Forbearance in the U.S. Insurance Industry: The Effects of Removing Capital Requirements for an Asset Class," *Review of Financial Studies*, 35(12), 5438–5482.

BEGENAU, J., AND T. LANDVOIGT (2022): "Financial Regulation in a Quantitative Model of the Modern Banking System," *Review of Economic Studies*, 89(4), 1748–1784.

BERLIN, M., G. NINI, AND E. G. YU (2020): "Concentration of Control Rights in Leveraged Loan Syndicates," *Journal of Financial Economics*, 137(1), 249–271.

BEYHAGHI, M., C. NGUYEN, AND J. K. WALD (2019): "Institutional Investors and Loan Dynamics: Evidence from Loan Renegotiations," *Journal of Corporate Finance*, 56, 482–505.

BLICKLE, K., Q. FLECKENSTEIN, S. HILLENBRAND, AND A. SAUNDERS (2021): "The Myth of the Lead Arranger's Share," *NYU Stern Working Paper*.

BOTSCH, M., AND V. VANASCO (2019): "Learning by Lending," *Journal of Financial Intermediation*, 37, 1–14.

BRUCHE, M., F. MALHERBE, AND R. R. MEISENZAHL (2020): "Pipeline Risk in Leveraged Loan Syndication," *Review of Financial Studies*, 33(12), 5660–5705.

BUCHAK, G., G. MATVOS, T. PISKORSKI, AND A. SERU (2018): "Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks," *Journal of Financial Economics*, 130(3), 453–483.

——— (2022): "Beyond the Balance Sheet Model of Banking: Implications for Bank Regulation and Monetary Policy," *Journal of Political Economy*, forthcoming.

CALEM, P., R. CORREA, AND S. J. LEE (2020): "Prudential Policies and their Impact on Credit in the United States," *Journal of Financial Intermediation*, 42, 100826.

CHERNENKO, S., I. EREL, AND R. PRILMEIER (2022): "Why Do Firms Borrow Directly from Nonbanks?," *Review of Financial Studies*, forthcoming.

COHEN, G. J., J. DICE, M. FRIEDRICHS, K. GUPTA, W. HAYES, I. KITSCHELT, S. J. LEE, W. B. MARSH, N. MISLANG, M. SHATON, M. SICILIAN, AND C. WEBSTER (2021): "The U.S. Syndicated Loan Market: Matching Data," *Journal of Financial Research*, 44(4), 695–723.

DRUCKER, S., AND M. PURI (2005): "On the Benefits of Concurrent Lending and Underwriting," *Journal of Finance*, 60(6), 2763–2799.

FLECKENSTEIN, Q., M. GOPAL, G. GUTIÉRREZ, AND S. HILLENBRAND (2021): "Nonbank Lending and Credit Cyclicality," *NYU Stern Working Paper*.

GANDE, A., M. PURI, A. SAUNDERS, AND I. WALTER (1997): "Bank Underwriting of Debt Securities: Modern Evidence," *Review of Financial Studies*, 10(4), 1175–1202.

GORTON, G., AND A. METRICK (2013): "Securitization," in *Handbook of the Economics of Finance*, ed. by G. Constantinides, M. Harris, and R. Stulz, vol. 2A of *Handbooks in Economics*, pp. 1–70. Elsevier.

GRYGLEWICZ, S., S. MAYER, AND E. MORELLEC (2022): "Screening and Monitoring of Corporate Loans," *Swiss Finance Institute Research Paper No. 21-82*.

GUSTAFSON, M. T., I. T. IVANOV, AND R. R. MEISENZAHL (2021): "Bank Monitoring: Evidence from Syndicated Loans," *Journal of Financial Economics*, 139(2), 452–477.

HOLMSTRÖM, B., AND J. TIROLE (1997): "Financial Intermediation, Loanable Funds, and the Real Sector," *Quarterly Journal of Economics*, 112(3), 663–691.

HU, Y., AND F. VARAS (2022): "Intermediary Financing without Commitment," *UNC Working Paper*.

IRANI, R. M., R. IYER, R. R. MEISENZAHL, AND J.-L. PEYDRÓ (2021): "The Rise of Shadow Banking: Evidence from Capital Regulation," *Review of Financial Studies*, 34(5), 2181–2235.

IRANI, R. M., AND R. R. MEISENZAHL (2017): "Loan Sales and Bank Liquidity Management: Evidence from a U.S. Credit Register," *Review of Financial Studies*, 30(10), 3455–3501.

IVASHINA, V. (2009): "Asymmetric Information Effects on Loan Spreads," *Journal of Financial Economics*, 92(2), 300–319.

IVASHINA, V., AND Z. SUN (2011): "Institutional Demand Pressure and the Cost of Corporate Loans," *Journal of Financial Economics*, 99(3), 500–522.

JIANG, E. X. (2023): "Financing Competitors: Shadow Banks' Funding and Mortgage Market Competition," *Review of Financial Studies*, forthcoming.

LEE, S. J., D. LI, R. R. MEISENZAHL, AND M. J. SICILIAN (2019): "The U.S. Syndicated Term Loan Market: Who Holds What and When?," *FEDS Notes*.

NADAULD, T. D., AND M. S. WEISBACH (2012): "Did Securitization Affect the Cost of Corporate Debt?," *Journal of Financial Economics*, 105(2), 332–352.

NEUHANN, D., AND F. SAIDI (2018): "Do Universal Banks Finance Riskier But More Productive Firms?," *Journal of Financial Economics*, 128(1), 66–85.

PURI, M. (1996): "Commercial Banks in Investment Banking: Conflict of Interest or Certification Role?," *Journal of Financial Economics*, 40(3), 373–401.

SANTOS, J. A. C., AND P. SHAO (2018): "Loan Ownership and Liquidity in the Secondary Loan Market," *Federal Reserve Bank of New York Working Paper*.

SUFI, A. (2007): "Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans," *Journal of Finance*, 62(2), 629–668.

Tables

Table 1: **Summary Statistics**

Package level	Mean	Std. dev.	5^{th} pctl	95^{th} pctl	*N*
Total lead share (in %)	37.102	27.122	4.256	92.5	28,830
Average lead share (in %)	26.617	18.454	4.245	62.5	28,830
Number leads	1.506	1.096	1	4	28,830
Arranged by universal bank	0.787	0.410	0	1	28,830
Loan-year by lender category level	Mean	Std. dev.	Min	Max	N
Participant share (in %)	21.017	22.874	0	66.665	417,096
Lead share (in %)	13.812	21.367	0	60	417,096
Arranged by universal bank	0.702	0.457	0	1	417,096

The top panel presents summary statistics at the package level; the variables correspond to those employed in Tables 2 to 6. The bottom panel presents summary statistics at the loan-year by lender category level; the variables correspond to those employed in Tables 7 and 8.

Table 2: **Effect of Universal-bank Deregulation on Lead Arrangers—Package Level**

	Total lead share	Avg. lead share	Total lead share	Avg. lead share
Arranged by universal bank	-5.087***	-4.663***	-5.011***	-4.502***
× After(1996)	(1.376)	(1.351)	(1.317)	(1.297)
Arranged by universal bank	10.476***	7.123***	10.041***	6.684***
	(1.335)	(1.429)	(1.296)	(1.371)
Lead-arranger FE	Y	Y	Y	Y
Industry-year FE	N	N	Y	Y
N	28,830	28,830	28,830	28,830
Adjusted R^2	0.48	0.20	0.49	0.22

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2002. Observations are at the package level, corresponding to loan l issued at date t. The dependent variable in columns 1 and 3 is the total share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. The dependent variable in columns 2 and 4 is the average share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $After(1996)_t$ is an indicator for whether the loan in question was issued after 1996. Lead-arranger fixed effects indicate the inclusion of bank fixed effects for all lead arrangers at the package level. Industry-year fixed effects are based on two-digit NAICS codes of borrower firms. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 3: **Effect of Universal-bank Deregulation on Lead Arrangers: Credit Lines vs. Term Loans—Package Level**

Sample	Total lead share Credit lines	Avg. lead share Credit lines	Total lead share Term loans	Avg. lead share Term loans
Arranged by universal bank	-4.310***	-4.417***	-6.472***	-4.630***
× After(1996)	(1.253)	(1.278)	(1.919)	(1.780)
Arranged by universal bank	10.200***	6.565***	9.555***	7.313***
	(1.333)	(1.417)	(1.832)	(1.728)
Lead-arranger FE	Y	Y	Y	Y
Industry-year FE	Y	Y	Y	Y
N	18,233	18,233	10,597	10,597
Adjusted R^2	0.52	0.21	0.48	0.26

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2002. Observations are at the package level, corresponding to loan l issued at date t. In the first two columns, the sample is limited to syndicated loans that are classified as credit lines throughout their entire run-time. In the last two columns, the sample is limited to syndicated loans that are classified as term loans throughout their entire run-time. The dependent variable in columns 1 and 3 is the total share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. The dependent variable in columns 2 and 4 is the average share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $After(1996)_t$ is an indicator for whether the loan in question was issued after 1996. Lead-arranger fixed effects indicate the inclusion of bank fixed effects for all lead arrangers at the package level. Industry-year fixed effects are based on two-digit NAICS codes of borrower firms. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 4: **Effect of Universal-bank Deregulation on Lead Arrangers: Risky vs. Safe Borrowers—Package Level**

Sample	Total lead share High volatility	Avg. lead share High volatility	Total lead share Low volatility	Avg. lead share Low volatility
Arranged by universal bank	-9.815***	-9.119***	1.068	1.418
× After(1996)	(3.165)	(2.734)	(2.574)	(1.972)
Arranged by universal bank	10.421***	9.073***	7.311*	5.018*
	(3.202)	(2.712)	(3.735)	(2.857)
Lead-arranger FE	Y	Y	Y	Y
Industry-year FE	Y	Y	Y	Y
N	1,833	1,833	1,540	1,540
Adjusted R^2	0.61	0.28	0.60	0.20

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2002. Observations are at the package level, corresponding to loan l issued at date t. In the first two columns, the sample is limited to the top quarter of firms in terms of their six-year sales-growth volatility from $t-6$ to $t-1$. In the last two columns, the sample is limited to the bottom quarter of firms in terms of their six-year sales-growth volatility from $t-6$ to $t-1$. The dependent variable in columns 1 and 3 is the total share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. The dependent variable in columns 2 and 4 is the average share (in %) of the loan retained by all lead arrangers, and is defined between 0 and 100. *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $After(1996)_t$ is an indicator for whether the loan in question was issued after 1996. Lead-arranger fixed effects indicate the inclusion of bank fixed effects for all lead arrangers at the package level. Industry-year fixed effects are based on two-digit NAICS codes of borrower firms. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 5: **Effect of Universal-bank Deregulation on Total Lead Shares: Dynamic Effects—Package Level**

	1 year	2 years	3 years	4 years	5 years
Arranged by universal bank × After(1996)	-4.996***	-4.945***	-4.892***	-4.867***	-4.863***
	(1.298)	(1.279)	(1.279)	(1.275)	(1.277)
Arranged by universal bank	9.758***	9.563***	9.441***	9.421***	9.412***
	(1.309)	(1.301)	(1.298)	(1.293)	(1.291)
Lead-arranger FE	Y	Y	Y	Y	Y
Industry-year FE	Y	Y	Y	Y	Y
N	28,830	28,830	28,830	28,830	28,830
Adjusted R^2	0.49	0.48	0.48	0.48	0.48

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2002. Observations are at the package level, corresponding to loan l issued at date t. The dependent variable is the total share (in %) of the loan retained by all lead arrangers, defined between 0 and 100, and is measured one to five years after loan issuance (across columns). *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $After(1996)_t$ is an indicator for whether the loan in question was issued after 1996. Lead-arranger fixed effects indicate the inclusion of bank fixed effects for all lead arrangers at the package level. Industry-year fixed effects are based on two-digit NAICS codes of borrower firms. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 6: **Effect of Universal-bank Deregulation on Average Lead Shares: Dynamic Effects—Package Level**

	1 year	2 years	3 years	4 years	5 years
Arranged by universal bank × After(1996)	-4.520***	-4.484***	-4.481***	-4.490***	-4.500***
	(1.284)	(1.263)	(1.267)	(1.263)	(1.265)
Arranged by universal bank	6.656***	6.661***	6.641***	6.652***	6.653***
	(1.377)	(1.362)	(1.358)	(1.353)	(1.352)
Lead-arranger FE	Y	Y	Y	Y	Y
Industry-year FE	Y	Y	Y	Y	Y
N	28,830	28,830	28,830	28,830	28,830
Adjusted R^2	0.23	0.23	0.23	0.23	0.23

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2002. Observations are at the package level, corresponding to loan l issued at date t. The dependent variable is the average share (in %) of the loan retained by all lead arrangers, defined between 0 and 100, and is measured one to five years after loan issuance (across columns). *Arranged by universal bank*$_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $After(1996)_t$ is an indicator for whether the loan in question was issued after 1996. Lead-arranger fixed effects indicate the inclusion of bank fixed effects for all lead arrangers at the package level. Industry-year fixed effects are based on two-digit NAICS codes of borrower firms. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 7: **Universal Banks and Institutional-investor Lead Arrangers—Within-loan Variation over Time**

	Lead share				
Sample	All	Credit lines	Term loans	High volatility	Low volatility
Institutional investor × Arranged by universal bank× Years since issue	0.923***	1.133***	0.606**	0.487*	0.416
	(0.216)	(0.266)	(0.242)	(0.267)	(0.351)
Institutional investor × Arranged by universal bank	-1.003	-1.017	1.516	-1.402	0.116
	(2.077)	(2.302)	(1.563)	(2.150)	(2.895)
Institutional investor × Years since issue	-0.586***	-0.410*	-0.596***	-0.237	0.084
	(0.216)	(0.244)	(0.214)	(0.285)	(0.308)
Loan-year FE	Y	Y	Y	Y	Y
Lender-category-year FE	Y	Y	Y	Y	Y
N	417,096	252,732	164,364	23,271	23,271
Adjusted R^2	0.08	0.15	0.02	0.19	0.23

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2012. Observations are at the loan-year by lender category level lit, corresponding to the shares of loan l held by three types of lenders i, namely universal banks, other banks, and institutional investors (or non-banks), in year t. In columns 2 and 3, the sample is limited to loans classified as credit lines and term loans, respectively, in year t. In columns 4 and 5, the sample is limited to the top and bottom quarters, respectively, of firms in terms of their six-year sales-growth volatility from $t-6$ to $t-1$. The dependent variable is the total share (in %) of loan l retained by lead arrangers in lender category i in year t, and is defined between 0 and 100. $Institutional\ investor_i$ is an indicator variable for loan shares held by institutional investors, as opposed to the remaining two categories of lenders (universal and non-universal banks). $Arranged\ by\ universal\ bank_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $Years\ since\ issue_{lt}$ is the difference in years between t and the year in which loan l is issued. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.

Table 8: **Universal Banks and Institutional-investor Participants—Within-loan Variation over Time**

		Participant share			
Sample	All	Credit lines	Term loans	High volatility	Low volatility
Institutional investor × Arranged by universal bank × Years since issue	0.555*	0.368	1.538***	1.255	-0.028
	(0.333)	(0.310)	(0.563)	(0.861)	(0.509)
Institutional investor × Arranged by universal bank	-3.760**	-1.733	1.682	-2.571	-5.342
	(1.859)	(1.973)	(3.166)	(3.324)	(4.035)
Institutional investor × Years since issue	-2.219***	-1.503***	-2.410***	-2.303***	-1.670***
	(0.190)	(0.156)	(0.286)	(0.350)	(0.439)
Loan-year FE	Y	Y	Y	Y	Y
Lender-category-year FE	Y	Y	Y	Y	Y
N	417,096	252,732	164,364	23,271	23,271
Adjusted R^2	0.03	0.29	-0.12	0.04	0.15

The sample consists of syndicated loans granted to U.S. firms anytime from 1992 to 2012. Observations are at the loan-year by lender category level lit, corresponding to the shares of loan l held by three types of lenders i, namely universal banks, other banks, and institutional investors (or non-banks), in year t. In columns 2 and 3, the sample is limited to loans classified as credit lines and term loans, respectively, in year t. In columns 4 and 5, the sample is limited to the top and bottom quarters, respectively, of firms in terms of their six-year sales-growth volatility from $t-6$ to $t-1$. The dependent variable is the total share (in %) of loan l retained by participants in lender category i in year t, and is defined between 0 and 100. $Institutional\ investor_i$ is an indicator variable for loan shares held by institutional investors, as opposed to the remaining two categories of lenders (universal and non-universal banks). $Arranged\ by\ universal\ bank_l$ is an indicator variable for whether any one of the lead arrangers is a universal bank at the time of issuance. $Years\ since\ issue_{lt}$ is the difference in years between t and the year in which loan l is issued. Robust standard errors (clustered at the level of all lead arrangers) are in parentheses.