Bank Enforcement Actions as Reputation Devices: Theory and Evidence from the Structure of Loan Syndicates

Manthos D. Delis
Surrey Business School, University of Surrey
m.delis@surrey.ac.uk

Maria Iosifidi
Surrey Business School, University of Surrey
m.iosifidi@surrey.ac.uk

Sotirios Kokas
Essex Business School, University of Essex
skokas@essex.ac.uk

Steven Ongena
Department of Banking and Finance, University of Zurich, CH-8032, Zurich
Email: steven.ongena@bf.uzh.ch

Dimitrios Xefteris
Department of Economics, University of Cyprus
xefteris.dimitrios@ucy.ac.cy

We are grateful to Franklin Allen, Thorsten Beck, Tobias Berg, Bruno Biais, Charles Calomiris, Barbara Casu, Stijn Claessens, Jens Hagendorff, Iftekhar Hasan, Vasso Ioannidou, Kose John, Alex Michaelides, Philip Molyneux, Alan Morrison, Andrea Polo, Anthony Saunders, Joel Shapiro, Panagiotis Staikouras, Amir Sufi, John Thanassoulis, Chris Tsoumas, Francesco Vallascas, and Paolo Volpin. We also thank conference participants at the "9th Swiss Winter Conference on Financial Intermediation (CEPR)", the "Reputation Symposium - University of Oxford", the Bank of England, the "EFiC Conference in Banking and Finance", the "15th Conference on Research on Economic Theory & Econometrics (CRETE)" and the "6th International Ioannina Meeting on Applied Economics and Finance", as well as seminar participants at the Cass Business School, Surrey Business School, Essex Business School, Exeter Business School, the Athens University of Economics and Business, the University of Cyprus, University College Dublin, and the Cyprus University of Technology.

Bank Enforcement Actions as Reputation Devices: Theory and Evidence from the Structure of Loan Syndicates

WORK IN PROGRESS - DO NOT CIRCULATE
June 2, 2017

Abstract

A regulatory enforcement action on banks for non-compliance with laws and regulations has an adverse reputational effect that potentially disincentivizes syndicate participants from co-financing the loan. We formally argue that in such cases, the lead arranger must increase his share of the loan in order to make the loan sufficiently attractive to potential participants. We provide strong empirical evidence to support our theoretical argument, using hand-collected syndicated loan-level data and a sample of enforcement actions enacted from 2001 through 2010 on U.S. lead-syndicate lenders. These effects can be offset or lessened by including loan guarantees, performance pricing provisions, and covenants.

JEL classification: D82; G21; G28

Keywords: Syndicated loan market; Syndicate structure; Reputation of lead arranger; Enforcement actions; Incomplete and asymmetric information; Loan-level data

I. Introduction

What effect do regulatory enforcement actions, enacted for breaches of laws and regulations, have on the punished entities' reputation? Our study is the first to address this question and does so using a novel theoretical framework and data from the banking sector and the syndicated loan market. In this market, a number of banks—namely, the lead (principal) arranger (lender) and the participants—form a syndicate to provide large corporate loans that a single bank cannot (or is unwilling to) finance alone. Regulatory enforcement actions enacted on lead arrangers potentially impose an important reputational burden on these banks in their relationship with participant banks. Evidence from this burden would come from a significant change in the loan syndicate structure, whereby the punished lead arranger is forced to retain a considerably larger share of the syndicated loan.

A formal theory of the reputational burden that enforcement actions have on punished banks is lacking in the literature. We thus begin by building a formal argument that links syndicate designer's reputation to syndicate structure. Our setup includes three players: the lead arranger, the participant bank, and the borrowing firm. The interesting case occurs when the lead arranger and the participant decide to finance the firm's project. After this decision, the lead arranger also decides how much costly monitoring effort to input. The participant has no way to observe the monitoring effort exerted by the lead arranger, implying incomplete information. We first show that, all else constant, the principal arranger's optimal monitoring effort, and subsequently the project's success, strictly increase with the lead arranger's participation share. This relationship is quite intuitive, because a larger participation share makes a lead arranger care more about the project's prospects and, hence, induces the lead arranger to invest more effort in its success.

Importantly, a regulator audits the lead arranger and reveals a signal based on the lead arranger's compliance with regulatory law on the books (Ioannidou, 2005; Nguyen et al.,

2016; Delis et al., 2016). This signal relates to the presence, or absence, of an enforcement action, which becomes publicly available information. We consider that the participant bank bears a reputational risk by joining a syndicate designed by a punished lead arranger. According to the Office of the Comptroller of the Currency (OCC) reputational risk is "the current and prospective risk to earnings or capital arising from negative public opinion." In the context of this definition, reputational risk should be proportional to the amount of the syndicated loan that is covered by the participant: the exposure of a participant to the threats that the lead arranger faces is increasing in the amount of the syndicated loan financed by the participant.

A punished lead arranger thus needs to further incentivize participant banks to co-finance the project. To do so, the lead arranger must hold a larger share of the loan compared to the participants, essentially committing the arranger to a great deal of monitoring effort and, thus, to increasing the project's success potential. Our solution to the game is a perfect Bayesian equilibrium, the comparative statics of which, with respect to the reputation component, suggest that an increase in reputational risk induces an increase in the lead arranger's equilibrium participation share in the syndicate. By doing that, the lead-arranger provides incentives to herself to exert extra monitoring effort and thus to improve the success potential of the project. This informal, but nonetheless credible, commitment compensates the syndicate participants for the reputational risk that they undertake by collaborating with a punished bank and allow for the formation of the syndicate.

We empirically examine the validity of this theoretical argument using data from three different sources. Specifically, we use data on all U.S. syndicated loans (the unit of our analysis) available in DealScan, information on enforcement actions enacted on lead lenders from a hand-collected dataset by Delis et al. (2016), and match these using identification codes on banks from the Call Reports. We stress that these enforcement actions are quite

important penalties, enacted purely for safety and soundness reasons and thus are fairly homogeneous events. Our data set spans the period 1997 through 2014 to allow a window around enforcement actions enacted during the years 2001-2010.

Our empirical model aims to establish causality running from the enforcement action to the structure of the syndicated loan. Our main explanatory variable is a dummy that takes the value one for loans originated by punished banks after the enforcement action, zero for the loans originated by punished banks in the years prior to the enforcement action and in the year of the enforcement action, and also zero for loans originated by non-punished banks. More closely related to our theoretical model, we use as dependent variable the lead arranger's share of the loan. In alternative specifications, we also use as dependent variables a Herfindahl–Hirschman index (HHI) to analyze the concentration of holdings within the syndicate and the number of lenders participating in the syndicate.

Our main identification method accounts for potential unobserved variables, especially bank-year and firm-year ones, that might bias our inference on the effect of the enforcement actions. Specifically, our data set comprises a cross-section of loans. Each lead arranger (including the punished ones) originates many loans, *sometimes along with other lead arranger(s)* within one year. This allows including bank*year fixed effects because the different lead arrangers in the same loan do not receive enforcement actions in the same year. Thus, we use a differences-in-differences-in-differences (DDD) exercise, where we compare the share of the punished lead bank with (i) its own share in other similar loans (given loan controls) before the enforcement action, (ii) the share of the non-punished lead bank(s) of the same loan, and (iii) the share of all other lead banks in other loans. This exercise saturates the model from alternative supply-side explanations of the findings. Further, and equally important, in multiple occasions firms borrow more than once within a year. This allows including firm*year fixed effects, which completely saturate the model from alternative

demand-side explanations of the findings. In addition, the bank*year and firm*year fixed effects fully control for common effects to all banks and firms, such as the impact of the subprime crisis.

Our baseline specification shows that an enforcement action enacted on a lead arranger increases that lender's share by approximately 2.9 percentage points, which is a 15% increase for the average punished lead lender's share in our sample. The HHI of the syndicate also increases by approximately 15% relative to the average punished bank, and the number of lenders decrease by approximately one lender. Thus, we conclude that the main effect of an enforcement action on the loan syndicate is that the participants require the punished lead arranger to retain a larger share of the loan (or equivalently the lead lender retains a larger share to convince the participant banks to participate), the syndicate structure is more concentrated, and there is a lower number of lenders. These results are aligned with the theoretical model's predictions on the reputational impact of the enforcement action and the associated increased monitoring effort required from the lead arranger by the participants.

Our results are robust to the use of subsamples and model re-specifications. One important test is to further saturate the model with bank*firm*year fixed effects. Importantly, these models simultaneously control for the time-varying supply and demand effects of our baseline specifications and for effects specific to bank-firm relationships. A second important sensitivity test is to restrict our sample only to those loans where the bank syndicate members and the borrower are the same before and after the enforcement action. This implies that our results cannot be affected by changes in the members of the syndicate, which can in turn trigger changes in residual demand- and supply-side forces that affect the structure of the syndicate. We show that our results are still highly significant even in this subsample analysis. In final robustness tests we show that the effects are quite lasting and stronger when the enforcement actions are more important.

We also show empirically that there are specific loan characteristics aiming at lower informational asymmetries that moderate the positive effect of enforcement actions on the lead lender's participation share. Evidently, the inclusion of a guarantor completely offsets the positive impact of enforcement actions on the lead lender's share, and the use of covenants and performance pricing provisions lower the impact of enforcement actions by more than half.

Our paper is related to, but also quite distinct from, at least four strands of literature.[1] Sufi (2007) empirically shows that when borrowing firms require more-intense monitoring, the lead arranger retains a larger share of the loan and forms a more concentrated syndicate. Regarding the metric most relevant to our analysis, Sufi (2007) also shows a positive effect of the lead arranger's reputation, as measured by lead arranger's market share, on the loan share held by the lead arranger. Lee and Mullineaux (2004) and Jones et al. (2005) find that syndicates are more concentrated when the quality of information on borrowing firms is low. Gatev and Strahan (2009) analyze the effect of liquidity risk on syndicated loan structure and find that risk-management considerations matter more for participants than for lead arrangers. Dennis and Mullineaux (2000) use repeated syndicate members and bank ratings as measures of reputation and examine their effect on the origination or not of a syndicated loan.

A second strand of literature analyzes the effect of enforcement actions on banks' risk and performance. The most relevant study is that of Delis et al. (2016), who document that enforcement actions only moderately reduce the risk-weighted assets and non-performing loans ratios of punished banks, with no accompanying increase in the level of regulatory capital. Ioannidou (2005) suggests that a central bank with dual mandate (monetary policy and bank supervision) alters bank supervisory behavior in terms of imposing penalties vis-à-vis supervisors without a dual mandate. Nguyen et al. (2016) show that board monitoring is

[1] We do not intend to be fully exhaustive with respect to these strands of literature and refer only to the most relevant studies for our analysis.

effective in reducing the probability that banks receive enforcement actions from regulators. Delis and Staikouras (2011) use aggregate data on the number of enforcement actions across countries and document similar results. Danisewicz et al. (2014) suggest that enforcement actions have adverse short-term effects on the macro-economy. A more dated literature (e.g., Brous and Leggett, 1996; Slovin et al., 1999) provides similar findings on the effect of enforcement actions on bank risk.

A third strand of literature concerns the setup and findings of our theoretical model within the framework of contract theory. In our model, the contract designer is the party that must exhibit the monitoring effort, and the participant contributes only part of the loan. This model thus relates to studies that analyze potentially reversed principal–agent relationships. In the standard principal–agent framework, the principal designs a contract and the agent exerts a non-verifiable effort that affects both players' payoffs (moral hazard). Hence, the principal introduces, in the contract, incentives for the agent to exert as much effort as possible. Bhattacharyya and Lafontaine (1995), Kim and Wang (1998), and Demski and Sappington (1999) refer to many cases in which the principal must exert a costly effort that affects both players' payoffs and, hence, must include in the contract clauses that provide her with the appropriate incentives in order to convince the agent that she will exert the desired level of effort. Indeed, as we show in the context of syndicated loans, these self-directed incentives of the contract designer can take a very intuitive form: The designer convinces the potential participants that she will exert the necessary monitoring effort by committing to finance a sufficiently large part of the project.

Finally, the tradeoff we establish between reputation and lead arranger shares has analogies in corporate governance literature more broadly. For example Calomiris and Carlson (2016) show that bank manager ownership is a substitute for formal corporate governance tools to ensure proper effort by the manager. In general, bank managers who have

large stakes in their banks' performance could exert greater effort in managing risk to preserve their own financial wealth (Demsetz et al., 1997; Laeven and Levine, 2009). Thus, the analysis conducted here for lead lender shares has a broad theoretical basis that goes back to at least Holmstrom and Tirole (1997).

Beyond the important element that this study is the first to provide an explicit theoretical framework for the role of reputation in the syndicated loan structure, it also differs from the foregoing research because we focus on the reputational effects of enforcement actions. Notably, analyses of the role of regulatory actions for the reputation of banks (as in our paper) but also for firms in other industries are quite rare to say the least. Our paper aims to fill this gap in the literature.

The paper proceeds as follows. The next section discusses our theoretical mechanism and, based on its implications, specifies our testable hypothesis. Section III describes the empirical model and our identification method. Section IV discusses the empirical results. Section V concludes.

II. Theoretical Mechanism

In this section, we sketch our theoretical argument by adopting a narrative approach of the formation of the syndicate when the lead lenders' reputation suffers loss due to an enforcement action. A formal model for this argument is provided in Appendix I. The syndicated loan market is an excellent setup to identify this potential reputational loss because the reputation of the lead arranger is a very important decision for participant banks to invest in a loan. The main reason for this is that the principal arranger is responsible for all price setting decisions and the monitoring process of the loan, and the participant banks must trust the lead arranger to participate in the syndicate (Sufi, 2007; Ivashina, 2009).

Assuming that a principal arranger wants to partially finance a project with positive net present value using the syndicated loan market, she writes a contract determining the share of the loan financed by her and the share of the loan financed by the potential participants. The project's success positively depends on the project's inherent success potential and on the lead arranger's monitoring effort. The monitoring effort is extremely important in our case because a potential participant would like the lead arranger to exert as much monitoring effort as possible to maximize the possibility of the loan's success.

In the syndicate loan market there is no third party that can enforce the level of monitoring effort and hence the monitoring effort that the principal arranger will exert is not part of the contract and is subject to well-known informational asymmetry problems (Ivashina, 2009). This represents a possible source of moral hazard and the potential participant must form rational expectations about the monitoring effort of the lead arranger based on the available information available.

Given that a lead arranger's monitoring technology does not depend on the share of the project that she finances, it is evident that *her incentives to monitor the project are increasing in the share of the project that she finances*. Indeed, a lender is more willing to undertake costs that increase the chances that she will "get her money back" when she has contributed a large amount of money rather than when she only participated to a small extent. Leland and Pyle (1977) find that an increase in the informed party's share of ownership would signal a higher quality of the underlying project, thereby reducing the cost of asymmetric information. The effect of ownership on asymmetric information is difficult to show because ownership is endogenous. However, in our frame work, sanctions are exogenous and we can offer a special case of asymmetric information between the lead arranger and participants. This difference enables us to identify shifts in the lead's share

(ownership) that are driven by the sanctions that are exogenous to the structure of the syndicate.

In this study, we closely link the lead arranger's reputation with the regulator's signal on the lead arranger's compliance with regulatory law on the books. Specifically, if a principal arranger is found to have engaged in legal or regulatory misconduct, especially for important reasons related to financial safety and soundness, then she receives an enforcement action that is publicly announced (Delis et al., 2017). It is then natural to assume that such actions reveal that the lead arranger has certain undesired characteristics, most notably risky behavior, leading to increased moral hazard for participants. This increased moral hazard stems from the worsened reputation of the punished lead arranger. It follows that penalized lead arrangers are less appealing to potential participants compared to non-penalized lead banks.

Hence, punished lead arrangers need to compensate potential participants for these reputational costs. Theory predicts that an important way through which participant banks can be compensated is participation share. Leland and Pyle (1977) and many others henceforth, highlight that an increase in the ownership of the informed party would signal a higher quality of the underlying project thereby reducing the cost of asymmetric information. In our case, this will be more so because a higher participation share by the punished lead bank will signal higher monitoring effort. This leads to our testable hypothesis:

Hypothesis: Signed contracts designed by lead arrangers with high reputational risks, should be such that the lead arranger's participation share is larger compared with the lead arranger's participation shares in other signed contracts.

III. Empirical Model, Data, and Main Identification Strategy

A. Empirical Specification and Variables

To empirically test our hypothesis, we use the following equation:

$$S = a_f + a_1 PEL_{bt} + a_3 L_{l,t} + u_{fblt}. \quad (13)$$

In Equation (13), S represents the syndicate loan structure. L is a vector of loan characteristics used as control variables. In turn, a_f denotes a vector of fixed effects and *u* is the remainder disturbance.

The variable of main interest is *PEL (post enforcement loan)*, which is a dummy taking the value one for loans originated after the year t of the enforcement action enacted on lead bank *b* and zero for loans originated before the enforcement action and in the year of the action. *Post enforcement loan* also takes the value zero for all loans originated by lead banks that were never punished during our sample period (see also Table I, which includes definitions for all variables used in our analysis). Within this framework, we assume that the reputational effect of enforcement actions is long-lasting. Alternatively, we also experiment with empirical specifications, where *post enforcement loan* equals one for the loans originated within three, four, and five years after the year of the enforcement (and zero for all other loans). A positive value on a_1 implies that once a lead arranger is punished, the structure of a syndicated loan originated after the enforcement action changes so that the lead arranger holds a significantly larger share relative to that lead arranger before the enforcement action or a lead arranger without an enforcement action.

[Insert Table I about here]

To estimate Equation (13), we combine information from three different sources. First, we obtain data for U.S. syndicated loans from DealScan over the period 1997-2014. For the enforcement actions, we use the data set provided by Delis et al. (2016), which contains hand-collected information on formal enforcement actions between 2001 and 2010. Thus,

even for enforcement actions enacted in 2010, we have four years of data after their enactment. We use all loans (and banks) irrespective of whether the lead arrangers received an enforcement action. Finally, we match information from DealScan with banks that received enforcement actions using bank-level coding from the Call Reports.[2]

Following the literature (e.g., Sufi, 2007), we measure the syndicate loan structure with several alternative measures. First, we use the share of the loan held by the lead lender, which is the dependent variable most directly relevant to the theoretical model. A closely related variable is the Herfindahl-Hirschman index (HHI) of the syndicate, which shows the concentration of holdings within a loan syndicate. Finally, we also examine the total number of lenders participating in the syndicate to explore whether the average syndicate size decreases following an enforcement action on a lead arranger.

Enforcement actions are reported in the websites of the three main banking supervisors in the U.S.: the Federal Reserve System (Fed), the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC). All insured commercial and savings banks in the U.S. have one of the above agencies as their primary federal supervisor (Ioannidou, 2005). In general, the supervisory organization conducts a full-scope on-site examination of each insured depository institution at least once every 12 months.[3] This examination involves an audit procedure necessary to evaluate all components of the Uniform Financial Institutions Ratings Systems (UFIRS) or the CAMELS rating system assigned to each bank.[4] The findings from the on-site examinations and CAMELS

[2] This matching process allows us to identify the accounting characteristics of banks involved in the loan and to use these characteristics as control variables. We can do the same for firms, by matching our end sample with Compustat. However, as we discuss below, the inclusion of bank*year and firm*year fixed effects in our empirical model forces these variables to drop out from estimations.

[3] Different on-site audit frequencies can apply to banks that have been examined by the state authorities, to well-capitalized and well-managed small banks, to banks in operation for less than five years, and to bank holding companies depending on their size and complexity. In our sample, most of the banks are large and are under relatively uniform inspection by regulators, most of the time involving the regulators maintaining offices inside the banks' headquarters.

[4] The components of CAMELS are capital adequacy (C), asset quality (A), management (M), earnings (E), liquidity (L), and sensitivity to market risk (S).

determine whether a formal or an informal enforcement action will be enacted. Informal actions are not disclosed to the public, so information on them is private and does not contain reputational risk. Such actions mostly are voluntary commitments made by a bank's board members to correct problems and consist of commitment letters, memoranda of understanding, and approved safety and soundness plans.

When informal actions are inadequate to correct a problem, formal enforcement actions take place. These are legally enforced, more severe, and disclosed to the public. Thus, formal enforcement actions relate directly to reputational risk (Nguyen et al., 2015). Delis et al. (2016) group the formal enforcement actions according to their rationale into a number of groups, mostly reflecting the action's severity. We completely exclude enforcement actions that are not related to safety and soundness reasons so as to observe homogeneous events. We also demonstrate that our results are robust to including only those actions that very strictly relate to the financial safety and soundness of banks based on the Basel Committee Core Principles for Effective Banking Supervision (Basel, 2012) so that our events are even more homogeneous (see Table I).

We control for various loan characteristics such as the *maturity* and amount of the loan facility (Ioannidou et al., 2015). *Downgrading* is a dummy variable equal to one if the loan is downgraded and zero otherwise. In a similar fashion, we use *performance pricing*, *collateral*, and *relationship lending* (Ioannidou and Ongena, 2010), which are also dummy variables, taking a value equal to one if the loan has performance pricing provisions, is secured with collateral, and the lead arranger has made a loan to the same borrower in the past five years before the current loan, respectively, and zero otherwise. We also use loan type and loan purpose fixed effects to saturate our model from differences in syndicate structure due to loan type or purpose (for more extensive definitions, see Table I).

After cleansing our data from missing observations on the variables to be included in our analysis, we have 75,125 loan deals (loan facilities) originated by 763 lead banks.[5] From these, 74 banks received 79 enforcement actions (events) during 2001-2010.[6] The number of post-enforcement loans in our baseline specifications is 15,885. The vast majority of the banks received an enforcement action only once, while in very few cases banks received two actions more than three years apart. Thus, we anticipate that the reputation effect on the syndicate loan structure should be strong, as banks in our sample are receiving enforcement actions once (in most cases) or twice at most. Note that the number of enforcement actions is not quite relevant to the sample size of the empirical analysis because we assume (and we impose) that these are uniform events.[7] What matters, and what constitutes the unit of our analysis, are the numbers of loans pre and post enforcement.

Table II provides basic descriptive statistics for the sample of banks that received a penalty at some point during our sample period (Panel A), for the full sample of banks (Panel B), and for our dependent variables for the pre- and post-enforcement periods (Panel C). The summary statistics of Panel C are particularly interesting. They reveal a statistically significant 9.7 percentage point difference in the punished lead lender's share between the pre- and post-enforcement period, alongside a 9.2 percentage points higher HHI and a lower number of lenders (by approximately 2.7 lenders). In our empirical analysis, we aim to examine whether these effects are causal.

[5] The unit of our analysis is the loan facility and not the loan package. The difference between the two is that the loan facility refers to each individual portion of a deal, whereas the deal itself possibly (but not usually) comprises more than one loan facilities and covers the full amount of credit granted to the firm on that occasion. A loan-facility analysis is appropriate for the following reason. Loan facilities may have different starting dates, maturity, amount, and loan type. Hence, multiple loan facilities, even when in the same loan deal, are not fully dependent observations (e.g., simply adding facilities and ignoring their differences, may therefore introduce a bias in the estimates). However, all results presented in this paper are robust to a loan-package analysis.

[6] The number of enforcement actions by year is: 2001 (8 enforcement actions), 2002 (6), 2003 (7), 2004 (7), 2005 (6), 2006 (8), 2007 (5), 2008 (7), 2009 (14), 2010 (11). Thus, the number of enforcement actions is relatively evenly distributed across years, even though with some small increase in the crisis period. This is in contrast to Delis et al. (2016), who use almost the entirety of supervised U.S. banks and denote a clear concentration of enforcement actions during and shortly after the crisis period.

[7] For example, the vast majority of event studies look at the effect of one or a few homogeneous events.

[Insert Table II about here]

B. Main Econometric Identification

Our empirical model aims to test the hypothesis that an enforcement action enacted on a lead arranger hampers the lead arranger's reputation and requires him to hold a larger share of the loan. This is also equivalent to the lead arranger deciding to keep a larger share of the loan to persuade participants to co-finance the loan. In our context, we cannot imagine reasons for reverse causality, because an enforcement action is not enacted in response to the structure of a specific loan's syndicate. Identifying the causal effect of an enforcement action on syndicate structure can be impeded, however, by omitted variables that the syndicate structure of post-enforcement loans could capture erroneously. That is, specific evolving bank or firm characteristics might be correlated with both the enforcement action and, independently, with the lead bank's decision to hold a larger share of the syndicate.

Such omitted-variable bias could lead to at least three alternative explanations of the findings. First, an enforcement action could lead to lower demand for credit by firms from the punished bank and this might be especially true during the crisis. If demand drops, the lead arranger might decide to hold a larger share of the loan to either show confidence in the firm or simply because the drop in demand from other firms freed resources. Obviously, this has less to do with the lead bank's reputation within the syndicate. Second, if the less risky firms decide to leave the punished banks after the enforcement action, the punished bank will be left with the riskier firms, for which it holds a higher loan share irrespective of the action. Third, from a supply-side viewpoint, the lead bank will probably change its business model following an important enforcement action. Of course, this will probably be a change toward more prudent behavior that would usually imply taking less risk and thus less share of the

syndicate. However, other unobserved strategies might be at work, so that the changes in the business model of banks pre and post enforcement need to be accounted for.

Our dataset's structure provides a solution to these alternative explanations of our findings. First, note that banks originate many loans per year and many from these loans involve more than one lead bank. The fact that for the same loan each lead arranger might have received an enforcement action, whereas the other lead arranger(s) might have not, allows including bank*year fixed effects.[8] This creates a DDD exercise. The first differencing involves the share of the loan a lead bank holds before and after the enforcement action; the second involves the share of the *same* loan of the punished lead bank *vs.* that of the non-punished lead bank(s); and the third involves the share of the punished lead bank *vs.* the share of all other lead banks in other loans. This procedure creates an almost ideal natural experiment to completely saturate the reputation effect from other supply (punished lead bank)-side explanations of the findings.

Equally important, many firms in our sample borrow more than once within each year. This allows the inclusion of firm*year fixed effects. These fixed effects saturate the model from unobserved firm (demand) characteristics that could also render the effect of *post enforcement loan* endogenous. Further, the differences in the timing of the enactment across banks implies that the existence of a systematic omitted variable affecting both *post enforcement loan* and the structure of the syndicate is unlikely. Also, there is a number of enforcement actions before the crisis, so that the results are not solely driven by developments in this period (even though the bank*year and firm*year fixed effects must saturate the findings from crisis effects).

In even more restrictive specifications, we resort to the inclusion of firm*year*lead bank fixed effects. These fixed effects simultaneously control for the time-varying demand

[8] This is better explained with the help of an example, which we provide in Appendix II.

and time-varying supply unobserved factors discussed above, but also for unobserved factors specific to the lead bank-firm relationship that might affect our main results.[9] In a similar vein, we also conduct a test using a subsample of loans where all the syndicate members (lead banks, participant banks, and firms) are the same. In these specifications, alternative explanations of the findings, besides the reputational causal effects of enforcement actions on the lead lender's share, are indeed very difficult to think of.

IV. Empirical Results

A. Baseline Results

Table III reports our baseline results. In all three specifications, the effect of the enforcement action on various measures of syndicate structure is statistically significant at the 1% level. The results in column I show that an enforcement action increases the lead lender's share (the dependent variable most closely related to our theoretical predictions) in the syndicate by approximately 2.9 percentage points. For the punished lead lender with an average share (equal to 19.3% in our sample), this finding implies a large increase of approximately 15%. Comparing these results to the univariate analysis in Panel C of Table II, we note that 2.9 percentage points out of the 9.7 percentage points difference in *Lead lender shares* between the pre- and post-enforcement periods are attributed to the reputational effects of the enforcement action.

[Insert Table III about here]

A very similar picture appears when using as our dependent variables the HHI of the loan syndicate and the number of lenders (columns II and III of Table III, respectively). We find that an enforcement action increases the concentration of holdings within the syndicate by 2.6 percentage points or 15% for a punished lead bank with an average HHI in our sample.

[9] An alternative would be to include firm*year*syndicate fixed effects to keep the syndicate constant, but in that case the degrees of freedom are down to very low levels.

Concerning the number of lenders, we find a reduction of approximately 1.1 lenders following an enforcement action. This reduction is still statistically significant but economically smaller compared with the previous variables. Thus, although there is a decrease in the number of lenders that participate in a loan syndicate when the lead arranger receives an enforcement action, the most significant effect comes from the lead arranger taking up a larger share of the loan.

The implications of our results are completely aligned with observation 2 and our hypothesis. Specifically, once a lead arranger is punished, the structure of the syndicated loan changes so that the lead arranger holds a significantly larger share, *ceteris paribus*. Given our identification method, the main economic mechanism for this development must be that the enforcement action hurts the lead arranger's reputation, so that either the participant banks demand that the principal arranger hold a larger portion of the loan or, equivalently, the principal arranger decides to hold a larger portion of the loan to convince the participants to co-finance the project. With the larger share held by the lead bank, the participants are potentially less concerned with respect to the monitoring effort to be exerted by the lead arranger and thus the project's success. In Section B below, we empirically dig deeper into this conjecture regarding the lead arranger's monitoring effort.

Our baseline results are robust to a number of re-specifications and other robustness tests. In Table IV, we include firm*year*lead bank fixed effects (as discussed in Section III.B). The results are very similar with those of Table III: the effect of *post enforcement loan* on the *lead lender shares* (column I) and *HHI* (column II) are, if anything, economically a bit stronger, while the results on the *number of lenders* (column III) a bit weaker.

[Insert Table IV about here]

In Table V we conduct a number of additional robustness tests. We report the results only for the lead lender's share, which is our main dependent variable. First, in column I we

restrict our sample only to the observations where all the syndicate members, both banks and firms, are repeated before and after the enforcement action. In line with our discussion in Section III.B, this is a powerful test for the effect of the enforcement action on lead lender shares because the results on *post enforcement loan* cannot be attributed to a change in the synthesis of the syndicate. The results are still statistically and economically significant. Specifically, the effect of an enforcement action on the lead lender's share is 1.2 percentage points or approximately 6.4% for the average loan share of a punished lead arranger. We attribute the somewhat smaller economic effect of the results mainly to the much smaller sample.

[Insert Table V about here]

In column II we examine the effect of an enforcement action only to participant banks, in order to disentangle changes in the structure of the loan syndicates transmitted from participants to lead arrangers. This essentially is a placebo test: identifying an effect arising from the side of the participants would imply that our baseline results capture something else besides the reputation effect on the lead arranger. Evidently, the effect of *post enforcement loan* is economically small and statistically insignificant, implying that enforcement actions on participant lenders do not play a role in the structure of the loan syndicate.

In column III we examine the sensitivity of our findings when we exclude loans for leveraged buyouts (LBOs) and for mergers and acquisitions (M&As). These loans present, in principle, more complete information because the syndicate has acquired private information about the borrowing firm from prior transactions (Ivashina and Kovner, 2011). Thus, we expect that the participant banks would be even more reluctant to fully engage in loans that exclude LBOs and M&As (i.e., the participants would require higher participation shares from the lead lender compared with our baseline findings). Indeed, the coefficient estimates on *post enforcement loan* are economically more significant when we exclude loans for

LBOs and M&As, reflecting the importance of incomplete information in forming the effect of enforcement actions on loan syndicate structure.

Further, in column IV we use only the enforcement actions directly related to the guidelines of the Basel Committee Core Principles for Effective Banking Supervision (Basel, 2012), which bear a higher reputational risk on the punished bank (Delis et al., 2016; Vallascas and Hagendorff, 2013). In this respect, we do not mark as post-enforcement loans those when enforcement actions are issued on lead-bank affiliated members (e.g., bank directors and managers). Given that the latter actions are less closely related to safety and soundness, the remainder ones should have a more potent impact on the reputation of the lead arranger and, thus, a higher effect on *lead lender's share*. As the results show, this is indeed the case.

In the last three columns of Table V, we modify *post enforcement loan* by restricting the impact of the enforcement action to the first three years, four years, and five years after the penalty, respectively (see also Table I for definitions). The results show that the effect is statistically significant in all three specifications. As we move to a five year window after the events, the results become economically stronger and almost the same with our baseline specification. This shows that the effect of the enforcement action on the lead lender's share is potent in the relatively short run, but still gains momentum even in the fifth year after the penalty. We view this finding as quite important because it shows strong reputational effects of enforcement actions even in the medium term.

B. The Role of Reducing Informational Asymmetries

Banks clearly want to avoid enforcement actions, but after they occur, a lead bank in a loan syndicate must deal with its reputation and the syndicate structure. The emerging question is whether there exists a strategy that a punished lead arranger can follow (or actually follows)

to moderate the effect of the enforcement action on loan syndicate structure. An important issue in this respect is the alleviation of informational asymmetry problems among the participants, the lead arranger, and the borrower, so that the participant banks will perceive the loan as less risky. Further, there is a role of monitoring as related to Observation 1 of our model: Given the model's assumptions, the lead arranger's monitoring effort and participation share should be positively related. In a nutshell, we expect that loan characteristics related to lower informational asymmetry and increased monitoring effort (or rather, increased monitoring efficiency in the empirical sense of these characteristics) might have a moderating effect in the positive nexus between enforcement actions and the lead lender's share.

In column I of Table VI, we introduce an interaction term between *post enforcement loan* and *guarantee.* Loan guarantees, thoroughly defined in Table I, are a more enhanced form of collateral aiming at lowering a loan's riskiness in case of adverse developments for the borrower. The interaction term is negative and significant at the 1% level, and the marginal effect of *post enforcement loan* is positive and statistically insignificant. Clearly, the lead arranger can completely offset the effect of enforcement actions on his loan share by requesting a guarantee facility, indirectly passing the cost of the enforcement action to the borrower.

[Insert Table VI about here]

Similarly, we use information on (i) whether the loan has performance pricing provisions and (ii) the number of general loan covenants. These are the main characteristics in loan contracts that directly relate to loan monitoring. We thus expect that use of such loan characteristics will also lower the potency of the effect of enforcement actions. We report the respective results in columns II and III of Table VI. In both specifications, the interaction terms between *post enforcement loan* and the variables related to loan monitoring are

negative and statistically significant. Thus, our results confirm Observation 1 of our model, showing that participant banks do require enhanced monitoring activity from a punished lead arranger, which here comes in the form of performance pricing provisions and general covenants.

V. Conclusions and Extensions

With an aim to identify the reputational effect of regulatory enforcement of law on the books, we study both theoretically and empirically the role of important regulatory enforcement actions, enacted on banks for breaches of laws and regulations, on loan syndicate formation. We first study a theoretical model with three players: the principal arranger, a participant bank, and the borrowing firm. The sequence of the game leads to the possibility that the principal arranger and the participant decide to originate the loan. Importantly, we link the quality (reputational) characteristics of the principal arranger with the regulator's signal on the lead arranger's compliance with laws on the books. The participant bank uses this information to decide on its participation share. Our solution to the game is a perfect Bayesian equilibrium, the comparative statics of which with respect to the reputation component suggest that an increase in reputational risk induces an increase in the lead arranger's equilibrium participation share in the syndicate.

Subsequently, we match hand-collected data on enforcement actions with data for syndicated loans, as well as data for characteristics of the lead arrangers and the borrowing firms, and we conduct an empirical analysis to validate our theoretical findings. We show that loans originated by a principal arranger after an enforcement action have a significantly higher participation share by the lead arranger. According to our baseline specification, an enforcement action increases the lead lender's share by approximately 2.9 percentage points, a 15% increase for a punished lead lender with an average share. The empirical results are

very similar when we consider the responses of the HHI of the syndicate and the number of lenders in the syndicate.

We further empirically show that this strong effect of an enforcement action can be mitigated, by including guarantees, performance pricing provisions, and covenants in the loan contract. These decisions apparently ease participant lenders' concerns resulting from the lower informational asymmetry and higher monitoring efficiency of these loan contracts, elements that significantly reduce enforcement actions' reputational effects.

Our study opens up new avenues for research in the field of regulatory enforcement actions and/or syndicated lending. Two such avenues are particularly interesting. First, we do not explore in this paper the effect of enforcement actions on syndicated loan pricing. On one hand, enforcement actions might trigger more-competitive pricing to prevent losing business in light of reputational effects. On the other hand, the banks might pass along the cost of enforcement actions to borrowers, especially if banks have some market power in niche markets and specific industries or strong relationships with specific firms.

Second, the reasons behind enactment of enforcement actions are potentially interesting. Examining the price and non-price terms of syndicated loans for punished lead banks vis-à-vis the price and non-price terms of syndicated loans enacted on lead arrangers with similar CAMELS ratings that did not receive an enforcement action, might highlight important effects stemming from differences between regulators, networks of banks, political connections, and so on. Such a study would be constrained by the fact that regulatory decisions for enforcement actions are to some extent discretionary, which is endogenous and difficult to measure. Because we have covered a lot of ground already in this paper, we leave these ideas for future research.

REFERENCES

Agarwal, S., Lucca, D., Seru, A., Trebbi, F., 2014. Inconsistent regulators: Evidence from banking. Quarterly Journal of Economics 129, 889-938.

Ahn, S., Choi, W., 2009. The role of bank monitoring in corporate governance: Evidence from borrowers' earnings management behavior. Journal of Banking and Finance 33, 425-434.

Banerjee, A.V., Duflo, E., 2000. Reputation effects and the limits of contracting: A study of the Indian software industry. Quarterly Journal of Economics 115, 989-1017.

Basel Committee on Banking Supervision. 2012. Core Principles for Effective Banking Supervision.

Beck, T., De Jonghe, O., Schepens, G., 2013. Bank competition and stability: Cross-country heterogeneity. Journal of Financial Intermediation 22, 218-244.

Berg, T., Saunders, A., Steffen, S., 2016. The total costs of corporate borrowing in the loan market: Don't ignore the fees. Journal of Finance, forthcoming.

Bharath, S., Dahiya, S., Saunders, A., Srinivasan, A., 2011. Lending Relationships and Loan Contract Terms. Review of Financial Studies 24, 1141-1203.

Bhattacharyya, S., Lafontaine, F., 1995. Double-sided moral hazard and the nature of share contracts. RAND Journal of Economics 26, 761-781.

Brous, P., Leggett, K., 1996. Wealth effects of enforcement actions against financially distressed banks. Journal of Financial Research 19, 561-577.

Calomiris, C.W., Carlson, M., 2016. Corporate governance and risk management at unprotected banks: National banks in the 1890s. Journal of Financial Economics 119, 512-532.

Danisewicz, P., McGowan, D., Onali, E., Schaeck, K., 2014. The real effects of regulatory enforcement actions: Evidence from U.S. counties Available at SSRN: http://ssrn.com/abstract=2407646.

Delis, M.D., Staikouras, P., Tsoumas, C., 2016. Formal enforcement actions and bank behavior. Management Science, forthcoming.

Delis, M.D., Staikouras, P., 2011. Supervisory effectiveness and bank risk. Review of Finance 15, 511-543.

Demsetz, R., Saidenberg, M., Strahan, P., 1997. Agency problems and risk taking at banks. Banking Studies Department working paper. Federal Reserve Bank of New York, NY.

Demski, J.S., Sappington, D.E., 1991. Resolving double moral hazard problems with buyout agreements. The RAND Journal of Economics 22, 232-240.

Dennis, S.A., Mullineaux, D.J., 2000. Syndicated loans. Journal of Financial Intermediation 9, 404-426.

Dollinger, M.J., Golden, P.A., Saxton, T., 1997. The effect of reputation on the decision to joint venture. Strategic Management Journal 18, 127-140.

Flannery, M.J. 1998. Using market information in prudential bank supervision: A review of the U.S. Empirical Evidence. Journal of Money, Credit and Banking 30, 273-305.

Gatev, E., Strahan, P.E., 2009. Liquidity risk and syndicate structure. Journal of Financial Economics 93, 490-504.

Holmstrom, B., Tirole, J., 1997. Financial intermediation, loanable funds, and the real sector. Quarterly Journal of Economics 112, 663-691.

Ioannidou, V., 2005. Does monetary policy affect the central bank's role in bank supervision? Journal of Financial Intermediation 14, 58-85.

Ioannidou, V., Ongena, S., 2010. "Time for a Change": Loan Conditions and Bank Behavior when Firms Switch Banks. Journal of Finance 65, 1847-1877.

Ioannidou, V., Ongena, S., Peydro, J.S., 2015. Time for a Change: Loan Conditions and Bank Behavior When Firms Switch Banks. Review of Finance 19, 95-144.

Ivashina, V., Kovner, A., 2011. The private equity advantage: Leveraged buyout firms and relationship banking. Review of Financial Studies 24, 2462-2498.

Ivashina, V., Scharfstein, D., 2010. Bank lending during the financial crisis of 2008. Journal of Financial economics 97, 319-338.

Jones, J., Lang, W., Nigro, P., 2005. Agent bank behavior in bank loan syndications. Journal of Financial Research 28, 385-402.

Kang, J.K., Shivdasani, A., Yamada, T., 2000. The effect of bank relations on investment decisions: An investigation of Japanese takeover bids. Journal of Finance 55, 2197-2218.

Khalil, F., Parigi, B.M., 1998. Loan size as a commitment device. International Economic Review, 135-150.

Kim, S.K., Wang, S., 1998. Linear contracts and the double moral-hazard. Journal of Economic Theory 82, 342-378.

Laeven, L., Levine, R., 2009. Bank governance, regulation, and risk taking. Journal of Financial Economics 93, 259-275.

Lee, S.W., Mullineaux, D.J., 2004. Monitoring, financial distress, and the structure of commercial lending syndicates. Financial Management 33, 107-130.

Leland, E., Pyle, D.,1977. Information asymmetries, financial structure, and financial intermediation. Journal of Finance 32, 371–387.

Morrison, A.D., White, L., 2013. Reputational contagion and optimal regulatory forbearance. Journal of Financial Economics 110, 642-658.

Nguyen, D.D., Hagendorff, J., Eshraghi, A., 2016. Can bank boards prevent misconduct? Review of Finance 20, 1-36.

Slovin, M., Sushka, M., Polonchek, J., 1999. An analysis of contagion and competitive effects at commercial banks. Journal of Financial Economics 54, 197-225.

Sufi, A., 2007. Information asymmetry and financing arrangements: Evidence from syndicated loans. Journal of Finance 62, 629-668.

Vallascas, F., Hagendorff, J., 2013. The risk sensitivity of capital requirements: Evidence from an international sample of large banks. Review of Finance 17, 1947-1988.

Table I
Variable Definitions and Sources

Variable	Description	Source
Dependent variables:		
Lead lender shares (%)	The share of the loan held by the lead lender.	DealScan
HHI (%)	A Herfindahl–Hirschman index used as a measure of concentration of holdings within the loan syndicate. Higher values reflect higher concentration.	DealScan
Number of lenders	The total number of lenders participating in the loan syndicate.	DealScan
Main explanatory variable:		
Post enforcement loan	A dummy variable equal to one for all loans originated by a punished bank in the years after the year of the enforcement action and zero otherwise (i.e., for the loans originated from all other banks or the punished bank before the enforcement action and the year of the enforcement action). As the sample of enforcement actions spans the years 2001-2010, we extend the sample to 1997-2014 to allow time before and after all enforcement actions. The enforcement actions include all actions (penalties) enacted on lead arrangers for breaches of laws and regulations in a number of cases. These cases include laws and regulations related to the Basel Committee Core Principles for Effective Banking Supervision (i.e., capital adequacy and liquidity, asset quality, provisions and reserves, large exposures and exposures related to parties, internal control and audit systems, money laundering, bank secrecy, consumer protection, and foreign assets control). They also include breaches of the requirements concerning the fitness and propriety of banks' board members and senior management, as well as other persons closely associated with banks (institution affiliated parties).	Websites of FED, FDIC, and OCC
Post enforcement loan3	A dummy variable equal to one for the loans originated by a punished bank in the first three years after the year of the enforcement action and zero otherwise. Similar as in *Post enforcement loan.*	Websites of FED, FDIC, and OCC
Post enforcement loan4	A dummy variable equal to one for the loans originated by a punished bank in the first four years after the year of the enforcement action and zero otherwise. Similar as in *Post enforcement loan.*	Websites of FED, FDIC, and OCC
Post enforcement loan5	A dummy variable equal to one for the loans originated by a punished bank in the first five years after the year of the enforcement action and zero otherwise. Similar as in *Post enforcement loan.*	Websites of FED, FDIC, and OCC
Explanatory variables:		
Maturity	The natural logarithm of loan maturity in months.	DealScan
Facility amount	The natural logarithm of the loan (facility) amount.	DealScan
Downgrading	Dummy variable equal to one if the loan is downgraded and zero otherwise.	DealScan
Performance pricing	Dummy variable equal to one if the loan has performance pricing provisions and zero otherwise.	DealScan
Collateral	Dummy variable equal to one if the loan is secured with collateral and zero otherwise.	DealScan
Relationship lending	Dummy variable equal to one if the lead arranger lent to the same borrower in the past five years and zero otherwise.	DealScan
General covenants	The number of covenants in the loan contract.	DealScan

Guarantee	A facility backing the assumption of accountability for payment of a debt or performance of a person or entity obligation if the liable party fails to comply with expectations.	DealScan
Loan purpose	Set of dummy variables describing the loan's primary purpose.	Dealscan
Loan type	Set of dummy variables describing loan type. The most common types are lines of credit (such as Revolver/Line, 364-Day Facility, Limited Line) or term loans (term loan A, B, C, D, E) or a letter of credit or bridge loans.	Dealscan

Table II
Summary Statistics

The table reports summary statistics for the variables used in the empirical analysis. The variables are defined in Table I. Panel B reports the *t-test* obtained from the difference between the means among groups.

Panel A: Summary Statistic only for Banks with EA

					Percentile distribution		
Variables	Level	Obs.	Mean	Std. Dev.	25th	Median	75th
Lead lender shares (%)	Loan	5,406	19.319	19.856	8.333	12.500	21.277
HHI (%)	Loan	5,406	17.620	19.042	7.143	11.111	20.000
Number of lenders	Loan	5,406	11.671	10.629	5.000	9.000	15.000
Post enforcement loan	Bank	3,444	0.178	0.383	0.000	0.000	0.000
Maturity	Loan	5,404	3.766	0.636	3.584	4.094	4.094
Facility amount	Loan	5,406	5.410	1.375	4.605	5.521	6.310
Downgrading	Loan	5,406	0.282	0.450	0.000	0.000	1.000
Performance pricing	Loan	5,406	0.573	0.495	0.000	1.000	1.000
Collateral	Loan	5,406	0.491	0.500	0.000	0.000	1.000
Relationship lending	Loan	5,406	0.509	0.500	0.000	1.000	1.000
Guarantee	Loan	5,406	0.114	0.318	0.000	0.000	0.000
General covenant	Loan	5,406	3.562	3.060	0.000	3.000	6.000
Panel B: Summary Statistic for Total Banks							
Lead lender shares (%)	Loan	75,125	36.450	31.505	12.500	25.000	50.000
HHI (%)	Loan	75,125	32.951	29.808	11.111	20.000	50.000
Number of lenders	Loan	75,125	7.514	8.515	2.000	5.000	9.000
Post enforcement loan	Bank	75,125	0.070	0.256	0.000	0.000	0.000
Post enforcement loan3	Bank	75,125	0.039	0.195	0.000	0.000	0.000
Post enforcement loan4	Bank	75,125	0.044	0.205	0.000	0.000	0.000
Post enforcement loan5	Bank	75,125	0.048	0.214	0.000	0.000	0.000
Maturity	Loan	75,125	3.823	0.671	3.584	4.094	4.190
Facility amount	Loan	75,125	4.513	1.787	3.350	4.605	5.784
Downgrading	Loan	75,125	0.126	0.331	0.000	0.000	0.000
Performance pricing	Loan	75,125	0.260	0.439	0.000	0.000	1.000
Collateral	Loan	75,125	0.459	0.498	0.000	0.000	1.000
Relationship lending	Loan	75,125	0.353	0.478	0.000	0.000	1.000
Guarantee	Loan	75,125	0.057	0.231	0.000	0.000	0.000

Panel C: Summary Statistics for Banks Before and After the Enforcement Action

	Post enforcement loan=0 (A)			Post enforcement loan=1 (B)			Difference (B) – (A)
Variables	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean
Lead lender shares (%)	17.377	16.362	12.500	27.036	27.670	16.667	9.658***
HHI (%)	15.805	15.709	11.111	25.003	26.661	14.286	9.197***
Number of lenders	12.205	11.317	10.000	9.526	10.410	7.000	2.679***

Table III
Enforcement Actions and Syndicated Loan Structure: Baseline Results

The table reports coefficients and t-statistics (in brackets) from the estimation of equation (13). The dependent variable is reported in the second line of the Table and all variables are defined in Table I. Each observation in the regressions corresponds to a different loan facility. All regressions include bank*year and firm*year fixed effects and the standard errors are clustered by firm and bank, as shown in the lower part of the table. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III
Dependent variable:	Lead lender shares (%)	HHI (%)	Number of lenders
Post enforcement loan	2.910***	2.559***	-1.082***
	[3.186]	[2.888]	[-3.103]
Maturity	-2.492***	-2.150***	0.662***
	[-7.141]	[-7.442]	[6.771]
Facility amount	-0.807***	-1.134***	0.773***
	[-4.356]	[-5.877]	[6.866]
Downgrading	0.137	0.531	0.619**
	[0.111]	[0.545]	[2.420]
Performance pricing	-7.586***	-7.111***	3.214***
	[-11.953]	[-11.513]	[9.700]
Collateral	-5.361***	-3.647***	1.078***
	[-6.017]	[-5.457]	[4.117]
Relationship lending	-8.267***	-6.430***	0.620***
Observations	75,125	75,125	75,125
Adjusted R-squared	0.855	0.864	0.567
Loan-purpose FE	Yes	Yes	Yes
Loan-type FE	Yes	Yes	Yes
Firm*Year FE	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes
Clustering	Firm, Bank	Firm, Bank	Firm, Bank

Table IV
Including firm*lead bank*year fixed effects

The table reports coefficients and t-statistics (in brackets) from the estimation of equation (13). The dependent variable is reported in the second line of the Table and all variables are defined in Table I. Each observation in the regressions corresponds to a different loan facility. All regressions include firm*lead bank*year fixed effects and the standard errors are clustered by firm and bank, as shown in the lower part of the table. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III
Dependent variable:	Lead lender shares (%)	HHI (%)	Number of lenders
Post enforcement loan	3.086***	2.704***	-1.024*
	[3.305]	[3.024]	[-1.834]
Maturity	-2.194***	-1.939***	0.389***
	[-6.844]	[-6.917]	[4.711]
Facility amount	-0.860***	-1.200***	0.274***
	[-4.428]	[-5.947]	[4.027]
Downgrading	0.391	0.772	0.631
	[0.322]	[0.827]	[1.574]
Performance pricing	-7.708***	-7.295***	2.031***
	[-12.340]	[-11.990]	[4.643]
Collateral	-5.428***	-3.822***	1.424***
	[-6.255]	[-5.654]	[4.821]
Relationship lending	-8.368***	-6.252***	1.085**
	[-6.291]	[-7.875]	[2.076]
Observations	75,125	75,125	75,125
Adjusted R-squared	0.854	0.863	0.673
Loan-purpose FE	Yes	Yes	Yes
Loan-type FE	Yes	Yes	Yes
Firm*Lead Bank*Year FE	Yes	Yes	Yes
Clustering	Bank, Firm	Bank, Firm	Bank, Firm

Table V
Enforcement Actions and Syndicated Loan Structure: Sensitivity Tests

The table reports coefficients and t-statistics (in brackets) from the estimation of equation (13). The dependent variable is the *lead lender shares* and all variables are defined in Table I. Each observation in the regressions corresponds to a different loan facility. All regressions include fixed effects as noted in the lower part of the table and standard errors are clustered by firm and bank. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III	IV	V	VI	VII
	Repeated syndicate members	EA for participants	Exclude loans for LBOs and M&As	Basel-related actions only	3-year window	4-year window	5-year window
Post enforcement loan	1.212***	0.452	3.767***	3.831**			
	[3.006]	[1.153]	[6.205]	[2.257]			
Post enforcement loan3					2.258**		
					[2.037]		
Post enforcement loan4						2.120*	
						[1.908]	
Post enforcement loan5							2.877***
							[3.150]
Maturity	0.006	-0.436***	-3.237***	-2.362***	-2.492***	-2.492***	-2.492***
	[0.012]	[-2.878]	[-9.224]	[-3.004]	[-7.140]	[-7.140]	[-7.141]
Facility amount	-0.401***	0.003	-2.213***	-0.725***	-0.807***	-0.807***	-0.807***
	[-7.058]	[0.028]	[-7.769]	[-5.118]	[-4.356]	[-4.356]	[-4.356]
Downgrading	0.287	0.612*	-1.707**	-1.347	0.136	0.136	0.137
	[0.647]	[1.868]	[-2.324]	[-1.494]	[0.111]	[0.111]	[0.111]
Performance pricing	-3.153***	-2.064***	-7.283***	-7.194***	-7.584***	-7.584***	-7.585***
	[-7.647]	[-5.120]	[-10.989]	[-15.459]	[-11.949]	[-11.948]	[-11.952]
Collateral	-1.604**	-0.584	-2.920***	-2.801	-5.361***	-5.362***	-5.361***
	[-2.749]	[-0.739]	[-4.304]	[-1.635]	[-6.018]	[-6.018]	[-6.017]
Relationship lending	-1.753**	-1.767***	-2.902***	-2.401	-8.267***	-8.267***	-8.267***
	[-2.425]	[-2.868]	[-6.968]	[-1.015]	[-6.373]	[-6.372]	[-6.373]
Observations	5,605	75,125	74,883	8,954	75,125	75,125	75,125
Adjusted R-squared	0.848	0.782	0.752	0.850	0.855	0.855	0.855
Loan purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Firm, Bank	Firm, Bank	Firm, Bank	Firm, Bank	Firm, Bank	Firm, Bank	Firm, Bank

Table VI
The Role of Variables Mitigating Informational Asymmetry

The table reports coefficients and t-statistics (in brackets) from the estimation of equation (13). The dependent variable is the lead lender shares, and all variables are defined in Table I. Each observation in the regressions corresponds to a different loan facility. All regressions include bank*year and firm*year fixed effects, and the standard errors are clustered by firm and bank, as shown in the last row of the table. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III
Post enforcement loan	3.893**	4.490***	1.834***
	[2.254]	[5.095]	[3.192]
Post enforcement loan * Guarantee	-4.381***		
	[-21.230]		
Post enforcement loan * Performance pricing		-3.062***	
		[-4.386]	
Post enforcement loan * General covenants			-1.367***
			[-3.109]
Maturity	-2.355***	-2.960***	-2.526***
	[-2.997]	[-10.126]	[-7.251]
Facility amount	-0.722***	-2.405***	-0.966***
	[-4.895]	[-8.333]	[-4.632]
Downgrading	-1.388	-2.066***	0.268
	[-1.534]	[-2.969]	[0.220]
Performance pricing	-7.208***	-8.825***	-7.505***
	[-15.737]	[-16.055]	[-13.053]
Collateral	-2.860	-3.653***	-4.470***
	[-1.628]	[-4.793]	[-4.630]
Relationship lending	-2.343	-2.876***	-8.636***
	[-0.984]	[-6.814]	[-6.899]
Observations	75,125	75,125	75,125
Adjusted R-squared	0.850	0.716	0.852
Loan purpose FE	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes
Firm*Year FE	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes
Clustered standard errors	Firm, Bank	Firm, Bank	Firm, Bank

Appendix I. Reputation and Loan Syndicate Structure: A Formal Argument

In this Appendix, we formulate a theoretical argument that stresses the role of reputation of the lead arranger in the structure of a loan syndicate, with reputation emerging from a regulator's decision in whether or not to enact an enforcement action. The equilibrium outcome of our model yields the prediction of our testable hypothesis discussed in Section II.

The set of players is given by $\{B, A, P\}$, where B is the borrower (firm), A is the lead (principal) arranger (the bank that designs the contract), and P is the potential participant (the bank that is offered the contract).[10]

The borrower wants to finance a project that costs one dollar but lacks funds. Hence, he requests financing from the principal arranger. The principal arranger might want to (i) lend the borrower the entire amount, (ii) partially finance the project herself, or (iii) not finance the project at all. In the first case, she provides a loan of one dollar to the borrower. In the second, she asks another potential participant to participate in providing the borrower a syndicate loan of one dollar. In the third case, she turns down the borrower's loan application. If the loan (individual or syndicate) is approved, the lead arranger monitors the use of the borrower's funds.

The timing of the game is as follows:

Stage 1. The borrower applies for a loan of one dollar at a fixed interest rate, r, to finance a project.

Stage 2. If the principal arranger does not want to finance this project at all, the game ends here. If the principal arranger wants to finance the project (even partially), the principal arranger writes a contract (a_A, a_P) such that $a_A + a_P = 1$ and $a_i \geq 0$ for every $i \in \{A, P\}$. We use a_i to denote the participation share of player i in the loan (the share of the loan that this

[10] We assume that an arbitrary number of potential participants provides no additional intuition to our analysis and only complicates formal arguments.

player finances). Given that $a_P = 1 - a_A$, we usually refer to a loan contract only by the share held by the lead arranger.

Stage 3. The potential participant observes the contract and decides whether or not to sign it. We consider a contract approved if the potential participant signs the contract.

Stage 4. If the contract is not approved, the game ends here (no loan is given). If the contract is approved, the project is financed and the principal arranger decides how much monitoring effort to exert.

Stage 5. The returns of the project are made public information.

Stage 6. Players receive their payoffs.

The project's success is subject to uncertainty. Formally, we assume that the project's quality will be the outcome of a random draw from a uniform distribution on [0, $s(e)$], where $s(e) = s + e$.[11] Parameter $s \geq 1 + r$ can be viewed as the project's inherent success potential, and it is assumed to be common information, while $e \geq 0$ measures the lead arranger's monitoring effort. The larger the lead arranger's monitoring effort, the larger the project's success prospects. Therefore, a potential participant would like the principal arranger to exert as much monitoring effort as possible. We stress, however, that there is no third party that can enforce any level of monitoring effort, and hence the monitoring effort that the principal arranger will exert after the loan is approved cannot be part of the contract. This scenario represents a possible source of moral hazard, and the principal arranger must form rational expectations about it based on the information available to her.

If the project is financed and its quality turns out to be $\gamma \geq 1 + r$, then the payoff of the borrower is 1, the payoff of the lead arranger is $v(a_A(1 + r), a_A) - c(e)$, and the payoff of the potential participant is $v(a_P(1 + r), a_P) + a_P q_A$. In contrast, if the project quality

[11] The uniform distribution is just an auxiliary device that greatly simplifies analysis and has no substantial implication on our findings. Indeed, what is vital for our results, is that the project's success probability is increasing in the monitoring effort of the principal arranger. The precise way that one chooses to model this outcome through a distribution is essentially inconsequential as far as the main structure of the underlying incentives is concerned.

turns out to be $\gamma < 1 + r$, then the payoff of the borrower is 0, the payoff of the principal arranger is $v(0, a_A) - c(e)$, and the payoff of the potential participant is $v(0, a_P) + a_P q_A$, where $q_A \in \{-q, q\}$ for some $q > 0$. To make the analysis easier to follow, we consider that $v(x, y) = x - y^{\xi}$, where $\xi > 1$ and that $c(x) = x^2$. We stress though that all our qualitative findings are robust to more general formulations.[12]

The parameter q_A approximates the characteristics of player *A*—and it is hence known to *A*—that affect the potential participant's willingness to do business with *A*, but q_A need not be known to the potential participant. When the potential participant is unaware of the particular value of q_A, we consider that she believes that its value is $-q$ with probability ½ and q with probability ½. When there is no uncertainty, q_A takes one of the two admissible values. This parameter can be interpreted as the reputational risk of doing business with *A*.

In this study, we closely link the lead arranger's reputation with the regulator's signal on the lead arranger's compliance with regulatory law on the books. Specifically, if a principal arranger has recently been audited by the regulator and found to have engaged in legal or regulatory misconduct, then she receives an enforcement action that is publicly announced. It is then natural to assume that q_A is known and takes the value $-q$. This implies that potential participants incur costs by forming loan syndicates with principal arrangers with bad reputations (i.e., those punished by the regulator).

On the other hand, when *A* has been audited and found to comply with laws and regulations, then q_A is also known but takes the value q. This essentially implies that potential participants gain reputation by associating with principal arrangers with good reputations. Finally, when little is known regarding q_A, we can assume that the potential

[12] For example, we can replicate the analysis considering general forms of *u* and *c*—for our results to hold, it is essential that the lead arranger's expected utility is strictly concave in the size of her share and that *c* is strictly convex in effort—without adding anything to the intuition that we obtain from analyzing the current specification. However, this exercise bears considerable cost in the complexity of formal arguments.

participant assigns equal probability to any of the two eventualities, which is identical to conducting business with a principal arranger of intermediate reputation.

Overall, we consider that reputational risk is proportional to the degree of association. If the potential participant contributes a small (large) amount to a loan designed by *A*, it undertakes little (great) reputational risks associated with this loan. This relationship is the reason why we multiply q_A with a_P in the payoff of *P*.

Because this is a game of incomplete (the monitoring effort exerted by the principal arranger is unobservable) and asymmetric (the principal arranger is better informed about q_A than the potential participant) information, the natural solution concept is a perfect Bayesian equilibrium (PBE). For a proper characterization of such an equilibrium, one should identify a profile of players' strategies along with a consistent system of beliefs such that Bayes' rule is applied whenever possible. To investigate how a PBE should look like in this framework, we start by focusing on the fourth stage of the game.

After a contract (a_A, a_P) is approved in stage 3, the last decision of the game occurs in stage 4: The principal arranger decides how much monitoring effort to exert. Given our assumptions, therefore, at this stage the principal arranger solves the following problem:

$$max_{e\geq 0}\left\{\int_{1+r}^{s+e}\left[\frac{1}{s+e}(1+r)a_A\right]d\gamma - a_A^{\xi} - e^2\right\}. \quad (1)$$

Equation (1) simply amounts to the lead arranger deciding $e \geq 0$ in order to maximize her expected payoff, given that the contract (a_A, a_P) was approved. Simple algebra establishes that, for any positive participation share on behalf of the principal arranger, $a_A > 0$, there exists a unique interior solution $e^* > 0$, which is characterized by

$$2e^*(e^* + s)^2 = a_A(1+r)^2 \quad (2)$$

and it is such that:

$$\frac{\partial e^*}{\partial a_A} = \frac{(1+r)^2}{(s+e^*)^2\left(2+\frac{2a_A(1+r)^2}{(s+e^*)^3}\right)} > 0. \quad (3)$$

Observation 1: All else constant, the principal arranger's monitoring effort, and subsequently the project's cumulative success potential, strictly increases along with the principal arranger's participation share, a_A.

Observation 1 is quite intuitive, because the principal arranger has much greater incentive to improve the project's success potential when she has financed a large part of it compared with when she holds only a small part of the loan. To study what happens in the contract design stage, we put forward a formal assumption regarding when the potential participant signs a proposed contract and when she declines.

Assumption 1: We assume that the potential participant signs the contract if and only if her expected payoff from doing so is larger than investing the same amount of money in an outside option with success probability $w \in (0,1)$.

Taking into account that the only reasonable expectations regarding the monitoring effort that A will exert in the fourth stage of the game are uniquely defined for every admissible triplet (s, a_A, r), the participation constraint of the potential participant is

$$\int_{1+r}^{s+e^*(s,a_A,r)} \left[\frac{1}{s+e^*(s,a_A,r)}(1+r)a_P\right] d\gamma - a_P^{\xi} + a_P E(q_A) \geq w(1+r)a_P - a_P^{\xi}. \quad (4)$$

All these suggest that a PBE of this game is characterized by a solution of the following maximization problem:

$$max_{a_A \in [0,1]} \left\{\int_{1+r}^{s+e^*(s,a_A,r)} \left[\frac{1}{s+e^*(s,a_A,r)}(1+r)a_A\right] d\gamma - a_A^{\xi} - e^*(s,a_A,r)^2\right\} \quad (5)$$

s.t.

$$\int_{1+r}^{s+e^*(s,a_A,r)} \left[\frac{1}{s+e^*(s,a_A,r)}(1+r)\right] d\gamma + E(q_A) \geq w(1+r) \quad (6)$$

or

$$a_A \in \{0,1\}. \tag{7}$$

This maximization problem is well defined and hence always admits a unique solution—that is, we always have a unique equilibrium. When $a_A^* = 0$, no contract is offered, and when $a_A^* = 1$, the principal arranger finances the whole project (so approval of the contract by any other potential participant is unnecessary). Thus only the case in which $a_A^* \in (0,1)$ is interesting. Notice that the syndicate loan case $a_A^* \in (0,1)$ is generic: When *s* is larger than $1 + r$, but not excessively large, then the principal arranger wants to finance part of the project; and when *w* is sufficiently small, then the potential participant is willing to participate too. When $a_A^* \in (0,1)$, the constraint could be binding or not.

The question of interest relates to the comparative statics of this solution with respect to a discrete variable, namely $E(q_A)$. Notice that $E(q_A) \in \{-q, 0, q\}$ because either *P* knows the value of q_A—and hence we have either $E(q_A) = -q$ or $E(q_A) = q$—or she does not, in which case we have $E(q_A) = 0$. In other words, *P* either knows or does not know whether *A* has been subject to an enforcement action.

Consider first that $E(q_A) = 0$ and that the solution, a_A^*, is such that the constraint is not binding. Then,

$$\int_{1+r}^{s+e^*(s,a_A^*,r)} \left[\frac{1}{s+e^*(s,a_A^*,r)}(1+r)\right] d\gamma \geq w(1+r) \tag{8}$$

and the equilibrium contract, a_A^*, is characterized by

$$s + e^*(s, a_A^*, r) = \frac{a_A^*(1+r)^2}{a_A^* + a_A^* r - a_A^{*\,-\xi}\xi}. \tag{9}$$

Intuitively, this case is not as interesting from a real-world viewpoint because enforcement actions are public information.[13]

[13] There are certain informal enforcement actions imposed on banks that are not made public, which we discuss below. One can also think of the special case where $E(q_A) = 0$ as when participants only suspect that a principal arranger has been subject to informal action.

So what happens if we keep everything constant but change the value of $E(q_A)$ from zero to $-q$? In that case, if the constraint is still satisfied when computed for the initial contract, a_A^*, then the equilibrium contract should remain identical to the initial one. This is because in such a case, the solution should coincide with the principal arranger's ideal contract, $\hat{a}_A$ (understood as the solution of the principal arranger's unconstrained maximization problem). As we saw earlier, this ideal contract never depends on the exact value of $E(q_A)$.

Because $E(q_A)$ changes from zero to a negative value, however, it might be the case that the contract, a_A^*, is such that

$$\int_{1+r}^{s+e^*(s,a_A^*,r)} \left[\frac{1}{s+e^*(s,a_A^*,r)}(1+r)\right] d\gamma - q \geq w(1+r), \tag{10}$$

which suggests that the new solution, a_A^{**}, involves a binding constraint. In such a case,

$$\int_{1+r}^{s+e^*(s,a_A^{**},r)} \left[\frac{1}{s+e^*(s,a_A^{**},r)}(1+r)\right] d\gamma - w(1+r) = q. \tag{11}$$

We notice that

$$\partial\left(\int_{1+r}^{s+e^*(s,a_A,r)} \left[\frac{1}{s+e^*(s,a_A,r)}(1+r)\right] d\gamma\right)/\partial a_A = \left(\frac{1+r}{s+e^*(s,a_A,r)}\right)^2 \frac{\partial e^*}{\partial a_A} > 0. \tag{12}$$

In other words, the constraint can switch from being not binding to being binding if and only if $a_A^{**} > a_A^*$. The intuition is clear: When the reputational risks increase because of the enactment of an enforcement action ($E(q_A)$ jumps from zero to $-q$), a potential participant either still finds the principal arranger's initial contract, a_A^*, appealing enough to sign it or she refuses to sign unless the principal arranger increases the project's success probability and hence compensates for the extra reputational risk that *P* now undertakes. The only way that *A* can credibly commit to increasing the project's success probability is by taking a larger share of the loan herself, thus increasing her incentive to exert more monitoring effort after the contract is signed. Of course, if q is very large, then we could have that $a_A^{**} = 0$ (i.e., no contract is offered), because it might be impossible for *A* to propose a deal that is both

profitable for her and good enough for *P* to participate. But for non-extreme values of *q*, one should expect *A* to propose a contract with a strictly larger a_A.

Now consider that $E(q_A) = 0$ and that the solution, a_A^*, is such that the constraint is binding. It is obvious that if we change the value of $E(q_A)$ from zero to –*q*, then it cannot be the case this constraint still holds for the same contract. The arguments presented above should make clear that in this case, the new solution, a_A^{**}, is such that the left-hand side of Equation (11) is equal to q and, hence, $a_A^{**} > a_A^*$. Again, all these are conditional on q not being extremely large, because in such case we could have $a_A^{**} = 0$. Hence, again, the principal arranger reacts to a decrease in $E(q_A)$ by taking a larger share of the loan in order to commit herself to do more to improve the loan's success potential.

All the above hold for any decrease in $E(q_A)$, not just for changes from zero to –*q*. Symmetric arguments guarantee that an increase in $E(q_A)$ (for example, a change from zero to *q*) will cause *A* either to decrease the share of the loan that she finances or to leave the contract unchanged.

Observation 2: All else constant, a decrease (increase) in $E(q_A)$ induces an increase (decrease) in the lead arranger's equilibrium participation share in a syndicate loan.

Appendix II. Use of Fixed Effects

In this appendix, intended for online use only, we provide an example to show why the estimation of equation (13) with bank*year fixed effects does not yield perfect collinearity between these fixed effects and PEL. Consider the data set attached in the Table below, which replicates the structure of our actual data set. There are 6 banks, each issuing a number of loans over 6 years. There are 33 loans, each issued by at least two lead banks: observations 1 to 33 reflect the *first* lead banks of each loan and observations 34 to 66 reflect the *second*

lead banks. The first lead banks 2 and 3 have received enforcement actions in years 2 and 4, respectively. The second lead banks 5 and 6 have received enforcement actions in years 2 and 3, respectively. The column S denotes the share (in percentage) of each lead bank in the loan.

If we use observations 1 to 33 with bank*year fixed effects, PEL drops out due to perfect collinearity. In Stata, this comes from the commands:

egen by=group(Bank Year)

reghdfe S PEL, a(by)

This is irrespective of the sample size: indeed one can increase the sample size of our example and PEL will still drop out simply because PEL is a bank*year variable. However, adding a second lead bank in the observations 34-66, that received an enforcement action in a different year compared to the first lead bank, means that identification can be obtained from the differences in PEL between the first and the second lead arrangers within the same loan-year. We hope that this example facilitates a better reading of our empirical approach.

Obs.	Bank	Year	Loan	PEL	S
1	1	1	1	0	5
2	1	1	2	0	6
3	1	2	3	0	4
4	1	3	4	0	7
5	1	4	5	0	5
6	1	5	6	0	3
7	1	5	7	0	8
8	1	5	8	0	9
9	1	6	9	0	2
10	1	6	10	0	5
11	1	6	11	0	6
12	1	6	12	0	7
13	2	1	13	0	4
14	2	1	14	0	7
15	2	1	15	0	8
16	2	1	16	0	9
17	2	2	17	1	5
18	2	2	18	1	6
19	2	2	19	1	7

20	2	2	20	1	8
21	2	3	21	1	5
22	2	3	22	1	4
23	2	3	23	1	5
24	3	1	24	0	6
25	3	1	25	0	3
26	3	1	26	0	8
27	3	3	27	0	7
28	3	3	28	0	6
29	3	4	29	1	5
30	3	4	30	1	9
31	3	4	31	1	8
32	3	5	32	1	7
33	3	6	33	1	4
34	4	1	1	0	5
35	4	1	2	0	6
36	4	2	3	0	4
37	4	3	4	0	7
38	4	4	5	0	5
39	4	5	6	0	3
40	4	5	7	0	8
41	4	5	8	0	9
42	4	6	9	0	2
43	4	6	10	0	5
44	4	6	11	0	6
45	4	6	12	0	7
46	5	1	13	0	4
47	5	1	14	0	7
48	5	1	15	0	8
49	5	1	16	0	9
50	5	2	17	0	5
51	5	2	18	0	6
52	5	2	19	0	7
53	5	2	20	1	8
54	5	3	21	1	5
55	5	3	22	1	4
56	5	3	23	1	5
57	6	1	24	0	6
58	6	1	25	0	3
59	6	1	26	0	8
60	6	3	27	1	7
61	6	3	28	1	6
62	6	4	29	1	5
63	6	4	30	1	9
64	6	4	31	1	8
65	6	5	32	1	7

66	6	6	33	1	4