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The influence of loan officers on loan contract design and performance☆

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ABSTRACT

We investigate the extent to which loan officers generate independent, individual effects on the design and performance of syndicated loans. We construct a large database containing the identities of loan officers involved in structuring syndicated loan deals, allowing us to systematically disentangle borrower, bank, and loan officer fixed effects. We find that loan officers have significant influence on interest spreads, loan covenant design, and loan performance. Inclusion of borrower fixed effects increases our power to rule out the alternative that loan officer fixed effects reflect the matching of officerds to borrowers based on time-invariant borrower characteristics. We document heterogeneity in loan officers' influence across loan contract terms, with loan officers exerting stronger influence over covenant package design than over interest spreads, but marginal influence on loan maturity. Lead officers have greater influence than participant officers over covenant package design and loan performance, but less robust differential influence on interest spreads.

1. Introduction

Corporate loan deals are characterized by rich contracts that tailor contractual features such as interest spread, maturity, and covenants to a borrower's circumstances. Consistent with such tailoring, prior literature documents that borrower characteristics exert a first order influence on loan contracts. Beyond borrower characteristics, the literature posits that lending banks can exert an independent influence on loan contract design. However, banks are opaque entities whose internal decisions and performance are shaped by an intricate mix of organizational design features and human capital.[1] Bank

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[1] For example, see Bushman (2016) and Dang et al. (2017) for in-depth discussions of bank opacity.

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opacity combined with significant data limitations have hampered researchers' ability to observe lending decision processes and empirically disentangle the influence of banks' organizational capital from that of human capital. Previous research examining lending decisions by individual loan officers is generally limited to data from a single bank, a setting that impedes systematically disentangling the influence of individual loan officers from the influence of a bank's organizational features.[2]

In this paper, we overcome such limitations by exploiting a large sample of syndicated loan contracts and individual loan officers to distinguish the incremental influence on loan contract design of individual loan officers relative to the influence of the lending banks in which they work and the borrower on the loan.[3] We utilize this data to provide new insight into a number of open questions about the nature of the underlying forces that shape loan contracting. These questions include: Do loan officers have an independent effect on loan contract design that is distinct from the influence of borrowers and lending banks? If so, how important is the influence of individual loan officers? Does the extent of loan officer influence differ across loan contract terms, and if so why? Do individual differences across loan officers have economic consequences for loan performance? Do loan officers working at lead arranger banks exert a stronger influence over loan contracting and performance than do officers representing syndicate participants?

The syndicated loan market is extremely competitive and involves sophisticated players such as large banks, hedge funds, and credit rating agencies, among others. As a result, we expect firms' fundamentals to be the major force in shaping syndicated loan contracts. However, cross-sectional differences in loan contract design can derive from banks' organizational capital as banks differ across hierarchical structure, decision rights allocation, technology, incentive design, and culture that potentially impacts the lending process. Further, influence can independently derive from human capital, where banks' lending operations encompass a significant decision-making role for loan officers. Individual loan officers can influence loan contracting due to differences in cognitive abilities, values, talent, and background. Our premise is that by virtue of their interactions with borrowers, collection of soft information, and direct roles in negotiating and monitoring loan contracts, individual loan officers can have an independent influence on loan contracting over and above that of borrower fundamentals and banks' organizational capital.

The extent to which individual loan officers influence syndicated loan contracts and performance is ultimately an empirical question. A long-standing literature provides evidence that a bank's organizational design features play a powerful role in shaping the decisions and actions of loan officers operating within the context of these design features.[4] Thus, organizational features of large, sophisticated banks coupled with large, transparent borrowers may lead banks to rely heavily on formal policies and hard information that limit the influence of individual loan officers (Stein, 2002; Berger et al., 2005). However, if banks' organizational mechanisms do not systematically eliminate the effects of idiosyncratic differences across loan officers, then individual loan officers may have scope to influence loan contracts.[5] We bring large-sample evidence to bear on this issue.

We provide robust evidence that loan officers exert significant influence over loan contract design that is incremental to the influence of banks and borrowers. While, as expected, borrower characteristics explain by far the largest portion of variation in contract terms, loan officers are shown to have an independent, incremental influence on loan spreads and covenant design that is greater than or commensurate with the influence of lending banks. Importantly, this influence is economically consequential as loan officers have significant incremental effect on ex post loan performance. With respect to loan terms, we find evidence that loan officers exert a stronger influence over covenant package design than over interest spreads, while having little influence on loan maturity. We also find that loan officers at lead arranger banks exert a greater influence over contract terms and performance than do loan officers at syndicate participant lenders. Overall, our evidence provides a textured portrait of the relative importance of individual loan officers, banks' organizational capital, and borrower characteristics for shaping syndicated contract design and performance.

As noted earlier, distinguishing loan officer effects from bank effects is empirically challenging. First, such an analysis requires microdata that matches individual loan officers to specific loan contracts and also tracks their movement across different banks over time. We overcome this challenge by collecting and manually verifying loan agreements from SEC filings, and then extracting the identity of individual loan officers associated with a large sample of syndicated loans. Spanning from 1994 through August 2019, this represents the most comprehensive database to date on U.S. corporate loan officers, containing 989 distinct firms, 607 banks, and 3366 loan officers corresponding to 2809 (4089) distinct loan deals (facilities). By exploiting movement of loan officers across banks, this data allows us to disentangle loan officer fixed effects from bank and borrower fixed effects, and thus isolate any independent influence of individual loan officers on lending terms and loan performance.

Second, we do not have a randomized experiment and thus must confront significant interpretation challenges. Do estimated effects reflect loan officers imprinting their distinct styles on loan contracts? Or are loan officers matched to firms

[2] See Agarwal and Ben-David (2018), Cole et al. (2015), Behr et al. (2020), Berg et al. (2013), Drexler and Schoar (2014), Berg (2015), Hertzberg et al. (2010), Tzioumis and Gee (2013), Campbell et al. (2018), and Liberti and Mian (2009).

[3] For parsimony, we refer to all lenders as banks, although lending syndicates often include non-bank institutions.

[4] Features include: hierarchical structure (Stein, 2002; Berger and Udell, 2002; Liberti and Mian, 2009); decision authority (Liberti, 2017; Qian et al., 2015); incentives (Cole et al., 2015; Agarwal and Ben-David, 2018; Behr et al., 2020; Berg et al., 2013); information technology (Paravisini and Schoar, 2015); loan approval processes (Berg, 2015); and officer rotation (Hertzberg et al., 2010).

[5] Individual differences include: talent (Liu et al., 2017; Ewens and Rhodes-Kropf, 2015); values (Bushman et al., 2018); Cohn et al. (2014); early-career experience (Schoar and Zuo, 2017); personality traits (Cole et al., 2015); relationships (Herpfer, 2020); and cognitive biases (Campbell et al., 2018).

based on unobservable firm characteristics, where it is these firm characteristics, not officers, causing variation in contract design and outcomes (Bertrand and Schoar, 2003; Fee et al., 2013)? If the latter, then loan officer fixed effects simply serve as a proxy for unobservable determinants of optimal loan contracts, and as such they identify optimal loan terms for the borrowers to which they are matched. To address this issue, we restrict the analysis to a large sample of borrowers with multiple loans originated by different loan officers, which in turn allows us to include borrower fixed effects in addition to bank and loan officer fixed effects.[6] This implies that our estimates of loan officer influence are unaffected by matching or assignment between borrowers and loan officers based on included *observable* time-varying borrower characteristics or *unobservable* time-invariant borrower characteristics. Despite including borrower fixed effects and an extensive set of time-varying borrower characteristics, we acknowledge that we cannot completely rule out a matching explanation as there could still be a time-varying unobservable characteristic that drives matching. However, our demanding empirical specification represents a high hurdle and gives us some comfort that individual loan officers affect loan contract design and performance.

We examine loan officer influence across three dimensions: (1) interest spread and maturity; (2) covenant package design, including number of covenants, covenant strictness, and covenant mix[7]; and (3) *ex-post* loan performance (ratings downgrades and defaults). Our design allows us to examine the possibility that loan officer influence varies across different loan contract terms. In this regard, we posit that loan officers may have a weaker influence over interest spreads than other loan terms due to the competitive nature of the spread setting process. For example, Ivashina and Sun (2011) note that loan syndication is a sealed-bid auction with a ceiling price. If initial demand is low, the auction remains open until there is a sufficient demand or the spread is revised upward. They document that institutional investors' demand for loans is an explanatory factor for spreads. Further, Murfin and Pratt (2019) provide evidence that spreads from recently closed loans of comparable borrowers, which are beyond the control of loan officers, directly influence loan spreads. With respect to loan maturity, the literature provides no clear basis for predicting a role for loan officers' influence. While short term loans give banks flexibility and control, they subject borrowers to debt rollover risk (Diamond, 1993) and may undermine banks' incentives to monitor borrowers (Rajan and Winton, 1995). In contrast, the literature suggests considerable scope for customizing covenants to circumstances, positing that covenants serve many roles and documenting significant heterogeneity in covenants across loans.[8]

Our regression framework involves four sequential steps. To provide insight into the relative importance of time-invariant and time-varying borrower characteristics in loan contracting, we first regress individual lending terms and loan outcomes on borrower fixed effects alone. We then add a rich set of borrower and loan characteristics designed to reflect the collective impact of time-varying, observable information. We next layer in bank fixed effects. Finally, we add loan officer fixed effects. Adding loan officer fixed effects last in the sequence, after including borrower characteristics (and bank fixed effects), is key to isolating the independent influence of loan officers, as distinct from a borrower-loan officer matching effect. We estimate the incremental influence of each addition to the specification using incremental adjusted R-squared. For example, we estimate loan officers' influence as the incremental adjusted R-squared from adding loan officer fixed effects to a model including borrower fixed effects, observable borrower characteristics, and bank fixed effects.

Turning to results, our fundamental finding is that loan officers have significant incremental explanatory power for interest spreads, covenants, and loan performance, after controlling for borrower characteristics (fixed effects and observable characteristics) and bank fixed effects. With respect to contract terms, the incremental adjusted R-squared is 1.2% for interest spreads, −1.1% for maturity, 3% for the number of covenants, 3.1% for covenant strictness, and 1.2% for covenant mix. More notably, we demonstrate that loan officers have a robust, significant influence over all aspects of outcomes except for maturity using simulation analyses (Fee et al., 2013; Fracassi et al., 2016). Interestingly, we note that the incremental loan officer effect on both the number of covenants and covenant strictness is almost 2.5 times as large as their incremental effect on interest spreads. With respect to performance, loan officer fixed effects generate incremental adjusted R-squareds of 3% for both rating downgrades and loan default.

In the above analysis, we observe that borrower fixed effects explain a large portion of the variation, explaining, for example, 64% for loan spreads and 75% for covenant strictness. To offer a different perspective, we re-estimate the analysis after demeaning all continuous variables by their *within-borrower* mean values. By removing the variation explained by borrower fixed effects, we can focus on how much of the remaining variation is explained by loan officer effects. We find that incremental loan officer fixed effects explain 4% of this residual variation for spreads, while incremental loan officer fixed effects for covenants are much higher, ranging from 8 to 16%. In terms of loan performance, incremental loan officer effects explain 11% (14%) of the residual variation for downgrades (loan default). Further, we find that loan officers at lead arranger banks are more influential than officers at participant banks over both covenant package design (around 1.5 times as large) and loan performance (around 1.7 times as large), but find mixed evidence in terms of differential influence over interest

[6] For example, consider an officer matched to borrowers based on an unobservable, time-invariant risk factor. We estimate the officer's influence on lending outcomes by comparing loans extended by different loan officers to the same borrower. Thus, loan officer fixed effects cannot be explained by time-invariant differences across borrowers.

[7] Following Christensen and Nikolaev (2012), financial covenants can be classified as performance covenants or capital covenants. We operationalize covenant mix as the proportion of total financial covenants that are performance covenants. We define performance and capital covenants below.

[8] See for example, Skinner (2011), Christensen and Nikolaev (2012), Nikolaev (2018), Prilmeier (2017), Gârleanu and Zwiebel (2009), and Demiroglu and James (2010). We discuss this literature further in Section 2.

spreads. Overall, we provide robust evidence consistent with individual loan officers exerting a significant influence over loan contracts, where these loan officer effects are consequential in that they have a significant influence on loan performance.

Finally, we find that bank fixed effects add little incremental explanatory power for loan terms, covenants, or loan performance. However, when bank fixed effects are replaced with bank-industry or bank-time fixed effects to allow for bank specialization or changing circumstances over time, both sets of fixed effects significantly increase the incremental explanatory power of banks.[9] Importantly our loan officer results remain largely unchanged with these more stringent bank effects. This suggests that organizational capital is influential in loan contracting, while human capital is equally if not more influential in this process.

Our study contributes to a growing literature documenting that differences across individual loan officers and across banks' organizational design influence loan officers' information collection and transmission incentives, loan decisions, and loan performance. However, data limitations generally preclude these studies from systematically disentangling the contributions of organizational and human capital. We extend this literature by exploiting a novel database on individual loan officers and providing large-sample evidence quantifying the incremental influence of loan officers on loan contracts. By exploiting movements across banks to isolate loan officer effects we provide new insight into the nature of the syndicated lending process within banks. Our findings of loan officer influence on corporate lending should be informative to regulators and others concerned with prudential lending.

Our paper relates to Herpfer (2020), who focuses on the role of personal relationships in the U.S. syndicated loan market. We differ from Herpfer (2020) in two ways. First, our evidence suggests that loan officers generate considerable time-invariant influence on loan terms. This influence is stronger for covenant design and loan performance than for interest rates. Second, we separately examine the effect of loan officers at lead arranger banks and participant banks. Our results indicate that lead officers have a greater influence than participant officers on both covenant design and loan performance, while they generate similar influence on interest spreads. We note however that our results do not assess whether loan officers have a time-varying impact on loan terms.[10] Overall, our study and Herpfer (2020) both advance the debt contracting literature by documenting the influence of individual loan officers.

The rest of the paper is organized as follows. Section 2 discusses the conceptual framework of the paper and related literature. Section 3 describes the data and empirical methodology. Section 4 presents results of the main empirical analyses. Section 5 conducts additional analyses and robustness tests. Finally, Section 6 concludes.

2. Conceptual framework and related literature

In this section we discuss the conceptual framework underpinning our analyses and the related literature upon which we build. In Section 2.1 we discuss how organizational capital and human capital interact to shape lending outcomes. In Section 2.2 we present our arguments supporting the hypothesis that loan officers have considerable and differential scope for influencing debt contracting terms. We also discuss the relative influence of loan officers at lead arranger banks versus those at participant institutions.

2.1. Influence of bank organization features and loan officers on lending outcomes

Loan officers interface with borrowers, collect, process, and transmit soft information, and participate in lending decisions. The recent financial crisis accentuated the importance of loan officers to the value chain of banks. For example, it has been posited that a factor in precipitating the crisis were distorted financial incentives for lower-level employees, such as loan officers and loan originators, and poor organizational designs that allowed loan officers to exercise their discretion and judgment to issue poor quality loans (e.g., Berg et al., 2013; Behr et al., 2020). This has spawned literature that examines how banks' organizational structure, incentive schemes, and policies influence loan officers' information collection and transmission incentives, loan decisions, and loan performance.

Loan officers work in large, opaque banking organizations and as such their individual decisions and ensuing consequences are generally unobservable to researchers. As a result, much of the research to date on individual loan officers is limited to data from a single bank or on experiments using loan officers within a single bank. This literature provides evidence that incentive structures, organizational design features, and bank policies powerfully influence loan officers' decision-making and loan performance.

For example, examining hierarchical structure and delegation of authority using data from a large multi-national bank, Liberti and Mian (2009) find that greater hierarchical distance between information collecting agents and loan approving officers leads to less reliance on soft information, where Liberti (2017) finds that loan officers who receive more authority rely

[9] For example: Berger et al. (2017) show that differences in industry specialization can significantly influence a bank's lending processes. Gopalan et al. (2011) show that Chapter 11 bankruptcy filings by a bank's borrowers can damage the bank's reputation and negatively impact its subsequent loan syndication activity.

[10] In addition to Herpfer (2020), other studies provide evidence on bankers' time-varying influence on borrowers and loans. For example, Frattaroli and Herpfer (2019) find that bankers help firms establish strategic alliances. Carvalho et al. (2020) show that bankers experiencing lower local housing price growth issue higher spreads. Dagostino et al. (2020) show that politically misaligned bankers issue higher spreads.

more on soft information relative to hard information in their lending decisions. Using data from a large U.S. commercial lender, Agarwal and Ben-David (2018) study the effect of loan-volume-based compensation on loan volume and delinquency rates. They find that when compensation rewards volume, loan officers generate more but lower quality loans. Using data from an Indian bank, Cole et al. (2015) use a laboratory experiment to study how compensation that rewards loan volume and penalizes bad loan performance affects lending decisions and subsequent loan performance. They find that such incentives entail more screening effort and better lending decisions. Behr et al. (2020) examine non-linear compensation structures that reward loan volume and penalize poor performance, finding that when loan officers are at risk of losing their bonuses, they increase loan prospecting and monitoring, and that loan officers adjust their behavior more towards the end of the month when bonus payments are approaching. Berg et al. (2013) study how automated lending decisions based purely on hard information influence loan officer behavior when compensation depends on generated loan volume, and find that loan officers bias their assessment of the borrowers' risk to increase the pool of clients that are eligible to get credit.

While this literature shows that banks' organizational features are instrumental in shaping loan officers' behavior, single bank settings make it difficult to fully disentangle bank from loan officer effects. In contrast, our large sample of loan officers includes a critical mass of loan officers that switch banks, allowing us to address this limitation and isolate effects of individual loan officers, on the lending process. Our data also allow us to make more generalizable inferences. However, it is not ex ante obvious that such individual effects exist.

First, large, sophisticated banks that lend to large transparent borrowers may leave little scope for loan officers to independently influence loans. Second, in a classic principal agent framework, an agent's characteristics (e.g., risk aversion; cost of effort function) are common knowledge, and the principal designs contracts that optimally incorporate the agent's characteristics and features of environment. If banks offer incentive schemes that optimally incorporate specific loan officer, bank, and borrower characteristics, an individual loan officer's decisions could change following a move to a new bank with different features. Thus, cross-sectional differences in loan decisions might reflect cross-sectional differences in the organizational features of banks. In this case, loan officers should play no incremental role in loan decisions after fully accounting for the influence of the bank and borrower. However, if loan officers differ across unobservable characteristics, there may be scope for loan officers to imprint their style on loan outcomes.

Prior studies provide a basis for considering the effects of individual differences across loan officers. For example, Campbell et al. (2018) examine loan officers in a large federal credit union and provide evidence that behavioral biases impede the effective processing and interpretation of soft information in private lending. They delineate three factors affecting the lending process: (1) limited attention, (2) task-specific human capital, and (3) common identity. In an experiment using commercial bank loan officers, Cole et al. (2015) provide evidence that career concerns and personality traits (e.g., risk-aversion, optimism, or overconfidence) affect loan officer behavior. Focusing on bank officers' materialism, Bushman et al. (2018) find that banks with materialistic CEOs exhibit significantly weaker risk management controls and significantly more downside tail risk. Cohn et al. (2014) provide experimental evidence suggesting that the prevailing business culture in the banking industry weakens and undermines the honesty norm. They show that when subjects' professional identity as bank employees is rendered salient, a significant proportion of them become dishonest.

Thus, despite the evidence supporting a role of individual influences on economic outcomes in banking, prior research cannot fully separate the effects of individuals from the influence of the bank itself. Further, the literature has not explored how loan officers differentially influence various lending terms and outcomes of large syndicated loans. We use our comprehensive database of loan officers involved in structuring syndicated deals to address this issue.

2.2. Differential scope for the influence of loan officers across specific loan contract terms

A private debt contract represents a contractual arrangement embedding a wide set of terms (e.g., interest rate spread, maturity, and covenants) that is agreed upon by a borrower and lenders. We consider the possibility that the influence of individual loan officers may not be uniform across contract terms. While loan officers have discretion in setting interest spreads, their influence may be constrained by competitive market forces. For example, as we discuss in the introduction, Ivashina and Sun (2011) and Murfin and Pratt (2019), among others, provide evidence that loan spreads are partially influenced by competitive market forces outside the influence of loan officers (and banks), potentially limiting their scope to influence spreads.

In contrast, incomplete contracting theory posits that contractual incompleteness can be mitigated by making ex-post control allocation contingent on covenants correlated with the state of nature (Aghion and Bolton, 1992; Christensen et al., 2016). Rajan and Winton (1995) argue that covenants offer banks incentives to monitor borrowers and such monitoring activities are welfare increasing. Furthermore, the literature documents significant heterogeneity in the use of covenants across firms (Skinner, 2011; Christensen et al., 2016).[11] For example, Demerjian and Owens (2016, Table 3) provide comprehensive descriptive data on all financial covenants used in a large sample of syndicated loans from the Dealscan

[11] This heterogeneity is not well understood as covenants serve many complex roles, including: allocation of decision rights (Aghion and Bolton, 1992; Christensen et al., 2016); monitoring borrowers (Rajan and Winton, 1995; Christensen and Nikolaev, 2012; Nikolaev, 2018; Prilmeier, 2017); screening and signaling (Gârleanu and Zwiebel, 2009; Demiroglu and James, 2010; Li et al., 2016; Armstrong et al., 2019); easing bargaining frictions (Berlin et al., 2017; Saavedra, 2018b); and allowing operating flexibility (Saavedra, 2018a).

database. They isolate 15 distinct financial covenants and document wide variation in the frequency with which they are used in loan contracts, and in the way these covenants are defined across loan contracts (see also Li, 2016). Using specific covenant definitions, Demerjian and Owens (2016, Table 6) create a measure of the aggregate probability of covenant violation (i.e., covenant strictness), finding that there is significant variation in covenant strictness across loans. Li et al. (2016) document significant cross-loan variation in initial financial covenant thresholds and in the use of dynamic covenant threshold features. Christensen and Nikolaev (2012) classify financial covenants as either performance or capital covenants. They provide evidence that the mix of performance and capital covenants used in a loan package differs substantially across industries and varies significantly with various firm characteristics. However, even after including a large vector of firm (Table 3) and industry characteristics (Table 5), they are able to explain only 30% of the variation in the mix of covenants.

Consistent with flexibility in covenant design, S&P Global Market Intelligence (2017) discusses the information memorandum prepared by the lead arranger describing the transaction terms. They note (page 10): "The list of terms and conditions is a preliminary term sheet describing the pricing, structure, collateral, covenants, and other terms of the credit (covenants are usually negotiated in detail after the arranger receives investor feedback)." Also, in discussing the widespread use of the Loan Market Association (LMA) standard forms, Ward and Darley (2017, page 46) note: "The LMA recommended forms are only a starting point, however, and whilst typically, the "back-end" LMA recommended language for boilerplate and other non-contentious provisions of the loan agreement will be only lightly negotiated (if at all), the provisions that have more commercial effect on the parties (such as mandatory prepayments, business undertakings, financial covenants, representations and warranties, conditions to drawdown, etc.) remain as bespoke to the specific transaction as ever."

Overall, heterogeneity in the use of financial covenants and large unexplained variation in covenant choices relative to firm and industry characteristics allow scope for loan officer influence over covenant choices. If covenant design requires significant human touch and has value consequences, we expect loan officers to exert influence over covenants and loan performance.

With respect to loan maturity, the literature provides no clear basis for predicting a role for loan officer influence. First, borrowers' incentives to match loan duration to project duration or use maturity to signal credit quality may limit scope for influence (e.g., Flannery, 1986; Diamond, 1993). Second, strategic loan portfolio considerations of bank organizations may impose short loan maturities on riskier borrowers to limit overall risk exposure thereby limiting scope for loan officer influence (e.g., Gottesman and Roberts, 2004). While there may be scope for banks and borrowers to negotiate trade-offs between maturity and spreads, the empirical evidence is mixed on this (e.g., Strahan, 1999; Dennis et al., 2000; Gottesman and Roberts, 2004). We do not make predictions with respect to the influence of loan officers on debt maturity.

We note that optimal debt contracts may not be unique, and different loan officers could potentially choose different contracts for similar loans. Any loan officer effects would then have minimal economic consequences as equivalent optimal contracts should deliver similar performance on average. That is, optimality implies that we should find no incremental loan officer influence on loan performance after controlling for borrower and bank characteristics. Mitigating this explanation, we find a significant loan officer effect on loan performance.

Finally, syndicated loan deals are characterized by the existence of a lead arranger bank who establishes a relationship with the borrowing firm, negotiates terms of the contract, performs due diligence and loan monitoring, and organizes a syndicate of participant lenders who each fund part of the loan. Based on this structure it seems likely that lead arrangers would generally exert more influence on loan contracting than participants. However, there is reason to believe that participants exert some influence over some aspects of loan contracting. Lim et al. (2014) find that leveraged loans with non-bank institutions in the syndicate have higher spreads than bank-only facilities. These findings are consistent with non-bank institutions, especially hedge and private equity funds, exerting bargaining power over spreads as lenders of last resort for loans struggling to raise capital. Cai et al. (2017) find that lead arrangers choose banks that have a similar focus in terms of lending expertise and give these banks more senior roles in the syndicate. These results support the hypothesis that syndicate members that are close to lead arrangers are delegated some responsibilities such as screening and monitoring and thus can lower the overall loan syndication costs. Bruche et al. (2020) provide evidence that the lead arranger's book-building process allows scope for participants to have some influence over deal terms. Also, as discussed earlier, participants play an active role in negotiating covenant packages, among other things. In this paper, we examine the influence of officers at lead arrangers relative to those at participant banks and whether this relative influence varies across contract terms.

3. Data and empirical methodology

3.1. Sample selection & data on loan officer identity

Our sample selection begins with all loans reported in LPC Dealscan between July 1994 and August 2019. We require loans to have available information on loan contract terms (e.g., spreads, maturity, and covenants). We exclude borrowers in financial and utility industries and require them to have available information on firm characteristics from Compustat. This initial procedure leaves us with a sample of 39,717 loans extended to 5692 firms.

Based on the initial Dealscan sample, we search SEC filings for the loan contracts. These contracts are material public disclosures that are generally filed as exhibits to a firm's 8-K, 10-Q, or 10-K. We search for any filing that contains an appended Exhibit 10 (which relates to "Material Contracts"). We require the contract to contain either the word "loan" or "credit" followed by "agreement", to exclude other types of material contracts (such as supply agreements or executive compensation

agreements). To account for errors in the reporting date in Dealscan (Murfin, 2012), we search for all filings meeting these criteria in the 90-day window centered on loan initiation date.

Loan agreements contain signature pages from which we identify the names of the loan officers examined in this study. We retain all documents containing at least one instance of the string "/s", which indicates the presence of an electronic signature. For each instance of this string, we extract the name of the loan officer, the bank in which he or she is employed, and the officer's title as disclosed in the signature page. Given the heterogeneity of loan contract forms, we also manually verify the data to ensure its accuracy. As our focus is on loan officers' influence in the lending process, we retain only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors), as they are likely to be more influential in this process. We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. Doing so allows us to accommodate our empirical strategy of identifying loan officers' impact, namely, their corresponding fixed effects while controlling for borrower fixed effects. This sample selection process results in a sample of 28,077 loan officer-facility observations corresponding to 4089 distinct loan facilities and 2809 distinct loan packages. The average (median) loan officer is observed on 11 (6) loan facilities and 7 (4) loan packages. Depending on our fixed effects structure, our analyses contain up to 989 distinct firms, 607 lenders, and 3366 loan officers.

3.2. Empirical methodology

Our main analyses employ regressions using a loan facility-loan officer panel, where we layer bank and officer fixed effects on top of a baseline specification that includes an extensive set of borrower characteristics in addition to borrower fixed effects. We conduct our analysis at the facility level because: (1) the lending terms we focus on such as interest spread, maturity, and loan performance measures vary across facilities within the same loan package; and (2) loan officers vary across facilities even within the same loan package (Lim et al., 2014).[12] Altogether, the facility level analysis allows us to maximize the usage of within-package information across facilities.[13] We focus on the incremental adjusted R-squared generated from the addition of each set of fixed effects to infer the influence of bank organizational capital and officers' human capital in the lending process. We also conduct F-Test analyses using simulations to corroborate our inferences based on the incremental adjusted R-squared measure.

It is important to highlight that our estimation of loan officer effects builds on the residual variation in lending outcomes that cannot be explained by observable borrower fundamentals, borrower fixed effects, or bank characteristics. Consequently, our estimates are unaffected by matching or assignment between borrowers and officers based on included *observable* time-varying borrower characteristics or their *unobservable* time-invariant characteristics as such effects will be purged away from loan officer effects. For example, if an officer only underwrites loans to borrowers with speculative ratings, the officer's influence on lending outcomes is estimated by comparing multiple loans extended by different loan officers to *the same* borrower. Therefore, the loan officer fixed effects estimated from our approach cannot be explained by differences (e.g., credit risk) across borrowers.[14]

We begin with the baseline model:

$$Y_{ibkt} = \beta_1 X_{jt} + \beta_2 Z_k + \delta_j + \mu_t + \epsilon_{ibkt}, \quad (1)$$

where *i* denotes loan officer, *b* denotes bank, *j* denotes borrower, *k* denotes loan facility, and *t* denotes time. In (1), Y_{ibkt} represents the loan term, maturity, covenant package term, or measures of ex post loan performance. First, we examine two loan terms: loan pricing (*Spread*) measured as all-in-drawn spreads in basis points over LIBOR, and loan maturity (*Maturity*) measured as the number of months until the loan matures. Second, we examine three features of the covenant package: the number of covenants (*Covenants*), covenant strictness (*Strictness*), which is computed following Demerjian and Owens (2016), and the ratio of the number of performance covenants to the number of performance plus capital covenants (*Covenant Mix*), following the classification of performance and capital covenants described in Christensen and Nikolaev (2012).[15] Prior research (e.g., Murfin 2012; Christensen and Nikolaev, 2012) shows that these three dimensions represent key features of a covenant package used by lenders to address agency conflicts between borrowers and lenders. Third, we examine two measures of loan performance: *Downgrades* (the number of S&P rating grids that a firm is downgraded between the loan initiation date and maturity date), and *Default* (an indicator for whether a loan facility receives a default rating from S&P prior to maturity).

Eq. (1) controls for borrower (δ_j) and year fixed effects (μ_t), thus reducing concerns about any effects being attributed to the time-invariant matching between borrowers and loan officers. The model also includes a large set of control variables related to time-varying characteristics of both the borrower (X_{jt}) and the loan contract (Z_k). These variables help to account for important aspects of observable, hard information available in the lending process. Firm controls include *Size*, *Age*, *Profitability*, *Tangibility*,

[12] More specifically, loan performance variables are measured as the borrower performance prior to the loan maturity date. Different facilities in the same loan package can thus have different performance outcomes.

[13] In untabulated analyses, we note that despite losing meaningful variation at the facility level, we produce similar inferences using a package level analysis where we restrict the sample to only the largest facility in a package.

[14] Our estimation uses the program developed by Correia (2017) as implemented using the Stata package reghdfe. This algorithm relies on graph theory and allows the estimation of multiple levels of fixed effects. In unreported analysis, we show that the AKM method generates higher explanatory power for incremental loan officer effects. Our inferences remain robust using the AKM method to estimate fixed effects.

[15] We thank Ed Owens and Peter Demerjian for sharing their strictness measure dataset, which can be downloaded at https://sites.google.com/site/edowensphd/research.

Market-to-Book Ratio (*MB*), and *Leverage*. Loan contract controls include *Spread*, *Maturity*, *Covenants*, *Loan Size* (excluding the dependent variable), an indicator for whether the loan is secured (*Secured*), and an indicator for whether the loan is senior (*Senior*). The model also includes fixed effects for credit ratings and loan type (*Loan Type*).[16] All continuous variables are winsorized at the 1st and 99th percentiles. Detailed definitions of these variables are described in the Appendix.

To estimate the explanatory power of individual loan officers and the banks employing them, we augment Eq. (1) with bank fixed effects (θ_b), and then with loan officer fixed effects (ϕ_i):

$$Y_{ibkt} = \beta_1 X_{jt} + \beta_2 Z_k + \delta_j + \mu_t + \theta_b + \epsilon_{ibkt}, \quad (2)$$

$$Y_{ibkt} = \beta_1 X_{jt} + \beta_2 Z_k + \delta_j + \mu_t + \theta_b + \phi_i + \epsilon_{ibkt}, \quad (3)$$

Based on the increase in the adjusted R-squared generated from Eq. (2) relative to Eq. (1), we can infer the influence of bank organizational capital on the lending process beyond the explanatory power of observable borrower and loan characteristics, as well as unobservable time-invariant borrower characteristics.[17] Banks' effect on loan terms and performance may relate to their certification role (Lummer and McConnell, 1989; Billett et al., 1995; Ross, 2010), their organizational structure, or their reputation in the loan market (Diamond, 1984; Ross, 2010).[18] We interpret the increase in the adjusted R-squared generated from (3) relative to (2) as the influence of loan officers above and beyond banks and other observable information in our model. Exploring the incremental explanatory power of individual officers beyond those of borrower fundamentals and bank organizational capital allows us to identify loan officers' influence beyond the matching effects reflected in borrower time-invariant unobservable heterogeneity.

3.3. Descriptive analysis

Table 1 presents summary statistics for the variables of interest. The average loan is priced at approximately 174 basis points above LIBOR and matures in 55 months, both of which are comparable to those (178 basis points and 52 months, respectively) reported in Demerjian and Owens (2016). Loans in our sample contain approximately 1.29 covenants, which is lower than the 2.69 reported in Demerjian and Owens (2016), and have average strictness of 0.23.[19] Becker and Ivashina (2016) note that covenant lite loans are more populated in recent years, which likely explain the lower number of covenants in our sample. The data also indicate that performance covenants represent 84% of the set of performance and capital covenants. This ratio is higher than the 60% reported in Christensen and Nikolaev (2012). Borrowers are, on average, larger,

Table 1
Descriptive statistics.

Variable	Mean	Median	Std. Dev.
Spread	174.13	150	92.06
Maturity	54.65	60	16.20
Covenants	1.29	1	1.10
Strictness	0.23	0.04	0.35
Covenant Mix	0.84	1.00	0.32
Downgrades	0.85	0	1.65
Default	0.02	0	0.13
Size	8.52	8.40	1.39
Age	27.70	22	19.23
Profitability	0.13	0.13	0.07
Tangibility	0.28	0.19	0.25
MB	1.85	1.63	0.89
Leverage	0.33	0.31	0.18
Loan Size	20.18	20.21	1.19
Secured	0.42	0	0.49

This table displays the descriptive statistics for variables of interest. Our sample is comprised of 28,077 loan officer-facility observations. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. All summary statistics are based on this sample, except for *Strictness* and *Covenant Mix* which are restricted to 18,246 and 18,946 observations, respectively, with requisite data. All data are obtained from Dealscan, Compustat, and CRSP. All variables are defined in Appendix.

[16] We create a separate dummy for whether a firm has an outstanding credit rating.

[17] Our analysis allows us to estimate effects both for officers that have worked in more than one bank (i.e., movers) and for officers that have worked in only one bank (i.e., stayers). In two-way fixed effect models, movers help establish employer fixed effects, which are then used to back out fixed effects for both movers and stayers (e.g., Abowd et al., 1999; Correia, 2017). Put differently, estimating fixed effects requires there to be movement in the sample, but does not require us to subsample on only movers. This fact is described in detail, for example, in Graham et al. (2012).

[18] In Section 5 we conduct additional analyses that consider more stringent fixed effects including bank-industry and bank-year fixed effects (section 5.2). We also limit the analysis to only lead loan officers and demonstrate that our results are robust.

[19] The statistics for *Strictness* and *Covenant Mix* are based on reduced samples of 18,246 and 18,946 observations, respectively, for which we have data.

more mature firms compared with the average firm in the Dealscan universe, with average total assets of just over $8.5 billion, mean age of 28 years, and mean profitability of 13%.

In Table 2, we estimate Eq. (1) without firm fixed effects for each of the outcome variables in our study.[20] Doing so allows us to better assess the correlation patterns in the data. Column (1) presents the results for *Spread* and Column (2) presents the results for *Maturity*. The results indicate that larger firms tend to receive loans with lower spreads and reduced maturity, whereas firms with higher leverage face higher spreads. In Columns (3) through (5), we present the results for *Covenants*, *Strictness*, and *Covenant Mix*, respectively. The results indicate that larger firms receive fewer covenants and more levered firms face stricter contracts. The evidence also indicates that firms with higher profitability, younger age, lower tangibility, and higher market to book ratio tend to have higher covenant ratio of *performance covenants*, which is all consistent with the findings of Christensen and Nikolaev (2012). Columns (6) and (7) present the results for *Downgrades* and *Default*. Loans to borrowers with higher market-to-book are less likely to be downgraded, and loans charged with higher interest are more likely to be downgraded. Highly levered borrowers are more likely to experience default within loan maturity. Overall, the evidence suggests both downgrades and default seem to do a reasonable job gauging a loan's performance. The adjusted R-squareds across the models indicate that our covariates explain approximately 20−50% of the variation in the lending term or loan performance, depending on the outcome variable.

4. Main empirical analyses

4.1. Fixed effects regressions to estimate loan officers' influence

We examine loan officers' influence on debt contract terms and lending outcomes using the models specified in Eq. (1) through (3) above. Table 3 presents the results from this analysis. We first run the model with only firm fixed effects (Specification A). We then add in firm and loan controls, which represents our baseline model in Eq. (1) (i.e., Specification B). We then add bank fixed effects to the specification, which estimates Eq. (2) (i.e., Specification C). In our final specification (D), we estimate Eq. (3), by adding loan officer fixed effects to the model.

Table 2
Firm and loan covariates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. Var.:	*Spread*	*Maturity*	*Covenants*	*Strictness*	*Covenant Mix*	*Downgrades*	*Default*
Size	−9.9533***	−2.7353***	−0.1340***	−0.0142	−0.0128	0.0643	0.0006
	(-5.20)	(-6.63)	(-4.80)	(-1.29)	(-1.20)	(1.42)	(0.20)
Age	−0.0915	0.0179	0.0003	−0.0004	−0.0026***	0.0072***	−0.0001
	(-1.19)	(0.99)	(0.20)	(-0.65)	(-4.27)	(3.45)	(-0.72)
Profitability	−92.8423***	13.6835***	0.1640	−1.5335***	0.3129**	0.3778	−0.0311
	(-2.87)	(2.61)	(0.38)	(-7.78)	(2.09)	(0.66)	(-0.81)
Tangibility	10.2767*	−5.2046***	−0.2709***	0.1614***	−0.3619***	0.3556*	0.0310**
	(1.75)	(-4.04)	(-2.79)	(3.37)	(-8.81)	(1.90)	(2.02)
MB	−11.9897***	−0.5105	−0.0094	0.0109	0.0244**	−0.1175***	−0.0031
	(-5.88)	(-1.22)	(-0.29)	(0.75)	(2.44)	(-2.75)	(-1.07)
Leverage	28.0706***	2.5759	−0.1084	0.5501***	0.1187**	0.2739	0.0456**
	(2.93)	(1.63)	(-0.69)	(8.35)	(2.57)	(1.10)	(2.33)
Loan Spread		0.0106***	−0.0004	0.0001	0.0001	0.0014***	0.0000
		(2.94)	(-1.32)	(0.47)	(0.99)	(2.76)	(0.59)
Loan Maturity	0.2453***		−0.0024*	−0.0005	0.0011*	0.0056**	0.0005**
	(2.90)		(-1.77)	(-0.90)	(1.85)	(2.14)	(2.01)
Loan Size	−1.7095	2.8985***	0.0344	0.0088	−0.0135*	0.0911***	0.0027
	(-1.11)	(6.81)	(1.47)	(0.87)	(-1.81)	(2.75)	(0.95)
Covenants	−1.9644	−0.4868*				0.0794**	0.0051*
	(-1.31)	(-1.77)				(2.13)	(1.73)
Secured	30.2160***	4.1114***	0.5351***	0.0172	0.0480***	0.0473	0.0101*
	(7.82)	(6.23)	(7.87)	(0.66)	(2.71)	(0.57)	(1.86)
Loan Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,077	28,077	28,077	18,246	18,946	28,077	28,077
Adjusted R-squared	0.5174	0.3281	0.2662	0.3068	0.3260	0.2118	0.3044

This table displays the results of OLS regressions of lending terms, covenant packages, and loan performance on loan-level and firm-level determinants. Our sample consists of 28,077 loan officer-facility observations. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. The dependent variables are *Spread*, *Maturity*, *Covenants*, *Strictness*, *Covenant Mix*, *Downgrades*, and *Default*. All variables are defined in Appendix. Standard errors are clustered by package. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

[20] We cluster standard errors at the package level to account for some loans having multiple facilities and multiple officers.

Table 3
Loan officer effects – untransformed estimation.

Specification:	**A**	**B**	**C**	**D**
Firm Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Controls	No	**Yes**	**Yes**	**Yes**
Bank FE	No	No	**Yes**	**Yes**
Loan Officer FE	No	No	No	**Yes**
Panel A: Loan Terms				
Spread				
Adjusted R^2	63.65%	75.12%	75.64%	76.87%
Incremental R^2		11.46%	0.52%	**1.23%**
Maturity				
Adjusted R^2	38.37%	54.37%	54.57%	53.51%
Incremental R^2		16.00%	0.20%	**-1.06%**
Panel B: Covenant Package				
Covenants				
Adjusted R^2	65.06%	72.75%	73.41%	76.33%
Incremental R^2		7.69%	0.66%	**2.92%**
Strictness				
Adjusted R^2	75.52%	79.31%	79.88%	82.98%
Incremental R^2		3.79%	0.57%	**3.10%**
Covenant Mix				
Adjusted R^2	92.46%	93.32%	93.49%	94.70%
Incremental R^2		0.86%	0.17%	**1.22%**
Panel C: Loan Performance				
Downgrades				
Adjusted R^2	76.55%	81.78%	82.15%	85.08%
Incremental R^2		5.23%	0.38%	**2.92%**
Default				
Adjusted R^2	79.51%	83.91%	84.09%	87.11%
Incremental R^2		4.40%	0.19%	**3.01%**

This table displays the results of OLS regressions of loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects. Each regression is based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 607 banks, and 3,366 loan officers. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A presents the adjusted R-squared from a regression including only firm (i.e., borrower) fixed effects. Specification B represents the baseline model and presents the adjusted R-squared after including firm fixed effects and time-varying firm controls and loan characteristics. Specifications C and D add bank fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

The results yield several interesting insights. First, with respect to borrower fixed effects, we generally find that unobserved firm heterogeneity explains a substantial portion of the variation in lending outcomes. The adjusted R-squared ranges from 38.4% in the *Maturity* regression to up to nearly 92.5% for *Covenant Mix*. Thus, it is fair to say that borrower time-invariant characteristics are first-order determinants of loan outcomes. Adding the remaining controls specified in Eq. (1) boosts the incremental explanatory power of the models by 0.9–16.0 percentage points, depending on the outcome variable of interest. Specification B (our baseline model, which includes both borrower fixed effects and controls) suggests that firm- and loan-characteristics combined with borrower fixed effects explains 75% of the variation in *Spread*, 54% of the variation in *Maturity*, 73% of the variation in *Covenants*, 79% of the variation in *Strictness*, 93% of the variation in *Covenant Mix*, 82% of the variation in *Downgrades*, and 84% of the variation in *Default*. In other words, this initial model is tightly specified and leaves as little as 6.7% residual variation for banks and loan officers to explain.[21]

The second trend that emerges from Table 3 is the limited role for banks in explaining lending terms and loan outcomes. The results from Specification C, which adds only bank fixed effects to the baseline model, suggest that banks add roughly 50 basis points to the adjusted R-squared. Bank explanatory power becomes particularly small for *Covenant Mix* (0.17%) and loan performance measures, as evidenced by the 0.38% and 0.19% incremental adjusted R-squared for *Downgrades* and *Default*, respectively.

[21] For example, the R-squared in Specification B for *Covenant Mix* is 93.3%, suggesting that banks and loan officers can explain at most 100%−93.3% = 6.7%.

Third, and perhaps most importantly, loan officers have a sizable impact on contract terms and lending outcomes after controlling for bank fixed effects and borrower characteristics. The results in Specification D indicate that loan officers explain a small amount of the variation in *Spread* (1.23%) and have no impact on *Maturity* (−1.06%). In contrast, loan officer fixed effects increase the explanatory power of the *Covenants* and *Strictness* models by 2.9% and 3.1%, respectively, while admittedly having a smaller impact on *Covenant Mix* (1.2%). Thus, loan officers are shown to have a positive influence over all aspects of outcomes except for maturity.[22] Also, the incremental loan officer effect on both the number of covenants and covenant strictness is almost 2.5 times as large as their incremental effect on interest spreads. Finally, loan officer fixed effects also increase the explanatory power of both *Downgrades* and *Default* by roughly 3%.

Overall, this initial analysis suggests that individual loan officers have a distinct effect on many elements of covenant package design, a weaker effect on loan spreads and little effect on maturity. This suggests that loan officers are an instrumental component in the design and negotiation of spread and covenant packages, but that loan officers' influence on maturity is muted. The loan spread and covenant results are consistent with prior studies showing that personal connections between bank executives and borrowers' affect loan interest (Engelberg et al., 2012), loan covenant packages exhibit significant heterogeneity (Skinner, 2011; Christensen et al., 2016; Demerjian and Owens, 2016), and soft information affects covenant choices (Prilmeier, 2017). With respect to performance, the results indicate an important role for loan officers potentially due to their role in monitoring.

4.2. Transformed estimation of loan officers' influence

As highlighted above, our initial results suggest that firm fixed effects explain a substantial portion of the variation in lending outcomes. To better illustrate the role of loan officers, we re-estimate our baseline model, but rather than including borrower fixed effects, we demean all continuous variables by the borrower-level mean (henceforth, the "transformed estimation"). This methodology is similar in spirit to a within-R-squared estimator, which is used in Fracassi et al. (2016) to assess the incremental role of rating analysts in issuing credit ratings. Removing the variation explained by borrower fixed effects allows us to better quantify the loan officers' incremental effect within-firm by focusing on how much of the remaining variation is explained by loan officer effects.

Table 4 provides the results from our transformed estimation. We label the baseline model, representing the transformed estimation of Eq. (1) without firm fixed effects, as Specification A. We then add bank fixed effects onto the baseline specification, which we label Specification B (Eq. (2)). Our final specification (C) considers the effects of loan officers above and beyond banks and borrower characteristics (shown in Eq. (3)).

Before interpreting the results, we first illustrate the relationship between Tables 3 and 4 results. Consider for example the incremental explanatory power of loan officer fixed effects on *Spread* (the final column of the first highlighted row in the table). The result from the transformed estimation indicates that loan officers add 3.97% explanatory power above and beyond the baseline with bank fixed effects. Using the untransformed estimation (Table 3), we find that loan officers boost the explanatory power of the model by 1.23%, but the residual variation remaining to be explained after including firm fixed effects is only 36.35% (100%−63.65%). Thus, loan officers explain 3.4% of the residual variation (1.23%/36.35%), a figure that is very similar to that produced in the transformed estimation.

The results in Table 4 ultimately indicate a similar pattern with respect to loan officers' effects. Loan officers modestly increase the explanatory power of *Spread* (adjusted R-squared = 3.97%) and have no impact on *Maturity*. In contrast, loan officer fixed effects increase the explanatory power of *Covenants* by 7.7%, *Strictness* by 12.1%, and *Covenant Mix* by 15.9%. With respect to performance, loan officers increase the explanatory power of the *Downgrades* model by 11.4% and *Default* by 14.2%. Overall, the pattern of results is consistent with that produced in Table 3.

4.3. Assessing statistical significance

While the above analyses provide evidence on the magnitude of loan officers' effects, they do not speak directly to their statistical significance. To assess the statistical significance of fixed effects, recent studies conduct simulations that randomly assign individuals as a placebo analysis (Fee et al., 2013; Fracassi et al., 2016). Our next set of analyses adopts this approach.[23]

In Table 5, we formally test the statistical significance of incremental loan officer effects by implementing a simulation analysis that randomly assigns loan officers to other loans in the sample for 1000 iterations. The simulation analysis thus generates a distribution of incremental adjusted R-squared explained by randomly matched loan officers. The columns indicating "90th Percentile," "95th Percentile," and "99th Percentile" display the percentiles on the simulated distribution. The column "Incremental R^2" indicates the incremental adjusted R-squared explained by loan officers from our analyses (Tables 3 and 4). In Panels A and B, we present the results for the untransformed and transformed incremental adjusted R-

[22] In subsequent analysis, we use simulation analysis following Fee et al. (2013) to show that, except for maturity, the adjusted R-squareds generated by loan officers are significantly different from zero.

[23] We do not rely on Akaike and Bayesian Information Criterion statistics to assess model fit because these statistics are based on maximum likelihood estimation (MLE). MLE can generate inconsistent estimators in a model with a large number of fixed effects (i.e., the "incidental parameter problem," see Neyman and Scott (1948), Lancaster (2000), and Greene (2004)).

Table 4
Loan officer effects – transformed estimation.

Specification:	A	B	C
Firm-Demeaned	**Yes**	**Yes**	**Yes**
Controls	**Yes**	**Yes**	**Yes**
Bank FE	No	**Yes**	**Yes**
Loan Officer FE	No	No	**Yes**
Panel A: Loan Terms			
Spread			
Adjusted R^2	19.85%	21.23%	25.21%
Incremental R^2		1.38%	**3.97%**
Maturity			
Adjusted R^2	18.26%	18.78%	17.46%
Incremental R^2		0.52%	**-1.32%**
Panel B: Covenant Package			
Covenants			
Adjusted R^2	18.21%	19.93%	27.62%
Incremental R^2		1.71%	**7.69%**
Strictness			
Adjusted R^2	9.95%	12.23%	24.34%
Incremental R^2		2.29%	**12.10%**
Covenant Mix			
Adjusted R^2	5.79%	8.05%	23.93%
Incremental R^2		2.26%	**15.87%**
Panel C: Loan Performance			
Downgrades			
Adjusted R^2	13.97%	15.42%	26.85%
Incremental R^2		1.44%	**11.43%**
Default			
Adjusted R^2	11.87%	12.72%	26.91%
Incremental R^2		0.86%	**14.18%**

This table displays the results of OLS regressions of firm-demeaned loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects. Each regression is based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 607 banks, and 3,366 loan officers. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A represents the baseline model and presents the adjusted R-squared after including time-varying firm controls and loan characteristics. Specifications B and C add bank fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

squared, respectively. We find that loan officers' incremental explanatory power exceeds the 99th percentile of the simulated distribution for *Spread*, *Covenants*, *Strictness*, *Covenant Mix*, *Downgrades*, and *Default* using both the untransformed and transformed estimations. In both settings, *Maturity* does not exceed any simulated incremental adjusted R-squared criteria. This analysis thus suggests that loan officers have a statistically significant impact on spreads, covenants, and performance, but no effect on loan maturity.

We also conduct a similar analysis using F-stats, where F is defined as follows:

$$F = \frac{\left(\frac{RSS_1 - RSS_2}{p_2 - p_1}\right)}{\left(\frac{RSS_2}{n - p_2}\right)} \tag{4}$$

In Eq. (4), RSS_1 is the residual sum of squares from the restricted model (i.e., model without loan officer fixed effects) and $RSS_2$is the residual sum of squares from the unrestricted model (i.e., with loan officer fixed effects); n represents the sample size; and $p_1$and p_2 are the number of parameters in the restricted and unrestricted models, respectively.

Table 5
Assessing statistical significance of loan officer effects using simulation analysis.

Panel A: R^2 Simulation Using Untransformed Estimation					
	Simulated Distribution of Incremental R^2			*Incremental R^2*	
Dep. Var.:	90th Percentile	95th Percentile	99th Percentile		
Spread	0.18%	0.24%	0.32%	**1.23%**	***
Maturity	0.21%	0.25%	0.37%	−1.06%	
Covenants	0.13%	0.17%	0.24%	**2.92%**	***
Strictness	0.19%	0.25%	0.32%	**3.10%**	***
Covenant Mix	0.10%	0.12%	0.16%	**1.22%**	***
Downgrades	0.15%	0.20%	0.27%	**2.92%**	***
Default	0.21%	0.26%	0.40%	**3.01%**	***
Panel B: R^2 Simulation Using Transformed Estimation					
	Simulated Distribution of Incremental R^2			*Incremental R^2*	
Dep. Var.:	90th Percentile	95th Percentile	99th Percentile		
Spread	0.50%	0.62%	0.82%	**3.97%**	***
Maturity	0.35%	0.45%	0.68%	−1.32%	
Covenants	0.38%	0.48%	0.72%	**7.69%**	***
Strictness	0.74%	0.98%	1.39%	**12.10%**	***
Covenant Mix	1.20%	1.54%	2.30%	**15.87%**	***
Downgrades	0.79%	1.05%	1.64%	**11.43%**	***
Default	1.00%	1.34%	1.94%	**14.18%**	***
Panel C: F-Statistic Simulation Using Untransformed Estimation					
	Simulated Distribution of F-statistics			*F-statistic*	
Dep. Var.:	90th Percentile	95th Percentile	99th Percentile		
Spread	1.06	1.08	1.10	**1.43**	***
Maturity	1.04	1.04	1.07	0.82	
Covenants	1.04	1.05	1.07	**1.99**	***
Strictness	1.05	1.06	1.08	**2.01**	***
Covenant Mix	1.08	1.10	1.14	**2.31**	***
Downgrades	1.07	1.09	1.12	**2.57**	***
Default	1.11	1.13	1.20	**2.88**	***
Panel D: F-Statistic Simulation Using Transformed Estimation					
	Simulated Distribution of F-statistics			*F-statistic*	
Dep. Var.:	90th Percentile	95th Percentile	99th Percentile		
Spread	1.05	1.07	1.09	**1.44**	***
Maturity	1.04	1.05	1.07	0.87	
Covenants	1.04	1.05	1.07	**1.89**	***
Strictness	1.05	1.06	1.09	**1.93**	***
Covenant Mix	1.07	1.10	1.14	**2.25**	***
Downgrades	1.08	1.10	1.16	**2.30**	***
Default	1.09	1.13	1.19	**2.62**	***

This table displays the of OLS regressions of lending terms, covenant packages, and loan performance on loan-level and firm-level determinants and fixed effects using simulation analyses. For each simulation, loan officers are randomly assigned to other loans in our sample, and the simulation is run with 1000 iterations. Panels A and B present simulated incremental adjusted R-squared using untransformed and transformed estimations. Panels C and D present simulated F-statistics using untransformed and transformed estimations. The untransformed estimation contains firm fixed effects and the transformed estimation demeans by firm. Statistical significance is assessed based on the percentage of simulations in which the estimated loan officer incremental adjusted R-squared or F-statistic exceeds the simulated threshold. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

In Panels C and D, we provide the simulated F-statistics as well as those generated using our data. We find that loan officers' F-statistic exceeds the 99th percentile of the simulated distribution for *Spread*, *Covenants*, *Strictness*, *Covenant Mix*, *Downgrades*, and *Default* using both the untransformed and transformed estimations. In both settings, *Maturity* does not exceed the simulated F-statistics. Overall, all four panels produce a similar inference and suggest that loan officers have a significant impact on many aspects of the loan contracting process.

5. Additional analyses

In this section, we discuss additional analyses to further assess loan officer effects. In our first set of analyses, we re-examine our results across lead and participant officer samples. In our second set of analyses, we assess the robustness of our findings after controlling for other forms of unobservable bank heterogeneity.

5.1. Lead versus participant loan officers

Our main analyses include all loan officers (i.e., from both leads and participating banks). Prior research and industry practice suggest that lead banks play a prominent role in the lending and monitoring process. However, recent studies (e.g., Lim et al., 2014; Cai et al., 2017; Bruche et al., 2020) suggest that participating lenders also have an influence. To shed light on this issue, we re-examine our results by partitioning our sample into those issued only by loan officers at lead arranger banks versus those that at participant lenders.

Table 6 reports results for the lead lender sample and participant lender sample separately using the untransformed estimation. The results for lead lenders are provided in the first major panel (Panels A1, B1, and C1) and the results for participant lenders are provided in the second major panel (Panels A2, B2, and C2). The results indicate that both lead and participant loan officers affect the debt contracting process, although lead officers appear to have a larger effect. For example, lead officer fixed effects increase the incremental explanatory power of *Spread* by 1.75%, *Covenants* by 5.15%, *Strictness* by 5.44%, *Covenant Mix* by 2.09%, performance variables by roughly 6.5%, and have no effect on *Maturity*. Participant officers have a smaller effect and only increase the incremental explanatory power of *Spread* by 0.69%, *Covenants* by 3.25%, *Strictness* by 3.33%, *Covenant Mix* by 1.19%, and performance variables by roughly 2.5%.

Table 6
Lead & participant officers – untransformed estimation.

Lead Loan Officer Sample

Specification:	**A**	**B**	**C**	**D**
Firm FE	**Yes**	**Yes**	**Yes**	**Yes**
Controls	No	**Yes**	**Yes**	**Yes**
Bank FE	No	No	**Yes**	**Yes**
Loan Officer FE	No	No	No	**Yes**
Panel A1: Loan Terms				
Spread				
Adjusted R^2	64.94%	74.00%	74.52%	76.27%
Incremental R^2		9.06%	0.52%	**1.75%**
Maturity				
Adjusted R^2	37.85%	53.62%	54.33%	52.52%
Incremental R^2		15.77%	0.71%	**-1.81%**
Panel B1: Covenant Package				
Covenants				
Adjusted R^2	66.85%	73.08%	74.40%	79.55%
Incremental R^2		6.23%	1.32%	**5.15%**
Strictness				
Adjusted R^2	75.56%	79.81%	80.79%	86.24%
Incremental R^2		4.25%	0.99%	**5.44%**
Covenant Mix				
Adjusted R^2	91.52%	93.53%	94.41%	96.49%
Incremental R^2		2.00%	0.88%	**2.09%**
Panel C1: Loan Performance				
Downgrades				
Adjusted R^2	76.02%	82.15%	82.75%	89.28%
Incremental R^2		6.13%	0.60%	**6.53%**
Default				
Adjusted R^2	76.41%	85.01%	85.64%	92.31%
Incremental R^2		8.59%	0.63%	**6.67%**

Participant Loan Officer Sample

Specification:	**A**	**B**	**C**	**D**
Firm FE	**Yes**	**Yes**	**Yes**	**Yes**
Controls	No	**Yes**	**Yes**	**Yes**
Bank FE	No	No	**Yes**	**Yes**
Loan Officer FE	No	No	No	**Yes**
Panel A2: Loan Terms				
Spread				
Adjusted R^2	66.51%	79.08%	79.99%	80.68%
Incremental R^2		12.57%	0.91%	**0.69%**
Maturity				
Adjusted R^2	40.59%	56.52%	56.50%	54.95%
Incremental R^2		15.93%	-0.01%	**-1.55%**
Panel B2: Covenant Package				
Covenants				
Adjusted R^2	67.74%	75.17%	75.89%	79.14%
Incremental R^2		7.42%	0.72%	**3.25%**
Strictness				
Adjusted R^2	78.24%	81.99%	82.51%	85.84%
Incremental R^2		3.75%	0.52%	**3.33%**
Covenant Mix				
Adjusted R^2	93.36%	94.00%	94.11%	95.31%
Incremental R^2		0.64%	0.11%	**1.19%**
Panel C2: Loan Performance				
Downgrades				
Adjusted R^2	80.75%	85.24%	85.51%	87.99%
Incremental R^2		4.49%	0.27%	**2.48%**
Default				
Adjusted R^2	81.97%	86.07%	86.23%	89.04%
Incremental R^2		4.10%	0.15%	**2.81%**

This table displays the results of OLS regressions of loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects for loan officers classified as lead lenders (Panels A1, B1, and C1) and loan officers classified as participant lenders (Panels A2, B2, and C2). The lead officer regressions are based on a sample of 10,295 loan officer-facility observations, including 901 distinct firms, 1,777 loan officers, and 222 banks. The participant officer regressions are based on a sample of 17,782 loan officer-facility observations, including 892 distinct firms, 2,964 loan officers, and 575 banks. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A presents the adjusted R-squared from a regression including only firm (i.e., borrower) fixed effects. Specification B represents the baseline model and presents the adjusted R-squared after including firm fixed effects and time-varying firm controls and loan characteristics. Specifications C and D add bank fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

In Table 7, we re-examine the influence of leads and participant lenders using the transformed estimation. Here, we continue to see that both lead and participant loan officers exhibit an effect on the debt contracting process. The inferences are generally similar to the untransformed estimation and suggest a larger role for lead lenders than participant lenders across all terms except for *Spread*, where we now see a marginally larger effect for participant loan officers. Specifically, we find that loan officers at lead arranger banks are more influential than officers at participant banks over both covenant

package design (around 1.5 times as large) and loan performance (around 1.7 time as large). In untabulated analyses, we also assess the significance of lead and participant officers on loan terms and performance using the simulation procedure discussed in Section 4.3. Using both the untransformed and transformed estimations, we randomly assign loan officers to different loans and then partition the sample by leads and participants, iterating 1000 times. Our inferences remain unchanged and suggest that both leads and participants have a significant impact on all terms, except for maturity.

To better illustrate these results, Fig. 1 plots the incremental explanatory power of loan officers across the two partitions using the transformed estimation. The red (solid) line delineates lead loan officer effects and the black (dashed) line delineates participant loan officer effects. The figure reveals similar effects for *Spread* and *Maturity* and a divergence for covenants and performance. While both types of officers clearly have an impact, leads consistently generate a larger effect on covenants and performance.

Table 7
Lead & participant officers – transformed estimation.

Lead Loan Officer Sample			
Specification:	**A**	**B**	**C**
Firm-Demeaned	**Yes**	**Yes**	**Yes**
Controls	**Yes**	**Yes**	**Yes**
Bank FE	No	**Yes**	**Yes**
Loan Officer FE	No	No	**Yes**
Panel A1: Loan Terms			
Spread			
Adjusted R^2	16.96%	17.83%	21.45%
Incremental R^2		0.87%	**3.62%**
Maturity			
Adjusted R^2	17.99%	18.68%	15.62%
Incremental R^2		0.69%	**-3.06%**
Panel B1: Covenant Package			
Covenants			
Adjusted R^2	14.45%	17.51%	31.30%
Incremental R^2		3.06%	**13.79%**
Strictness			
Adjusted R^2	10.08%	12.99%	30.95%
Incremental R^2		2.91%	**17.96%**
Covenant Mix			
Adjusted R^2	11.05%	19.30%	41.37%
Incremental R^2		8.24%	**22.08%**
Panel C1: Loan Performance			
Downgrades			
Adjusted R^2	13.67%	15.34%	37.98%
Incremental R^2		1.67%	**22.64%**
Default			
Adjusted R^2	19.87%	21.15%	45.07%
Incremental R^2		1.29%	**23.92%**

Participant Loan Officer Sample

Specification:	**A**	**B**	**C**
Firm-Demeaned	**Yes**	**Yes**	**Yes**
Controls	**Yes**	**Yes**	**Yes**
Bank FE	No	**Yes**	**Yes**
Loan Officer FE	No	No	**Yes**
Panel A2: Loan Terms			
Spread			
Adjusted R^2	21.75%	24.16%	28.31%
Incremental R^2		2.42%	**4.15%**
Maturity			
Adjusted R^2	17.33%	17.78%	15.75%
Incremental R^2		0.45%	**-2.03%**
Panel B2: Covenant Package			
Covenants			
Adjusted R^2	18.77%	20.74%	29.01%
Incremental R^2		1.97%	**8.27%**
Strictness			
Adjusted R^2	11.06%	13.49%	26.85%
Incremental R^2		2.43%	**13.36%**
Covenant Mix			
Adjusted R^2	4.06%	5.64%	21.71%
Incremental R^2		1.58%	**16.07%**
Panel C2: Loan Performance			
Downgrades			
Adjusted R^2	14.41%	15.64%	27.41%
Incremental R^2		1.23%	**11.78%**
Default			
Adjusted R^2	11.09%	11.94%	27.50%
Incremental R^2		0.85%	**15.56%**

This table displays the results of OLS regressions of firm-demeaned loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects for loan officers classified as lead lenders (Panels A1, B1, and C1) and loan officers classified as participant lenders (Panels A2, B2, and C2). The lead officer regressions are based on a sample 10,295 loan officer-facility observations, including 901 distinct firms, 1,777 loan officers, and 222 banks. The participant officer regressions are based on a sample of 17,782 loan officer-facility observations, including 892 distinct firms, 2,964 loan officers, and 575 banks. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A represents the baseline model and presents the adjusted R-squared after including time-varying firm controls and loan characteristics. Specifications B and C add bank fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

5.2. Accounting for other types of unobservable heterogeneity

Our final set of analyses considers more stringent bank-level fixed effects to stress-test whether loan officers exhibit an independent influence on loan contracting. We consider two additional bank fixed effects specifications in lieu of bank fixed effects. First, we include bank-industry fixed effects to account for the possibility that banks differ in industry focus. Berger et al. (2017) and Cai et al. (2017) show that industry specialization significantly influences a bank's lending processes. Second, we include bank-year fixed effects to account for time-varying characteristics of banks (e.g., performance,

Loan Term:	Spread	Maturity	Covenants	Strictness	Covenant Mix	Downgrades	Default
Lead	3.62%	-3.06%	13.79%	17.96%	22.08%	22.64%	23.92%
Participant	4.15%	-2.03%	8.27%	13.36%	16.07%	11.78%	15.56%

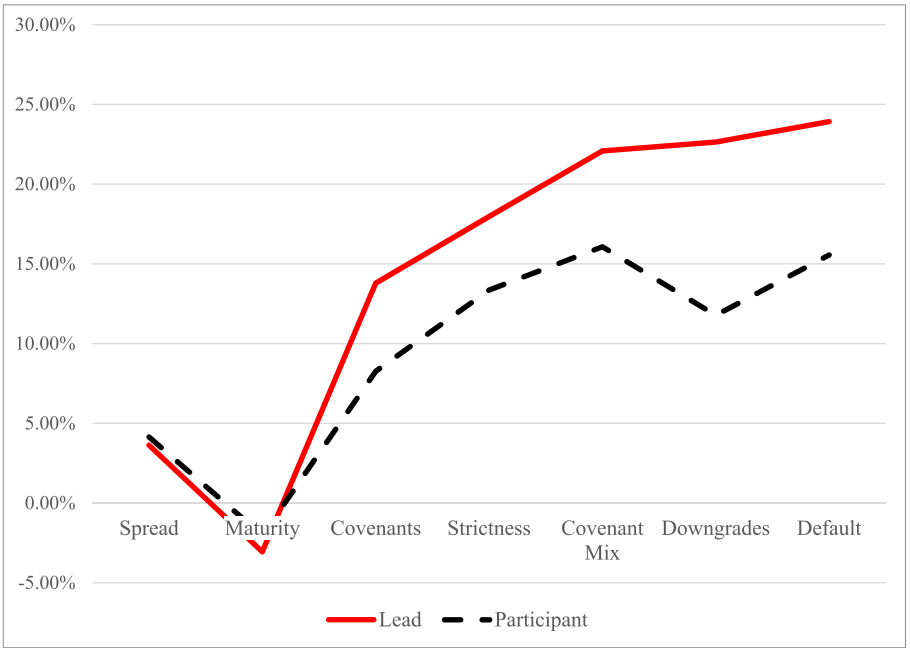

Fig. 1. Loan Officer Influence: Lead versus Participant Lenders. Figure 1 displays the incremental adjusted R-squared of loan officers on loan terms, covenant packages, and loan performance based on transformed estimation results from Table 7. The figure presents estimation results from two samples. The lead sample consists of 10,295 loan officer-facility observations, including 901 distinct firms, 1777 loan officers, and 222 banks. The participant sample consists of 17,782 loan officer-facility observations, including 892 distinct firms, 2964 loan officers, and 575 banks. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. The red (solid) line indicates incremental adjusted R-squared of loan officer fixed effects from a subsample of lead lenders. The black (dashed) line indicates incremental adjusted R-squared of loan officer fixed effects from a subsample of participant lenders. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

management changes, and reputational damage). For example, Gopalan et al. (2011) provides evidence that, following a large borrower's bankruptcy, a bank's reputation can be damaged and impact their lending activities in the syndicated loan market.

Tables 8 and 9 replace bank fixed effects with bank-industry and bank-year fixed effects using the untransformed estimation and transformed estimation, respectively. The results for bank-industry fixed effects are provided in the first major panel of each table (Panels A1, B1, and C1) and the results for bank-year fixed effects are provided in the second major panel of each table (Panels A2, B2, and C2).

The tables yield several interesting patterns. First, the analyses reveal that both bank-industry and bank-year fixed effects provide much higher explanatory power than bank fixed effects, which is consistent with banks having industry expertise and time-varying policies. To illustrate this point, consider Fig. 2, which presents the incremental bank, bank-industry, and bank-year explanatory power provided by Tables 4 and 9 (i.e., the transformed estimation) respectively. The red (solid) line reflects bank fixed effects, the black (dashed) line indicates bank-industry fixed effects, and the blue (dotted) line presents bank-year fixed effects. Bank fixed effects only increase the explanatory power of *Spread* by 1.4%, while bank-industry and bank-year fixed effects explain the explanatory power by 5.0% and 5.4%, respectively. The contrasts become even greater for covenants and performance measures. For example, bank fixed effects only offer 1.4% additional explanatory power for *Downgrades*, while bank-industry fixed effects boost the explanatory power by 16.6%, an effect that is more than 11 times that of bank fixed effects alone. Thus, these patterns suggest that finer levels of bank heterogeneity offer more explanatory power for lending outcomes.

Second, despite the increase in bank explanatory power, we continue to document incremental explanatory power for loan officer fixed effects across these tests. For *Spread*, we find that loan officers increase the explanatory power by 0.85% and 3.32% above and beyond bank-industry fixed effects using the untransformed (Table 8) and transformed estimation (Table 9),

respectively. Similarly, loan officers increase the explanatory power of *Spread* by 0.96% and 3.18%, respectively, above and beyond bank-year fixed effects using these two approaches. We also find that loan officers continue to have incremental influence over covenant packages and performance, but as before, not over maturity. For example, using the transformed estimation, loan officers increase the explanatory power of *Covenants* by 8.5% after including bank-industry fixed effects and increase the explanatory power by 7.3% after including bank-year fixed effects. The effects are more pronounced for *Covenant Mix* and for performance, with incremental explanatory power for loan officers reaching 15–16% for *Covenant Mix* and *Default* in the transformed estimation. These specifications provide evidence that our documented loan officer fixed effects are not due to banks' industry expertise or time-varying circumstances.

In untabulated analyses, we also assess the significance of loan officers on loan terms and performance after including bank-industry or bank-year fixed effects using the simulation procedure discussed in Section 4.3. Using both the untransformed and transformed estimations, we randomly assign loan officers to different loans and then re-estimate our models with bank-industry and bank-year fixed effects, iterating 1000 times. Our inferences remain unchanged and suggest that loan officers continue to have a significant impact on all terms, except maturity.

To illustrate the above point, Fig. 3 plots the incremental adjusted R-squared of loan officers for each outcome variable across specifications using the transformed estimation. The red (solid) line represents the bank fixed effects specification,

Table 8
Bank-industry and bank-year fixed effects – untransformed estimation.

	Bank-Industry Fixed Effects			
Specification:	**A**	**B**	**C**	**D**
Firm-Demeaned	**Yes**	**Yes**	**Yes**	**Yes**
Controls	No	**Yes**	**Yes**	**Yes**
Bank-Industry FE	No	No	**Yes**	**Yes**
Loan Officer FE	No	No	No	**Yes**
Panel A1: Loan Terms				
Spread				
Adjusted R^2	63.65%	75.12%	76.59%	77.45%
Incremental R^2		11.46%	1.47%	**0.85%**
Maturity				
Adjusted R^2	38.37%	54.37%	54.67%	53.09%
Incremental R^2		16.00%	0.30%	**-1.58%**
Panel B1: Covenant Package				
Covenants				
Adjusted R^2	65.06%	72.75%	77.38%	80.45%
Incremental R^2		7.69%	4.63%	**3.07%**
Strictness				
Adjusted R^2	75.52%	79.31%	84.00%	87.09%
Incremental R^2		3.79%	4.69%	**3.09%**
Covenant Mix				
Adjusted R^2	92.46%	93.32%	95.46%	96.64%
Incremental R^2		0.86%	2.13%	**1.19%**
Panel C1: Loan Performance				
Downgrades				
Adjusted R^2	76.55%	81.78%	86.13%	89.00%
Incremental R^2		5.23%	4.35%	**2.87%**
Default				
Adjusted R^2	79.51%	83.91%	85.58%	88.87%
Incremental R^2		4.40%	1.68%	**3.29%**

Bank-Year Fixed Effects

Specification:	**A**	**B**	**C**	**D**
Firm-Demeaned	**Yes**	**Yes**	**Yes**	**Yes**
Controls	No	**Yes**	**Yes**	**Yes**
Bank-Year FE	No	No	**Yes**	**Yes**
Loan Officer FE	No	No	No	**Yes**
Panel A2: Loan Terms				
Spread				
Adjusted R^2	63.65%	75.12%	76.80%	77.76%
Incremental R^2		11.46%	1.69%	**0.96%**
Maturity				
Adjusted R^2	38.37%	54.37%	54.98%	53.60%
Incremental R^2		16.00%	0.61%	**-1.38%**
Panel B2: Covenant Package				
Covenants				
Adjusted R^2	65.06%	72.75%	76.23%	79.04%
Incremental R^2		7.69%	3.48%	**2.81%**
Strictness				
Adjusted R^2	75.52%	79.31%	83.02%	86.08%
Incremental R^2		3.79%	3.71%	**3.06%**
Covenant Mix				
Adjusted R^2	92.46%	93.32%	94.38%	95.64%
Incremental R^2		0.86%	1.06%	**1.26%**
Panel C2: Loan Performance				
Downgrades				
Adjusted R^2	76.55%	81.78%	84.50%	87.49%
Incremental R^2		5.23%	2.72%	**2.99%**
Default				
Adjusted R^2	79.51%	83.91%	86.42%	89.49%
Incremental R^2		4.40%	2.51%	**3.07%**

This table displays the results of OLS regressions of loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects after including bank-industry fixed effects (Panels A1, B1, and C1) and bank-year fixed effects (Panels A2, B2, and C2). The bank-industry regressions are based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 3,366 loan officers, and 4,234 bank-industry dummies. The bank-year regressions are based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 3,366 loan officers, and 2,712 bank-year dummies. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A presents the adjusted R-squared from a regression including only firm (i.e., borrower) fixed effects. Specification B represents the baseline model and presents the adjusted R-squared after including firm fixed effects and time-varying firm controls and loan characteristics. Specifications C and D add bank-industry (or bank-year) fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

the black (dashed) line presents the bank-industry specification, and the blue (dotted) line presents the bank-year specification. Fig. 3 clearly reveals that there is little difference in loan officers' incremental influence across the three bank effects specifications. Despite the large increase in bank explanatory power, loan officers remain equally influential across settings.

6. Summary

We investigate the extent to which loan officers generate individual effects on the design and performance of syndicated loan deals. Our study contributes to a growing literature examining how differences across individual loan officers and across banking organizations influence the behavior and decisions of loan officers. However, data limitations generally preclude these studies from systematically disentangling the contributions of organizational and human capital. We address this limitation by constructing a large, novel database containing the identities of loan officers involved in structuring syndicated loan deals. This allows us to systematically disentangle borrower, bank, and loan officer fixed effects. Importantly, our sample permits us to restrict the analysis to a large sample of borrowers with multiple loans originated by different loan officers,

Table 9
Bank-industry and bank-year fixed effects – transformed estimation.

	Bank-Industry Fixed Effects		
Specification:	**A**	**B**	**C**
Firm-Demeaned	**Yes**	**Yes**	**Yes**
Controls	**Yes**	**Yes**	**Yes**
Bank-Industry FE	No	**Yes**	**Yes**
Loan Officer FE	No	No	**Yes**
Panel A1: Loan Terms			
Spread			
Adjusted R^2	19.85%	24.87%	28.19%
Incremental R^2		5.02%	**3.32%**
Maturity			
Adjusted R^2	18.26%	18.74%	16.84%
Incremental R^2		0.48%	**-1.91%**
Panel B1: Covenant Package			
Covenants			
Adjusted R^2	18.21%	29.88%	38.34%
Incremental R^2		11.67%	**8.45%**
Strictness			
Adjusted R^2	9.95%	25.06%	38.74%
Incremental R^2		15.12%	**13.67%**
Covenant Mix			
Adjusted R^2	5.79%	27.90%	43.87%
Incremental R^2		22.11%	**15.98%**
Panel C1: Loan Performance			
Downgrades			
Adjusted R^2	13.97%	30.52%	41.35%
Incremental R^2		16.55%	**10.83%**
Default			
Adjusted R^2	11.87%	19.50%	35.42%
Incremental R^2		7.64%	**15.92%**

Bank-Year Fixed Effects

Specification:	**A**	**B**	**C**
Firm-Demeaned	**Yes**	**Yes**	**Yes**
Controls	**Yes**	**Yes**	**Yes**
Bank-Year FE	No	**Yes**	**Yes**
Loan Officer FE	No	No	**Yes**
Panel A2: Loan Terms			
Spread			
Adjusted R^2	19.85%	25.24%	28.42%
Incremental R^2		5.39%	**3.18%**
Maturity			
Adjusted R^2	18.26%	19.75%	17.76%
Incremental R^2		1.49%	**-1.99%**
Panel B2: Covenant Package			
Covenants			
Adjusted R^2	18.21%	27.48%	34.76%
Incremental R^2		9.27%	**7.28%**
Strictness			
Adjusted R^2	9.95%	23.58%	36.22%
Incremental R^2		13.63%	**12.64%**
Covenant Mix			
Adjusted R^2	5.79%	18.50%	33.86%
Incremental R^2		12.71%	**15.36%**
Panel C2: Loan Performance			
Downgrades			
Adjusted R^2	13.97%	24.48%	36.22%
Incremental R^2		10.50%	**11.75%**
Default			
Adjusted R^2	11.87%	22.44%	37.29%
Incremental R^2		10.57%	**14.85%**

This table displays the results of OLS regressions of firm-demeaned loan terms (Panel A), covenant packages (Panel B), and loan performance (Panel C) on loan-level and firm-level determinants and fixed effects after including bank-industry fixed effects (Panels A1, B1, and C1) and bank-year fixed effects (Panels A2, B2, and C2). The bank-industry regressions are based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 3,366 loan officers, and 4,234 bank-industry dummies. The bank-year regressions are based on a sample of 28,077 loan officer-facility observations, including 989 distinct firms, 3,366 loan officers, and 2,712 bank-year dummies. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. In each test, Specification A represents the baseline model and presents the adjusted R-squared after including time-varying firm controls and loan characteristics. Specifications B and C add bank-industry (or bank-year) fixed effects and then loan officer fixed effects on top of the baseline model. The highlighted row presents the incremental adjusted R-squared from each subsequent model loading. All variables are defined in the Appendix.

allowing us to include borrower fixed effects in addition to bank and loan officer fixed effects. This implies that our estimates are unaffected by matching or assignment between borrowers and loan officers based on included *observable* time-varying borrower characteristics or *unobservable* time-invariant borrower characteristics. While we acknowledge that we cannot completely rule out a matching explanation, our empirical specification provides rigorous evidence to suggest that loan officers play a role in shaping debt contracts.

We provide robust evidence that loan officers have significant influence on interest spreads and loan covenant design ex ante, and on loan performance ex post. However, beyond simply identifying the existence of incremental loan officer effects, we investigate the heterogeneity of loan officers' influence across loan contract terms. We show that loan officer effects appear to be most pronounced for covenant package design and loan performance, which is consistent with competitive market forces partially constraining loan officers' ability to affect loan pricing. We also extend the literature by separately examining the influence of loan officers at lead arranger banks and participant banks, finding that lead officers have a substantially greater influence than participant officers over both covenant package design and loan performance, while we find mixed evidence in terms of differential influence over interest spreads.

Loan Term:	Spread	Maturity	Covenants	Strictness	Covenant Mix	Downgrades	Default
Bank FE	1.38%	0.52%	1.71%	2.29%	2.26%	1.44%	0.86%
Bank-Industry FE	5.02%	0.48%	11.67%	15.12%	22.11%	16.55%	7.64%
Bank-Year FE	5.39%	1.49%	9.27%	13.63%	12.71%	10.50%	10.57%

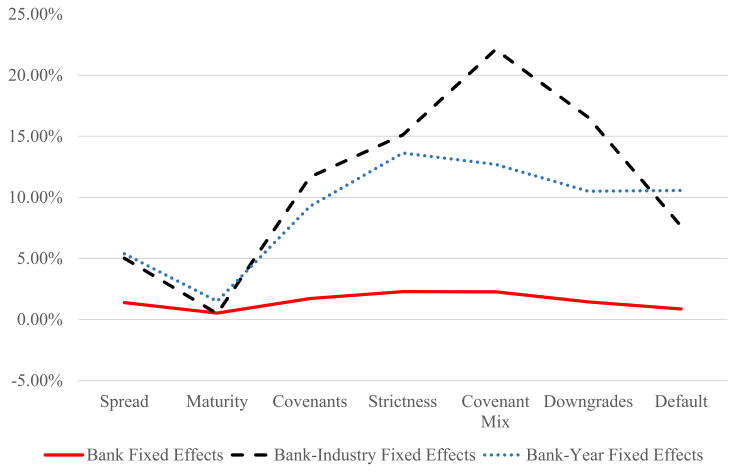

Fig. 2. Bank Influence: Varying Levels of Bank Heterogeneity. Figure 2 displays the incremental adjusted R-squared of banks on loan terms, covenant packages, and loan performance based on transformed estimation results from Table 4 (for row 1) and Table 9 (for rows 2 and 3). The sample is comprised of 28,077 loan officer-facility observations, including 989 distinct firms, 607 banks, 4234 bank-industry pairs, and 2712 bank-year pairs. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. The red (solid) line indicates incremental adjusted R-squared of bank fixed effects from regressions controlling for firm and loan characteristics. The black (dashed) line indicates incremental adjusted R-squared of bank-industry fixed effects. The blue (dotted) line indicates incremental adjusted R-squared of bank-year fixed effects. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Loan Term:	Spread	Maturity	Covenants	Strictness	Covenant Mix	Downgrades	Default
Bank FE	3.97%	-1.32%	7.69%	12.10%	15.87%	11.43%	14.18%
Bank-Industry FE	3.32%	-1.91%	8.45%	13.67%	15.98%	10.83%	15.92%
Bank-Year FE	3.18%	-1.99%	7.28%	12.64%	15.36%	11.75%	14.85%

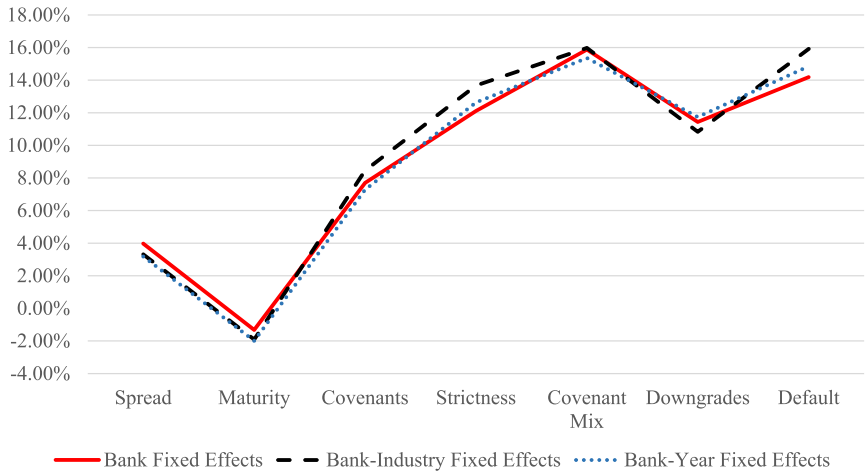

Fig. 3. Loan Officer Influence: Varying Levels of Bank Heterogeneity. Figure 3 displays the incremental adjusted R-squared of loan officers on loan terms, covenant packages, and loan performance based on transformed estimation results from Table 4 (for row 1) and Table 9 (for rows 2 and 3). The sample is comprised of 28,077 loan officer-facility observations, including 989 distinct firms, 607 banks, 4234 bank-industry pairs, 2712 bank-year pairs, and 3366 loan officers. Our sample retains only loan officers that serve an important role at the bank (e.g., vice presidents, presidents, managers, or directors). We further require each firm to have at least two loans in the sample, and for each officer to be observed across two or more firms. The red (solid) line indicates incremental adjusted R-squared of loan officer fixed effects from regressions controlling for bank fixed effects. The black (dashed) line indicates incremental adjusted R-squared of loan officer fixed effects from regressions controlling for bank-industry fixed effects. The blue (dotted) line indicates incremental adjusted R-squared of loan officer fixed effects from regressions controlling for bank-year fixed effects. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Finally, our study provides novel evidence on the relative importance of individual loan officers, banks' organizational capital, and borrower characteristics for designing syndicated contracts and affecting loan performance. While borrower characteristics explain by far the largest portion of variation in contract terms, individual loan officers are shown to have a significant incremental influence on loan spreads and covenant design that is greater than or commensurate with the influence of lending banks. Thus, in the syndicated loan market, with its intense competition, sophisticated players and publicly traded borrowers, we provide robust evidence that individual loan officers have scope to exert a significant influence on contract design. Importantly, these loan officer effects are consequential in that they have a significant influence on loan performance.

Appendix. Variable definitions

- *Spread:* All-in-drawn loan spreads over LIBOR (in basis points)
- *Maturity*: Loan maturity (in months)
- *Covenants*: Total number of covenants on the loan package
- *Strictness*: Covenant strictness as defined by Demerjian and Owens (2016).
- *Covenant* Mix: The ratio of the number of performance covenants to the number of performance and capital covenants as defined by Christensen and Nikolaev (2012).
- *Downgrades*: The total number of S&P rating grids that a borrower is downgraded during the span of the loan, and zero if the borrower does not receive a downgrade
- *Default*: An indicator variable that takes the value of one if a borrower experiences a default rating from S&P ("D" or "SD"), and zero otherwise
- *Size*: Log of total assets (AT)
- *Age*: Years after a firm's first appearance in Compustat database
- *Profitability*: Operating income (OIBDP)/total assets
- *Tangibility*: Property, plant, and equipment (PPENT)/total assets
- *MB*: (Stock price (PRCC) * shares outstanding (CSHO) + total assets − book equity (CEQ))/total assets.
- *Leverage*: (Long-term debt (DLTT) + current debt (DLC))/total assets
- *Loan Size*: Log of total loan amount (in dollars)
- *Secured*: A dummy variable that equals one if the loan is secured, and zero otherwise
- *Senior*: A dummy variable that equals one if the loan is senior, and zero otherwise
- *Loan Type*: An index for whether a loan is a term loan, revolver, or other

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