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EVALUATION

Thomas Schneider
Philip Strahan
Jun Yang

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ABSTRACT

Relative performance evaluation (RPE) intensifies competitive pressure by tying executive compensation to the profits of rivals. We show that these contracts make loan syndication harder by reducing banks' willingness to participate in loans underwritten by banks named in their RPE contracts. Lead arranger banks which are more frequently named in RPE hold larger shares of the loans they syndicate, and their borrowers face higher spreads. These banks, in turn, lose market share to banks less likely to be named in RPE. Our results highlight the tension between the normal benefits of competition versus the need for cooperation in loan syndication.

Thomas Schneider
Old Dominion University
Norfolk, VA 23529
tischnei@odu.edu

Jun Yang
Notre Dame
South Bend, IN 46556
jyang23@nd.edu

Philip Strahan
Carroll School of Management
324B Fulton Hall
Boston College
Chestnut Hill, MA 02467
and NBER
philip.strahan@bc.edu

1. Introduction

Syndicated lending requires cooperation between lead arrangers (typically banks) and investors (often, other banks). The cooperative nature of this market makes it unusual in banking, shaped both by competition across banks while requiring cooperation between banks. Competition occurs at the initial stage of loan syndication when the large banks vie for lead arranger status. Later, investment by many of these same banks requires some degree of cooperation. This paper shows that increases in the intensity of competition, generated by the advent of relative performance compensation contracts, have increased the cost of arranging syndicated loans.

Lead arrangers are fundamentally underwriters of syndicated loans, although unlike securities underwriters they typically retain some of these loans themselves. Banks compete for lead arranger status at the initial stage because winning the so-called mandate brings both fees as well as prestige (“League table status”).¹ Once a bank has won the mandate to act as lead arranger, they aim to sell participation in loans to other bank and non-bank investors on the best terms possible for the borrower. Higher demand from investors leads to better terms for both the borrower and the lead arranger: lower spreads, looser non-price terms, and a lower share held by the lead bank (Bruche et al., 2020). Many investors in syndicated loans are other banks, and banks are especially important investors in revolving lines of credit due to their special ability to manage liquidity risk (Kashyap, Rajan and Stein, 2002; Gatev & Strahan, 2006). This creates tension for investor banks. On one hand, investing in a given loan helps the lead arranger succeed in its underwriter role and thus, at the margin, raises the profits of the lead bank. On the other, banks

¹ Prestige may be valued because it increases future business with the issuer as well as other firms. It may also be independently valued by management.

compete across many domains; rivalries between potential investor banks and the lead may therefore limit the demand for a given deal.

This paper shows that the advent of relative performance evaluation (RPE) contracts has reduced the demand for banks to invest in rivals' syndicated loans, thereby making the underwriting function more difficult for lead arrangers. RPE contracts increase the incentive for bank managers to compete because their pay depends on it. A common RPE contract ties bonuses of senior bank management to the profits of named, rival banks (the RPE peer group). For example, in 2016, JP Morgan's senior managers received performance bonuses based on the bank's profits relative to Bank of America, Barclays, Capital One Financial, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, Morgan Stanley, UBS, and Wells Fargo. As a result, we argue that JP Morgan will be less willing to invest in loans arranged by banks named in their RPE contract, such as Bank of America or Credit Suisse, than loans arranged by banks outside their RPE peer group, such as PNC or SunTrust.

In our first set of results, we analyze banks' choice to invest ("participate") in syndicated loans arranged by other banks. For each loan, we observe the lead arranger and all of the participants. We model the probability that a given bank participates in that loan as a function of whether the potential investor-bank names the lead bank in its RPE contract. We show that the likelihood of such an investment declines by about 5% (relative to the overall average) if a given bank has named the lead arranger in its RPE compensation contract. To continue the example, our regressions suggest that JP Morgan would be 5% less likely to participate in a loan arranged by Bank of America than one arranged by SunTrust.

Our analysis of bank investment in syndicated loans focuses on the top 10 U.S. banks and top 5 foreign banks in the U.S. syndicated loan market, who are active both as lead arrangers and

as investors and cover over 85% of the market collectively (Table 1). Thus, each loan arranged by one of these banks generates 14 observations in our empirical design. The outcome of interest equals a series of zeroes and ones, depending on whether each of the candidate investors chooses to participate in the loan. In our regressions, we control not only for past relationships between potential participant-banks and the borrower, but also for fixed effects at the lead-bank/participant-bank level, the potential participant-bank/time level, and the loan level (which subsumes borrower level and lead-bank/time level). We can absorb the lead-bank/participating bank fixed effects because the RPE contracts became common only in the latter portion of our sample. Hence, the models are akin to difference-in-differences, with different banks initiating RPE at different times. Since the top banks typically list each other as RPE peers, our focus on these banks makes sense both economically and empirically, as bank-pairs without variation in RPE peer status are absorbed by model fixed effects. This difference-in-differences framework allows us to construct an analog to a parallel trends test, which suggests that the effects we observe occur only after a bank has initiated its RPE contract.

We also find that the effect of RPE on a bank's willingness to participate in a given loan varies with the loan's syndication risk: the effects are stronger for lines of credit (LC) than term loans. Term loans offer a useful comparison because this segment of the syndicated lending market is substantially easier to underwrite, and also has much greater post-syndication liquidity. Potential investors in term loans include not only other banks, but also a large array of non-bank institutions such as collateralized loan obligations (CLOs), loan mutual funds, pension funds, hedge funds, and others. In contrast, banks have historically and continue to dominate the market for lines of

credit due to their unique ability to provide liquidity on demand (Gatev and Strahan, 2009).² For example, in recent years non-bank investors (“shadow banks”) hold almost 60% of syndicated term loans; in contrast, banks have held more than 90% of revolving lines of credit consistently over the past three decades.³ Non-bank investment shares have been rising steadily over time, while bank dominance in the market of credit lines has not changed. Further, we show that banks are less willing to participate in a rival’s syndicate when the borrowing firm has a lower credit rating, and this effect is also stronger for LCs. Taken together, these results suggest that banks withhold capital when the lead arranger is most likely to be left holding a large fraction of the loan and when the borrower is most likely to default, thereby increasing the lead arranger’s exposure to credit risk.

In our second set of tests, we analyze the data at the loan level (rather than the loan-lead-participant level) to test whether the prevalence of RPE compensation schemes across the banking sector constrains demand. That is, if a given lead arranger is named in the RPE contracts of a large percentage of other banks – potential investor banks – we would expect lower demand for their loans. As shown in Bruche et al. (2020), lead arrangers will ‘flex’ loan spreads upward during periods of weak demand to draw interest from investors. They also show that weak demand is costly to the lead bank because it requires them to hold a larger share of the loan. Thus, low demand is associated with both higher spreads (all else equal) and a higher lead-arranger share. Therefore, lower loan demand caused by RPE contracts could be costly for both the borrower, as reflected by

² Li, et al. (2020) show that draw downs on credit lines during the March 2020 COVID crisis led to an unprecedented increase in bank lending.

³ See Paligorova and Santos (2020), Santos and Viswanathan (2021) and Fleckenstein et al. (2021) for evidence on the investments of banks vs non-banks. Many non-bank investors purchase their stake in syndicated term loans in the secondary market, shortly after the initial syndication process (Cohen, et al., 2018). In this study, we rely on data from Thomson Reuters LPC’s DealScan database, which only contains information on initial loan syndicates at time of origination.

the higher spread, and also for the lead arranger since they have to retain a larger share of their loans.

We provide evidence consistent with these implications. To do so, for each loan we construct the variable *% Banks with RPE vs Lead*, which equals the relative fraction of potential bank investors with RPE contracts versus the lead arranger, weighted by each potential investor's share of the syndicated loan market during the prior year. This variable measures the market demand from the top banks potentially influenced by RPE. Because *% Banks with RPE vs Lead* depends on the actions of banks other than the lead, it varies exogenously from the perspective of the lead arranger. Notably, *% Banks with RPE vs Lead* exhibits substantial cross-sectional and time-series variations that have trended upward throughout our sample as the prevalence of RPE contracts has increased.⁴

For loan pricing, we find higher spreads on loans underwritten by lead banks with a greater *% Banks with RPE vs Lead*. Our base case regression suggests that the all-in drawn spread on credit lines increases by about 3.5 basis points for a one-standard deviation increase in *% Banks with RPE vs Lead*. Consistent with our results on participation, we find no statistically significant effect on term loan spreads. Because lead arrangers are not constrained to sell investments in term loans to other banks – they more often sell to non-banks – the prevalence of RPE contracts does not affect pricing in this segment because it is not strongly correlated with demand.

Spreads for credit lines are higher, we argue, because some lead arrangers have fewer banks willing to invest due to their compensation schemes. If this is true, these same leads ought to hold a higher fraction of those loans, and this is precisely what we observe. The lead-arranger share increases with *% Banks with RPE vs Lead*. In this case, a one sigma increase in *% Banks with RPE*

⁴ See Figure 1 for the time series variations and Table 2 for the incidence of RPE for each bank over our sample.

vs Lead comes with about a 1.6 percentage point increase in the lead-arranger share; this reflects an increase of over 6.5% relative to the mean lead-arranger share. The large effect on lead-arranger share helps explain the small magnitude on loan spreads, as lead banks attempt to offset the weak demand to protect their customer relationships. (And, again, this effect is only statistically significant for credit lines.) Two caveats are important for the lead-arranger share tests, however. First, the DealScan data only include lead-arranger share for about 10% of deals. Second, the comparison of lead arranger share between credit lines and term loans is less relevant because banks often sell off term loans to non-bank investors in secondary market transactions shortly after syndication (Blickle et al., 2020).⁵

We investigate whether lead arrangers facing weak demand market their loans to substitute lenders, and we find they do. We define *Other Lenders Fraction* as the proportion of syndicate members outside of our core top-15 bank sample. We find that higher *% Banks with RPE vs Lead* leads to a greater proportion of other lenders involved in the syndicate. This effect is statistically strong but economically small, in part because lead arrangers can also find substitute lenders among our sample banks. Further, we find that overall syndicate size does not meaningfully decline. Combined with the lead-arranger share test results, the findings imply that lead arrangers are able to find smaller banks to form the syndicate but this substitution is not sufficient to completely mitigate the weak demand, as evidenced by the economically large increase in lead arranger's share.

Weaker demand ought to lead to declines in market share for banks most exposed to the downside effects of RPE. For example, we see that *% Banks with RPE vs Lead* raises lead-arranger

⁵ That is, there is measurement error in the lead share for term loans due to a high degree of secondary market trading shortly after syndication ends. Such error is much smaller for credit lines, which trade much less in the after-market. As we rely on DealScan data, we are unable to observe such secondary market trading.

share substantially, which in turn raises the cost of financing these loans (e.g., capital requirements) and reduces one of the main benefits of loan syndication. In our last set of results, we verify that the advent of RPE contracts has lowered lead-bank market share. We estimate these models at the highest level of aggregation (lead-arranger by year), and control for both bank and year fixed effects. Thus, the measured effect represents the relative effect of RPE on banks more versus less exposed. We find that a one standard deviation increase in % *Banks with RPE vs Lead* lowers market share by about half of a percentage point, or around 10% relative to the sample mean.

Our paper contributes to the large literature on syndicated lending. The early literature focused on diversification benefits of this market, as it allows banks to share idiosyncratic risks (Simons, 1993). More recently, syndicated lending has fostered diversification through the growth of collateralized loan obligations, who are major buyers of bank term loans (Paligorova and Santos, 2020; Bord and Santos, 2012). In addition, researchers have emphasized the importance of lead arrangers in solving moral hazard and adverse selection problems. Unlike underwriting in the corporate bond market, the literature has emphasized the importance of lead-bank underwriters retaining ‘skin in the game’ by holding portions of loans (Dennis & Mullineaux, 2000; Lee & Mullineaux, 2004; Sufi, 2007; Ivashina, 2009), as well as their reputation for ex-post contract enforcement based on past borrower defaults (Gopalan et al. 2011). Others have emphasized the importance of both past lending relationships between the borrower and the lead arranger (Drucker and Puri, 2009; Schenone, 2010; Bharath et al., 2007), as well as borrower’s concerns over bank characteristics such as financial strength (Schwert, 2018).

A number of studies also link both aspects of executive pay or effort by lending officers at lead arrangers to syndicated lending outcomes, but these papers do not consider the effects of

compensation schemes by other potential investor-banks, as we do (Herpfer, 2021; Gao et al., 2018). Hence, we depart from this literature by emphasizing the tension between competition and cooperation, which shapes the underwriting process because lead banks face the challenge of selling participations to their competitors (i.e., other banks). The compensation of those competitors matters to the extent that these contracts change their willingness to cooperate. Our results suggest that this underwriting function becomes more difficult when relative performance contracts enhance competition or rivalry between banks.

Our paper also contributes to the growing literature on RPE in executive compensation. Seminal papers on contract theory show that it can be optimal to measure an agent's performance relative to others operating under similar circumstances (e.g. Lazear and Rosen, 1981; Holmstrom, 1982; Nalebu and Stiglitz, 1983). Within the context of banking, RPE-based incentives are advantageous because banks share exposure to common systematic factors. Evaluating a bank relative to other banks can help remove the external effects of economic or regulatory conditions, thereby isolating the component of performance attributable to the bank manager's skill. However as modeled by Lazear (1989), RPE can stifle cooperative efforts and even invite sabotage. Aggarwal and Samwick (1999) show that strategic interactions among firms can explain the apparent lack of RPE incentives in executive compensation. In the decades since, RPE contracts have become increasingly prevalent among U.S. companies, perhaps in response to shareholders' attempts to limit 'pay for luck' (see Bertrand and Mullainathan 2001; Garvey and Milbourn 2006; and Jenter and Kanaan 2015, among others). Although prior literature has studied competition and RPE in a variety of economic contexts (see Chowdhury and Gurtler, 2015, for an excellent survey), we are among the first to provide direct empirical evidence of the competitive frictions caused by RPE in executive compensation. Along this dimension, our paper complements Feichter et al.

(2021), who find that RPE inspires firms to take more aggressive and more complex competitive actions such as introducing new products and launching new marketing campaigns, and Bloomfield et al. (2021), who find that firms routinely disclose information that harms RPE peers' stock prices.⁶ To the best of our knowledge, our paper is the first to study RPE directly within the context of banking. Our results expose a significant downside to these contracts from the perspective of the industry when cooperation between firms is important, including but not limited to the case of bank loan syndication. Importantly, our results do not suggest that RPE contracts are value-destroying from the perspective of the firm itself. If they were, this would raise questions about why firms award them in the first place. Our results instead suggest that the behavior of *other* firms' use of RPE can raise the cost of cooperation. So, there may be a collective action problem in which the overall industry is harmed by the widespread use of RPE, even though each firm's decision to implement these contracts is individually optimal.

The following sections describe our data, explain the design of the empirical tests using three distinct levels of aggregation, and interpret the findings.

2. Data

Our sample construction starts with all U.S. dollar-denominated syndicated loan deals originated in the United States in the Thomson-Reuters LPC DealScan database from 2010 to 2019. This decade represents a relatively mature period for the U.S. syndicated loan market, abutted by periods of volatility pertaining to the global financial crisis of 2008 and the coronavirus pandemic beginning in 2020. DealScan provides detailed information on syndicated loan originations, including the names and roles of all lenders involved in each deal. We map DealScan

⁶ Our paper is also related to Bloomfield et al. (2020) and Ha et al. (2020) who find that firms are more likely to use RPE when the potential to sabotage is low.

lenders to bank holding companies using the 2020 vintage of the DealScan Lender Link table curated by Michael Schwert and described in Schwert (2018).⁷ In tests requiring data on borrower-firm characteristics, we map borrowers to Compustat using the 2018 release of the linking table from Chava and Roberts (2008).⁸

We classify each syndicate's lenders into primary lead arrangers, secondary co-lead arrangers, and non-lead participants beginning with the procedure outlined by Ivashina (2009). When available, we assign the *Administrative Agent* as the primary lead arranger. The administrative agent conducts due diligence and monitors the borrower, handles loan payments, and typically retains the largest economic stake. If the syndicate does not have an administrative agent, we follow Bharath et al. (2011) and consider other roles that receive lead credit for purposes of league tables as available in DealScan.⁹ These schemata identify primary lead arrangers for 94% and 3% of sample loans, respectively. We further classify all lenders who receive lead credit for league table status but are not primary lead arrangers as secondary co-lead arrangers. This second tier of lenders often have preexisting relationships with the borrower, commit more capital than other participants, and play some active role in the process, but they do not bear the same level of syndication risk as the deal's primary lead arranger (S&P, 2016). The remaining lenders are non-lead participants. Since our objective is to study the costs of arranging syndicated loans induced by RPE contracts, we require that each syndicate have a single primary lead arranger, which

⁷ Schwert publishes this table on his website: <https://sites.google.com/site/mwschwert/data-and-code>

⁸ Roberts makes this data available on his website: <https://finance.wharton.upenn.edu/~mrrobert/styled-9/styled-12/index.html>

⁹ DealScan's binary *leadarrangercredit* variable designates league table status. A common syndicate structure without an administrative agent consists of one *Arranger* and many *Participants*. Other roles we assign as primary lead arranger include *Bookrunner*, *Lead Arranger*, *Mandated Lead Arranger*, and *Syndications Agent*.

constitutes 97% of syndicates. This restriction allows us to construct intuitive pairwise measures between the lead bank and potential syndicate members.

We limit our sample to the top 10 U.S. banks and top 5 foreign banks for two reasons. First, these banks are active players both as lead arrangers and participants, and as lead arrangers, their lending accounts for over 85% of the U.S. syndicated loan market. Table 1 shows the market share of the sample banks by lender role and loan type (see Appendix 1 for variable definitions). Second, these banks typically reference each other in their RPE contracts, making other smaller banks less relevant for our study.

[Insert Table 1 here]

We first obtain data on RPE in executive compensation from Institutional Shareholder Services's Incentive Lab. Incentive Lab contains hand-collected items from mandatory SEC filings, including data on the underlying reference groups used to determine payouts from performance-contingent compensation awards granted to named executive officers at public U.S. firms.¹⁰ Since Incentive Lab only covers U.S. firms, we complete our sample by hand collecting data on RPE use by foreign banks from their annual disclosures.

[Insert Table 2 here]

Table 2 shows annual RPE use by our sample banks. We code banks that benchmark their executives' RPE awards against a peer group as 'Yes'. We code banks as 'No' if they do not use RPE awards, if they subjectively use relative comparisons to determine pay without any formulaic benchmarking, or if they benchmark their RPE awards against a broad index such as the Dow Jones U.S. Banks Index or S&P 500 Financials Index.¹¹ As this table shows, RPE has become

¹⁰ See SEC Final Rule 33-8732a, November 7, 2006.

¹¹ Index-based RPE awards are less likely to have competitive effects because index lists usually contain many more constituents than a typical RPE peer group, thereby diluting the advantages gained from competing against any

more prevalent over the course of our sample period, rising from about one-third of sample banks in 2010 to over two-thirds in 2019. This upward trend in RPE adoptions among banks mirrors the aggregate trend in RPE use among S&P 1500 firms documented by Bizjak et al. (2021). We also visualize the time-series variation of RPE use in our sample by plotting the fraction of potential syndicate members that benchmark RPE awards against the deal's lead arranger, weighted by the number of deals. As Figure 1 shows, this fraction has increased from approximately 25% in 2010 to almost 40% in 2019.

[Insert Figure 1 here]

As Figure 1 also shows, however, there is substantial cross-sectional heterogeneity in RPE use even toward the end of our sample. Appendix 2 provides a detailed breakdown of the number of times each sample bank is referenced as an RPE peer in 2018. For instance, Bank of America is cited as an RPE peer by eight of the other sample banks, while Goldman Sachs is cited only twice. We conclude that our empirical setting contains sufficient time-series and cross-sectional variation.

To illustrate the form of a typical RPE contract disclosure, Appendix 3 presents excerpts from the Compensation Discussion and Analysis sections of JPMorgan's annual proxy statements. In 2015, JPM initiated a three-year performance share unit (PSU) program for all their named executive officers, including CEO James Dimon.¹² The fair value of the PSU award accounted for over 75% of the value of Mr. Dimon's total compensation, representing a significant economic

individual firm. Competitive effects are further dampened by the fact that broader indexes are often populated with firms that occupy different product market spaces than the benchmarking firm.

¹² These awards typically involve all "C-suite" officers. In subsequent years, JPM awarded additional overlapping three-year PSU programs, leading to three concurrent programs running by 2018.

stake.¹³ The award vested equally in thirds over the next three years depending on both absolute and relative return on tangible common equity (ROTCE) performance. The award formula was designed to payout nothing for absolute ROTCE below 6% and payout 150% of the target value for absolute ROTCE above 14%.¹⁴ For ROTCE falling between these thresholds and maximum values, the payout formula was based on relative ROTCE compared to JPM's peer group. Depending on JPM's percentile ranking within the peer group, the award payout ranged between 25% and 150% of the target value. Over much of the range, moving up by one rank would increase Mr. Dimon's expected annual payout by approximately one million dollars.¹⁵ Thus, we argue that these relative compensation awards can induce strong monetary incentives to compete with RPE peers. The details of performance metrics vary substantially across RPE contracts, so our empirical design focuses only on whether or not a given bank is named in the RPE contract; this simple metric provides comparability across contracts.

3. Empirical Design

We construct tests at three increasing levels of aggregation: syndicate level, loan level, and lead arranger level; and we complete our analysis by studying RPE peer group selection.

3.1 Syndicate Level

¹³ The target value of the PSU reward was \$20.5 million out of a targeted \$27 million; $\$20.5M \div \$27M = 75.9\%$.

¹⁴ Although RPE awards take many forms, this award is atypical as relative components are often "stand alone" from any absolute performance components. Additionally, payouts from some contracts are determined by multiplying the payout ratios from both absolute and relative goals.

¹⁵ Given that the target value of Mr. Dimon's 2015 performance award was \$20,500,000 paid over three years, the 15% award increase from rising one rank in the 3rd or 4th quartiles corresponds to an approximate dollar value increase of $\$20,500,000 \times 15\% \div 3 = \$1,025,000$. In the 2nd quartile, the increase per rank is 12.5%, and all spots in the 1st quartile receive equal award.

Our first set of tests studies the effects of RPE on syndicate composition. We argue that banks will be less likely to join loan syndicates when they benchmark their RPE awards against the syndicate's lead arranger. By not supplying capital to these deals, banks can increase the costs of syndication borne by their RPE rivals; in contrast, investing in these deals would enhance the RPE rival's profits and reputation.

To test this hypothesis, we construct a dataset which takes the identity of the lead arranger as given and then considers the choices made by both potential and actual syndicate members. Sample loans generate one observation for each of our candidate investor banks, which we limit to the set of top 10 U.S. banks and top 5 foreign banks in the U.S. syndicated loan market.¹⁶ The outcome *Syndicate Member* demarks whether the bank was involved in the syndicate. We further stratify *Syndicate Member* into *Co-Lead Member* and *Participant Member* based on the bank's role in the syndicate as described above. We define the variable of interest – *Bank RPE vs Lead* – as equal to one if the potential syndicate member benchmarks its RPE against the primary lead arranger.

Appendix 4 illustrates the structure of the regression data using a single loan as an example. In 2011, Under Armour Inc. received a four-year, \$300 million revolving line of credit arranged by PNC Bank. As shown, seven other banks invested in the loan syndicate, two as co-leads (Bank of America and SunTrust) and the other five as participants; of these seven banks, four came from the set of the top U.S. banks. In our data, this loan generates 14 observations (one for each of the sample banks other than PNC); the variable *Syndicate Member* equals one for Bank of America, Sun Trust, JPMorgan and Wells Fargo and equals zero for the remaining banks. The variables *Co-*

¹⁶ We have also estimated these models using the top 50 U.S. banks as candidate investors. This approach generates similar results in terms of relative magnitudes and statistical significance. We prefer to focus on the top 15, however, both because these banks are the most important investors, are most likely to be rivals, and because the full sample generates mostly zeroes in our outcomes (which reduces the absolute magnitude of estimated effects).

Lead Member and *Participant Member* decompose *Syndicate Member* based on each bank's role. Here, *Co-Lead* turns to one for Bank of America and SunTrust and *Participant* turns to one for JPMorgan and Wells Fargo. As such, the latter two variables add up to the first.

With this data structure, we estimate linear probability models of syndicate membership as follows:

$$\text{Syndicate Member}_{l,i} = \beta \text{Bank RPE vs Lead}_{i,j,t} + \phi_l + \phi_{i,j} + \phi_{i,t} + \varepsilon_{l,i} \quad (1)$$

where l indexes the loan and i is the potential investor-bank. We report an analog to Eq. (1) using *Co-lead* and *Participant* as outcomes. Additional subscripts j and t denote the identity of the lead and the year of origination. This model includes granular loan-level fixed effects, ϕ_l , which remove variation from loan, borrower-year, and lead-year characteristics. The addition of bank-by-lead arranger fixed effects, $\phi_{i,j}$, absorbs constant bank-pair relationship effects. This renders the model similar to a difference-in-differences framework by requiring *Bank RPE vs Lead* $_{i,j,t}$ to vary within bank-pair over time to identify β . We also include bank-year fixed effects, $\phi_{i,t}$, to capture time trends in each potential investor-banks' overall syndicated loan activity. To construct standard errors, we double cluster by loan and by investor bank-year. In addition to these fixed effects, we control for bank-borrower relationships using a set of dummy variables that indicate if the bank was involved in the borrower's prior syndicated loan deals either as the lead arranger, as a co-lead, or as a participant.

Our core argument implies that banks ought to be less likely to join loan syndicates if they benchmark their RPE against the lead arranger. This tendency, however, may be weaker if banks are able to obtain more prestigious or more profitable roles within the syndicate. Thus, we hypothesize that the negative relationship between RPE and membership will be stronger for

participant roles and weaker for co-lead roles, as the latter are afforded league table status and may receive favorable terms on pricing.

Next, we split loans into credit lines and term loans. Credit lines oblige lenders to provide capital on demand over the life of the facility, which necessitates active liquidity management. In contrast, term loans are largely analogous to traditional bond issuances where lenders only transfer capital at origination. While the market for credit lines is dominated by banks, term loans are held by a variety of institutions and often trade in secondary markets. We hypothesize that banks' reticence to contribute capital to their RPE peers' syndicates is greater for credit lines and lesser for term loans because the effect of withholding capital in the term loan market is diluted by the presence of substitute lenders. Additionally, banks may join term loan syndicates to secure loan shares on behalf of non-bank clients.

Our last test at the syndicate level studies banks' decision to participate as a function of both RPE and the borrowing firm's credit rating. Syndicating a loan for a risky borrower is a risky endeavor, as weak demand from investors may leave the lead arranger exposed to substantial credit risk. We hypothesize that bank managers seeking to hamper rivals' syndication efforts will be most likely to withhold capital on deals involving less-than-creditworthy borrowers. We capture creditworthiness with a binary variable, *Investment Grade*, which equals one for borrowers with long-term debt rated BBB- or above by S&P Global Ratings as reported in Compustat. Borrowers with debt rated BB+ and below are considered *Junk*. Since Compustat items are only available for about one-third of the borrower sample, we group *Unrated* and *Junk* together.¹⁷ We interact *Investment Grade* with *Bank RPE vs Lead* from equation (1).

3.2 Loan Level

¹⁷ In unreported tests, we find similar results for *Unrated* and *Junk* borrowers.

We next aggregate the data up to the loan level to test whether lead arrangers who are more often named in the RPE contracts of potential investors face lower demand for the loans which they syndicate. We construct the fraction of potential investors from the set of sample banks who have named the lead arranger, weighted by each of these bank's share of loans from the previous year (*% Banks with RPE vs Lead*). This measure reflects the collective RPE decisions of sample banks other than the lead arranger itself, so it varies exogenously from the perspective of the lead and does not depend on the lead arranger's RPE contract. The model includes one observation per loan (in contrast to Eq. 1), and has the following structure:

$$Y_l = \beta \% \text{ Banks with RPE vs Lead}_{j,t} + \phi_b + \phi_j + \phi_t + \varepsilon_l \quad (2)$$

We focus on four outcomes: 1) the all-in drawn spread (*Loan Spread*), which represents the simplest way to capture the price of the loan to the borrower; 2) the share of the loan retained by the lead arranger (*Lead Share*); 3) the number of lenders contributing capital to the syndicate (*Syndicate Size*), and, 4) the fraction of lenders other than the sample of top-15 banks in the syndicate (*Other Lenders Fraction*). As in Eq. 1, the additional subscript j keeps track of the identity of the lead arranger, b represents the borrowing firm, and t is the year of origination. This model includes a borrower-level fixed effect to capture firm characteristics, as well as both lead-arranger and year effects. As with the syndicate-level analysis, we split our sample to test whether the effect of *% Banks with RPE vs Lead* differs between credit lines versus term loans.

3.3 Lead-Arranger Level

In our next set of tests, we aggregate the data up further to the level of the lead arranger-year. Lead arrangers facing more potential investors naming them in the RPE contract ought to face lower demand than other leads less likely to be named; hence, banks with higher *% Banks with RPE vs Lead* should experience lower market shares. This essentially tests the quantity

implication of low demand, whereas the tests at the loan level above test the pricing implications of low demand. These regressions take the following form:

$$\text{Market Share}_{j,t} = \% \text{ Banks RPE vs Lead}_{j,t} + \phi_j + \phi_t + \varepsilon_{j,t}. \quad (3)$$

Equation (3) incorporates both lead arranger and time effects, and we cluster standard errors at the lead arranger level.

3.4 RPE Peer Group Selection

Last, we study the determinants of banks' peer group selection. The extant literature on RPE concludes that firms choose peers that are similar in terms of industry, geographic location, stock return correlation, firm size, index membership, and many other dimensions (*e.g.*, Carter et al. 2009, Albuquerque et al. 2013, Bizjak et al. 2021). In addition to these established predictors of peer selection, we build a measure of the number of syndicated loans that each bank-pair completed together in the prior year in which one bank acted as lead arranger. We hypothesize that this variable will positively correlate with RPE peer selection, since firms typically select peers that share exposure to similar revenue sources. Further, we create a variable to measure whether two banks hire the same compensation consultant to test if these consultants are a determinant of RPE peer selection. These regressions take the form of:

$$\begin{aligned} \text{RPE Peer}_{i,j,t} = & \beta_1 \log \# \text{ of Deals Together}_{i,j,t-1} + \beta_2 \text{ Same Comp Consultant}_{i,j,t-1} \\ & + \gamma X_{i,j,t-1} + \phi_{i,j} + \phi_{i,t} + \phi_{j,t} + \varepsilon_{i,j,t} \quad (4) \end{aligned}$$

where X represents a battery of firm-pair similarity measures from the prior literature. We estimate this equation both with and without bank-pair fixed effects, $\phi_{i,j}$, to test whether observable characteristics have explanatory power beyond time-invariant bank-pair traits.

4. Results

4.1 Syndicate Level

Panel A of Table 3 reports summary statistics for our data at the syndicate level (i.e., by loan/potential investor-bank, or $\{l, i\}$ as in Eq. 1). As such, we have more than 500,000 observations representing over 36,000 loan facilities. The unconditional probability that one of the sample banks will invest in a syndicated loan equals 17.9%, with a slightly higher likelihood of acting as a participant (probability = 9.9%) versus as a co-lead (probability = 8.1%). At the mean, about 27.1% of potential bank participants name the lead arranger in their RPE contract (*Bank RPE vs Lead*). Conversely, if we measure RPE in the other direction (*Lead RPE vs Bank*), the average lead names the potential participants in its RPE 20.5% of the time. This latter variable has a lower mean because the lead arranger banks are, on average, larger and thus more likely to be named in RPE contracts in general. As we show below, introducing this additional variable to our model does not change the core finding.

[Insert Table 3 here]

Table 4 reports the results of the baseline syndicate-level regressions (Eq. 1). These results support our hypothesis: banks are less likely to join their RPE peers' syndicated loan deals. For example, banks which name the lead in their RPE are 0.8 percentage points less likely to join the syndicate (column 1). This decline equals about 4.5% of the unconditional probability of syndicate membership (=17.9%). Columns 2 and 3 show that this effect is driven by banks' choices to participate as passive investors, as opposed to the more active role of co-lead. Thus, having *Bank RPE vs Lead* equal to one lowers the relative likelihood of a bank's passive participation by about 7.1% ($=-0.007/0.099$). Table 4 also reports the coefficients on three relationship measures representing each bank's past attachment to the borrower. These enter with very strong statistical

power (and sensible signs), although our core result is not sensitive to whether or not we include them in the model (not reported).

[Insert Table 4 here]

Table 5 reports the same model estimated separately for lines of credit and term loans. We drop roughly 1,500 facilities that do not fit into either category, such as bridge loans, standby letters of credit, and loans labeled ‘other’. Panel A shows similar sign patterns for credit lines to those in Table 4, but magnitudes increase dramatically. As in Table 4, the effect of *Bank RPE vs Lead* only emerges for *Participant Member* (column 2), as opposed to *Co-lead Member* (column 3). The magnitude for *Participant Member* is large, implying that a bank which names the lead in its RPE is 1.1 percentage points less likely to participate, which is 9.1% of the unconditional likelihood of participation (=0.121 for credit lines). Conversely, we find no effect of *Bank RPE vs Lead* for term loans (Panel B).

[Insert Table 5 here]

These patterns support our argument because only banks invest in credit lines, whereas non-banks are the dominant investors in syndicated term loans. Whether or not one of the large banks chooses to participate in a credit line, we argue, has a meaningful effect on the lead arranger’s cost (and thus profitability) of syndication. Thus, RPE contracts make banks less eager to participate in those loans. In contrast, a bank’s decision to participate in a term loan is likely to be of little impact on the deal because the lead has many more potential non-bank investors, and banks’ term loan shares are often sold immediately after syndication. Given the non-result for term loans, our remaining tests at the syndicate level focus on credit lines.

[Insert Table 6 here]

In Table 6, we interact *Investment Grade* with *Bank RPE vs Lead* to explore how syndicate membership varies with the borrowing firm’s credit quality. The regression results show that the effect of *Bank RPE vs Lead* is strongest at firms with poor credit ratings. In column (1), the direct effect of *Bank RPE vs Lead* is large and statistically negative at -0.019, while the same term interacted with *Investment Grade* is statistically positive at 0.018. We cannot reject the null that the sum of these two coefficients equals zero. The results suggest that banks only choose to withhold capital from their RPE rival’s deals if the borrower is poorly rated and thus more likely to default on their debt. Overall, our results at the syndicate level are consistent with the hypothesis that banks sabotage their RPE rivals’ syndicated loan deals by withholding capital. This propensity is greatest on loans that are most commonly retained by the lead arranger (credit lines) and when the borrower poses a greater default risk.

[Insert Table 7 here]

Tables 7 and 8 report robustness tests on our core finding. Table 7 introduces the *Bank RPE vs Lead* variable with a one-year lead, which is conceptually similar to testing for a pre-trend. As Figure 1 shows, RPE contracts have increased in popularity over our sample; moreover, seven of our sample banks changed from not using RPE to using RPE over the life of our sample. Hence, we have a well-defined “pre-period” for these banks and thus can check whether or not the effects observed occur only after the advent of the RPE contracts. Our core result remains essentially unchanged. The coefficients on *Bank RPE vs Lead* is large and statistically significant in columns studying syndicate membership and non-lead participation, and the effect remains dominated by the credit lines. We find no evidence that a pre-trend is confounding our interpretation of the results (i.e., *Bank RPE vs Lead_{T+1}* is not significant in Table 7).

[Insert Table 8 here]

Table 8 tests whether adding RPE in the other direction – *Lead RPE vs Bank* – affects our results. Table 8 shows that RPE in which the lead names the potential investor (*Lead RPE vs Bank*) seems positively related to the bank acting as a co-lead on the loan. This positive effect does not alter our core finding, but it suggests that lead banks may prefer to solicit their RPE rivals to share underwriter risk. Co-lead arrangers typically take on a fraction of the lead’s underwriter risk and, in return, share in a larger fraction of upfront fees compared to passive participants. This effect seems consistent with models of executive compensation in which performance-based pay can lead to lower risk taking by management. For example, Cabral et al. (2019) argue that RPE can lead banks to seek investments which are correlated with their peer group and thus raise systemic risk.

4.2 Loan Level

Table 3, panel B, reports summary statistics for our loan-level outcomes, *All-in Drawn Spread*, *Lead Arranger Share*, *Syndicate Size*, and *Other Lenders Fraction*. The mean *All-in Drawn Spread*, equal to the fixed interest-rate mark up over the loan’s base rate (typically a short-term market rate such as Libor or the Federal Funds rate), averages about 265 basis points. *Lead Arranger Share*, defined as the percentage of capital provided by the lead arranger at origination, averages about 25%. The average syndicate in our sample has 6.6 members, which we log transform to account for skewness. On average, 41% of syndicate members come from outside of our core top-bank sample (*Other Lenders Fraction*). Although we have data on syndicate size for all sample loans (over 36,000), DealScan only reports the amount held by the lead arranger for a small subset of loans, so the sample for *Lead Arranger Share* contains just over 4,000 observations (before some being partialled-out by borrower FEs), compared to nearly 33,000 loans for the sample with the *All-in Drawn Spread*. Each sample, however, exhibits substantial heterogeneity.

As before, we split the sample between credit lines and term loans as banks are the primary investors in credit lines.

[Insert Table 9 here]

Column 1 of Table 9 reports the results for the *All-in Drawn Spread*. The model includes year, lead arranger and borrower fixed effects (as in Eq. 2). The coefficient on *% Banks with RPE vs Lead* in panel A is positive and statistically significant ($=0.197$), meaning that borrowers with loans arranged by banks who are named more frequently in the RPE of potential investor-banks pay higher spreads. While statistically strong, the economic magnitude is modest. For example, a one standard deviation increase in *% Banks with RPE vs Lead* leads to a rise in the *All-in Drawn Spread* of just 3.5 basis points ($=0.197 \times 0.176 \times 100$). (Although the model may seem parsimonious, the fixed effects capture a substantial amount of the variation in loan spreads, explaining about 70% of the variation.) As before, this relationship is only present for credit lines; the coefficient of interest is small and insignificant in column 1 of panel B. Together, these results provide evidence that lead arrangers that are more commonly cited by other banks as RPE rivals achieve worse pricing for their borrowers within the credit line market, where banks are the dominant investors.

If less favorable pricing represents lower demand to lead arrangers facing more RPE rival banks, these leads also ought to invest more capital in their own loans. Column 2 of Table 9 tests this idea, using the same specifications for loan-level regressions with the *Lead Arranger Share* as the outcome (Eq. 2). This evidence suggests that the lead arranger holds more when named more frequently in the RPE of other banks. A one standard deviation increase in *% Banks with RPE vs Lead* raises the *Lead Arranger Share* by over 1.6 percentage points ($=0.176 \times 9.302$). This represents about a 5% increase in the mean level of this variable. Consistent with previous results, this effect is stronger for credit lines.

In a similar empirical fashion, we estimate equation (2) with *log Syndicate Size* and *Other Lenders Fraction* as dependent variables and report results in columns 3 and 4 of Table 9, respectively. If major banks commonly benchmark RPE against the loan's lead arranger, and are thereby less inclined to participate, the lead may solicit capital from other less prominent market participants. For credit lines, the coefficient on *% Banks with RPE vs Lead* is statistically positive for *Other Lenders Fraction* (column 3) and negative but statistically insignificant for *log Syndicate Size* (column 4). Together, these results suggest that lead arrangers respond to weak demand from their RPE rivals by marketing loans to substitute lenders from outside the top-15 banks. In column 3, the parameter is 3.26, implying that a one sigma increase in *% Banks with RPE vs Lead* corresponds to 0.57% more of the syndicate being comprised by non-top banks ($=3.263 \times 0.176$). We conclude that this coefficient is directionally and statistically consistent with our hypotheses, although not economically significant, perhaps in part because lead arrangers can also find substitute lenders within the top-15 banks. This small magnitude is also consistent with the previous lead share results, indicating that the substitution is not perfect and lead arrangers still need to shoulder the burden by contributing more capital.

[Insert Table 10 here]

Table 10 tests whether the effects of RPE on loan-level outcomes vary by borrower quality. Focusing only on credit lines, we split the sample into borrowers with junk-rated or unrated debt (panel A) and those rated investment grade (panel B). Our results are generally stronger for junk and unrated loans. For *All-In Drawn Spread* in column 1 and *Other Lenders Fraction* in column 3, the coefficients on *% Banks with RPE vs Lead* are large and statistically significant in panel A, and they are small and statistically insignificant in panel B. For *Lead Arranger Share* in column 2, the coefficient of interest is economically large for junk and unrated borrowers at 13.55 but

statistically insignificant, while it is smaller yet statistically positive at 3.89 for investment grade borrowers. However, the differences in statistical significance for these parameters is perhaps unsurprising given the relatively small number of observations for which *Lead Arranger Share* is available. We also find the *Other Lenders Fraction* increases with *% Banks with RPE vs Lead* for the relatively riskier loans (panel A) but not for safer ones (panel B). As before, we find no differences in *Syndicate Size* for either sample.

The combined results from Tables 9 and 10 constitute strong evidence that loan demand declines with *% Banks with RPE vs Lead*. The evidence parallels that of Bruche et al. (2020), who show that when loan markets are cold – when demand is low – both loan spreads and lead-arranger share are higher. In our setting, only the effect on the lead arranger’s share is economically large. Lead arrangers thus bear most of the burden of weak demand from RPEs, shielding their borrowers by holding more of the loan. This behavior makes sense if their goal is to retain viability in a market with competitor banks less commonly named in RPE contracts. This way of thinking leads to our next question: do these banks end up losing market share?

4.3 Lead Arranger Level

Table 11 reports regressions at the lead-arranger by year level testing whether banks lose market share when *% Banks with RPE vs Lead* is high. As shown in Eq. (3), we remove both arranger and year effects, so identification relies on within-arranger variation over time. Columns 1, 2, and 3 report the regression for overall *Market Share*, defined as the total number of loans arranged by bank j in year t divided by the total number of loans in the market, whereas columns 3, 4 and 5 define *Market Share* using dollar values of loans instead. Consistent with the previous results, we find that banks with greater *% Banks with RPE vs Lead* experience declines in market share. The overall effect in column 1 implies that a one standard deviation increase ($=0.174$) leads

to a loss of market share equal to about 0.6 percentage points ($=-3.544 \times 0.174$), or over 12% of the sample mean (4.79%). This effect remains similar, whether or not we control for bank size (*Ln Assets*) or the number of banks named in the lead's RPE contract (*% Lead RPE vs Banks*). We then split the data on borrower quality and re-estimate Eq. (3) for market shares within each subsample. Comparing the panels of Table 12 shows that these results are concentrated in the market for junk and unrated debt, which is consistent with our prior finding that these loans elicit the weakest participation from RPE rivals.

[Insert Table 11 here]

[Insert Table 12 here]

4.4 RPE Peer Group Selection

Last, we study RPE peer group selection as a function of bank-pair observables as in equation (4). Columns 1 and 2 of Table 13 shows that banks are more likely to choose each other as RPE peers if they work on more past syndicated loan deals together, as measured by *log # of Deals Together*, or if they share the same compensation consultant (*Same Comp. Consultant*). Columns 3 to 6 find that stock return correlation, geographic location, and asset similarity all correlate peer choice, consistent with the prior literature. However, column 7 shows that none of these bank-pair measures remain statistically significant predictors of peer choice beyond the direct effect of a bank-pair fixed effect. In other words, these variables explain cross-sectional patterns, but not the within-pair variation in RPE. We conclude that our results are unlikely to be confounded by endogenous peer group selection, as our syndicate membership tests control for fixed effects at the bank-pair level.

[Insert Table 13 here]

5. Conclusion

This paper studies the competitive effects of RPE-based compensation contracts among banks in the syndicated lending market. We find that banks are less likely to join their rivals' deals as participants, and this effect is strongest on loans with greater syndication risk. Lead arrangers respond to weak demand from rivals by holding larger loan shares, thereby insulating borrowers from all but minor increases in interest rate spreads. Rival banks' actions raise the costs of syndication, and banks frequently targeted in RPE contracts lose market share.

Although we focus on cooperation and competition within the syndicated loan market, our results are likely exportable to other settings with similar characteristics. Banking interactions involving M&As and IPOs or, more broadly, strategic alliances and joint ventures are all potentially fruitful avenues for future research.

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Figure 1. RPE against Lead Arrangers

This figure plots the fraction of potential syndicate members that benchmark relative performance awards against the deal's primary lead arranger. Solid line represents mean. Dashed lines represent mean $\pm$ one standard deviation.

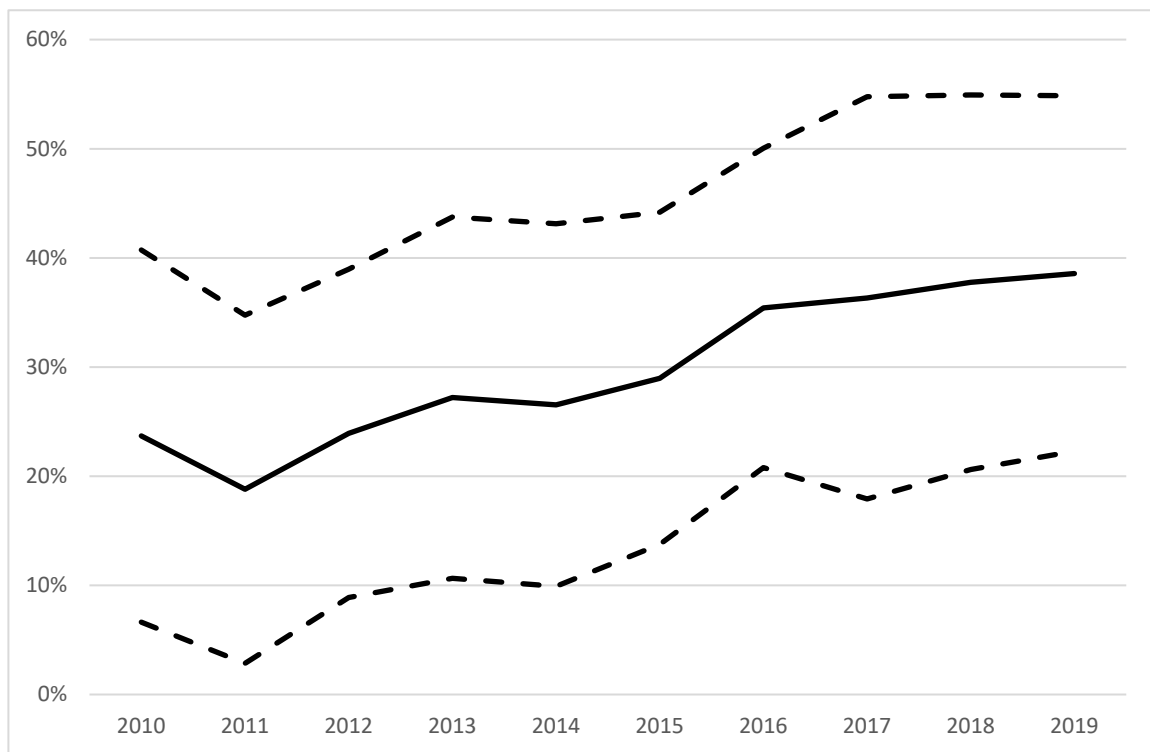


Table 1. Market Shares of Top Syndicated Lenders, 2010-2019

This table shows market shares for sample banks as a fraction of the aggregate syndicated lending market. *Lead Arranger* indicates that the bank served as the syndicate's mandated lead arranger. *Any Syndicate Member* indicates that the bank contributed capital to the deal in any capacity, including as the lead arranger, as a secondary co-lead arranger, or as a non-lead participant. Data represent banks' allocations at the time of the initial syndication and do not reflect any secondary market trading that may occur post-origination.

	Lead Arranger Value Weighted			Lead Arranger Equal Weighted			Any Syndicate Member Value Weighted			Any Syndicate Member Equal Weighted		
	All Loans (%)	Credit Lines (%)	Term Loans (%)	All Loans (%)	Credit Lines (%)	Term Loans (%)	All Loans (%)	Credit Lines (%)	Term Loans (%)	All Loans (%)	Credit Lines (%)	Term Loans (%)
Bank of America	18.2	17.9	19.3	15.1	17.9	13.2	67.0	75.2	53.6	37.6	46.6	30.3
Bank of Montreal	0.8	0.9	0.8	2.9	2.8	3.2	15.7	18.0	13.8	13.8	15.0	13.3
Barclays	2.7	0.8	4.6	1.6	1.1	2.3	39.4	41.2	34.6	13.4	15.0	12.3
BNP Paribas	1.7	2.6	0.6	1.5	1.7	1.1	27.1	34.4	14.6	9.7	12.7	6.6
Citigroup	10.1	13.2	5.8	3.4	4.4	2.4	48.6	58.3	33.5	16.4	20.9	11.9
Credit Suisse	4.1	0.5	10.2	3.1	1.5	5.1	28.1	24.0	33.5	11.0	10.0	12.7
Deutsche Bank	2.5	1.0	5.3	1.7	1.1	2.5	32.2	32.6	31.5	11.7	12.2	11.8
Fifth Third Bancorp	0.2	0.1	0.2	0.9	0.8	1.0	17.3	18.4	15.9	13.1	14.1	12.7
Goldman Sachs	1.6	0.1	2.8	1.1	0.5	1.8	32.5	31.8	32.3	11.5	11.7	11.8
JPMorgan Chase	29.2	35.8	18.4	14.3	18.4	10.7	63.1	74.2	45.1	31.4	39.7	24.1
KeyCorp	1.3	1.4	1.5	2.9	2.6	2.9	10.7	12.0	8.8	10.3	11.3	9.2
PNC	1.5	1.8	1.1	4.2	4.2	3.7	25.2	30.0	17.5	17.5	21.1	14.0
SunTrust	1.0	0.9	1.2	2.5	2.3	2.8	20.6	20.5	20.7	14.0	15.0	13.9
U.S. Bancorp	1.2	1.5	0.8	3.2	3.6	2.7	35.5	45.4	18.3	19.9	26.1	14.0
Wells Fargo	9.7	13.1	5.6	9.8	12.7	7.3	53.3	64.5	35.1	32.0	41.9	23.1
Collectively	85.9	91.7	78.2	68.3	75.6	62.7						

Table 2. Prevalence of RPE Contracts

This table lists RPE use in executive compensation contracts among sample banks. Banks that benchmark compensation awards against a peer group are coded as ‘Yes’. Banks that do not use RPE awards, banks that benchmark awards against a broad index (*e.g.* Dow Jones U.S. Banks Index or S&P 500 Financials Index), and banks that subjectively use relative comparisons without any formulaic benchmarking are coded as ‘No’.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bank of America Corp.	No	No	No	No	No	No	No	No	No	No
Bank of Montreal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Barclays PLC	Yes	No	No	No	No	No	No	No	No	No
BNP Paribas	No	No	No	No	No	No	No	No	No	No
Citigroup, Inc.	No	No	No	Yes	Yes	Yes	No	No	No	No
Credit Suisse Group AG	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deutsche Bank AG	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fifth Third Bancorp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Goldman Sachs Group, Inc.	No	No	No	No	No	No	No	Yes	Yes	Yes
JPMorgan Chase & Co.	No	No	No	No	No	No	Yes	Yes	Yes	Yes
KeyCorp	No	No	No	No	No	No	Yes	Yes	Yes	Yes
PNC Financial Services Group, Inc.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SunTrust Banks, Inc.	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
U.S. Bancorp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wells Fargo & Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3. Summary Statistics

Panel A: Syndicate Membership						
	Mean	Std. Dev.	10 th Pct	Median	90 th Pct	Obs.
Bank RPE vs Lead	0.271	0.444	0.000	0.000	1.000	513,156
Lead RPE vs Bank	0.205	0.404	0.000	0.000	1.000	513,156
Syndicate Member	0.179	0.383	0.000	0.000	1.000	513,156
Co-Lead Member	0.081	0.272	0.000	0.000	0.000	513,156
Participant Member	0.099	0.298	0.000	0.000	0.000	513,156
Past Lead	0.023	0.149	0.000	0.000	0.000	513,156
Past Co-Lead	0.065	0.246	0.000	0.000	0.000	513,156
Past Participant	0.170	0.376	0.000	0.000	1.000	513,156
Investment Grade	0.437	0.496	0.000	0.000	1.000	162,764
Panel B: Loan Level Outcomes						
	Mean	Std. Dev.	10 th Pct	Median	90 th Pct	Obs.
% Banks with RPE vs Lead	0.299	0.176	0.040	0.348	0.492	36,654
All-in Drawn Spread	2.651	1.473	1.200	2.250	4.500	32,797
Lead Arranger Share	24.981	18.270	7.703	18.000	54.000	4,259
Syndicate Size	6.645	5.345	2.000	5.000	14.000	36,654
log Syndicate Size	1.633	0.704	0.693	1.609	2.639	36,654
Other Lenders Fraction	41.456	22.500	0.000	50.000	66.667	36,654
Panel C: Market Share						
	Mean	Std. Dev.	10 th Pct	Median	90 th Pct	Obs.
% Banks with RPE vs Lead	0.178	0.174	0.000	0.152	0.429	150
Market Share (#)	4.790	5.091	1.035	2.705	14.363	150
Market Share (\$)	5.703	7.923	0.724	1.797	17.932	150
Panel D: Peer Selection						
	Mean	Std. Dev.	10 th Pct	Median	90 th Pct	Obs.
RPE Peer	0.259	0.439	0.000	0.000	1.000	1,422
# of Deals Together	70.722	94.695	7.000	37.000	166.000	1,422
log # of Deals Together	3.544	1.245	1.946	3.611	5.112	1,422
Same Comp. Consultant	0.073	0.260	0.000	0.000	0.000	1,422
Stock Correlation	0.670	0.147	0.463	0.682	0.857	1,422
Same Domicile	0.595	0.491	0.000	1.000	1.000	1,422
Similar Total Assets	0.378	0.485	0.000	0.000	1.000	1,422
Similar Trading Assets	0.488	0.500	0.000	0.000	1.000	1,422
Similar Mortgage Assets	0.371	0.483	0.000	0.000	1.000	1,422
Similar Loan Assets	0.401	0.490	0.000	0.000	1.000	1,422

Note: All continuous variables are winsorized at the 1st and 99th levels. See Appendix A for variable definitions.

Table 4. RPE and Syndicate Membership

This table shows that banks are less likely to join a loan syndicate if the bank benchmarks its top management's Relative Performance Evaluation (RPE) compensation awards against the syndicate's primary lead arranger. *Syndicate Member* indicates if the bank joins the syndicate as a lender. *Participant Member* and *Co-Lead Member* indicate if the bank joins the syndicate as a non-lead participant or as a secondary co-lead arranger, respectively. *Bank RPE vs Lead* indicates if the bank lists the primary lead arranger as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Loan and Bank×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Syndicate Member	(2) Participant Member	(3) Co-Lead Member
Bank RPE vs Lead	-0.008** (0.004)	-0.007** (0.003)	-0.001 (0.002)
Past Lead	-0.073*** (0.008)	-0.166*** (0.006)	0.093*** (0.007)
Past Co-Lead	0.486*** (0.005)	-0.088*** (0.007)	0.574*** (0.006)
Past Participant	0.363*** (0.006)	0.310*** (0.006)	0.054*** (0.003)
Loan FE	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes
Observations	513,156	513,156	513,156
Adjusted R^2	0.393	0.240	0.398

Table 5. RPE and Syndicate Membership, by Loan Type

This table shows that RPE-based incentives affect syndicate membership on revolving lines of credit but not term loans. *Syndicate Member* indicates if the bank joins the syndicate as a lender. *Participant Member* and *Co-Lead Member* indicate if the bank joins the syndicate as a non-lead participant or as a secondary co-lead arranger, respectively. *Bank RPE vs Lead* indicates if the bank lists the primary lead arranger as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Loan and Bank×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)
Panel A: Credit Lines	Syndicate Member	Participant Member	Co-Lead Member
Bank RPE vs Lead	-0.015*** (0.004)	-0.011*** (0.004)	-0.004 (0.002)
Past Lead	-0.082*** (0.009)	-0.176*** (0.007)	0.093*** (0.007)
Past Co-Lead	0.493*** (0.007)	-0.130*** (0.008)	0.623*** (0.009)
Past Participant	0.391*** (0.007)	0.346*** (0.006)	0.045*** (0.003)
Loan FE	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes
Observations	289,086	289,086	289,086
Adjusted R^2	0.419	0.254	0.445
Panel B: Term Loans	(1) Syndicate Member	(2) Participant Member	(3) Co-Lead Member
Bank RPE vs Lead	0.002 (0.005)	0.000 (0.004)	0.002 (0.003)
Past Lead	-0.054*** (0.011)	-0.136*** (0.007)	0.083*** (0.010)
Past Co-Lead	0.486*** (0.008)	-0.037*** (0.007)	0.523*** (0.007)
Past Participant	0.310*** (0.008)	0.238*** (0.007)	0.072*** (0.004)
Loan FE	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes
Observations	202,552	202,552	202,552
Adjusted R^2	0.354	0.202	0.354

Table 6. RPE, Syndicate Membership, and Borrower Quality, Credit Lines Only

This table shows that the effects of RPE-based incentives on syndicate membership are stronger when the borrowing firm has a lower credit rating. *Syndicate Member* indicates if the bank joins the syndicate as a lender. *Participant Member* and *Co-Lead Member* indicate if the bank joins the syndicate as a non-lead participant or as a secondary co-lead arranger, respectively. *Bank RPE vs Lead* indicates if the bank lists the primary lead arranger as an RPE peer. Borrowers rated BBB- and above by S&P Global Ratings are *Investment Grade*, and those rated BB+ and below are *Junk*. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Loan and Bank×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Syndicate Member	(2) Participant Member	(3) Co-Lead Member
Bank RPE vs Lead × Investment Grade	0.018** (0.008)	0.018** (0.007)	-0.000 (0.006)
Bank RPE vs Lead	-0.019*** (0.004)	-0.015*** (0.004)	-0.004 (0.003)
Past Lead	-0.082*** (0.009)	-0.175*** (0.007)	0.093*** (0.007)
Past Co-Lead	0.493*** (0.007)	-0.130*** (0.008)	0.623*** (0.009)
Past Participant	0.391*** (0.007)	0.346*** (0.006)	0.045*** (0.003)
Loan FE	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes
Observations	289,086	289,086	289,086
Adjusted R^2	0.419	0.254	0.445

Table 7. Pre-Trends Test, Credit Lines Only

This table shows that the effects of RPE-based incentives on syndicate membership do not precede the adoption of the RPE compensation awards. *Syndicate Member* indicates if the bank joins the syndicate as a lender. *Participant Member* and *Co-Lead Member* indicate if the bank joins the syndicate as a non-lead participant or as a secondary co-lead arranger, respectively. *Bank RPE vs Lead* indicates if the bank lists the primary lead arranger as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Loan and Bank×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Syndicate Member	(2) Participant Member	(3) Participant Member	(4) Participant Member	(5) Co-Lead Member	(6) Co-Lead Member
Bank RPE vs Lead		-0.019*** (0.005)		-0.015*** (0.005)		-0.004 (0.003)
Bank RPE vs Lead (T+1)	-0.004 (0.004)	0.007 (0.005)	-0.003 (0.004)	0.006 (0.004)	-0.001 (0.003)	0.001 (0.004)
Past Lead	-0.082*** (0.009)	-0.082*** (0.009)	-0.176*** (0.007)	-0.176*** (0.007)	0.093*** (0.007)	0.093*** (0.007)
Past Co-Lead	0.493*** (0.006)	0.493*** (0.006)	-0.130*** (0.008)	-0.130*** (0.008)	0.623*** (0.008)	0.623*** (0.008)
Past Participant	0.391*** (0.006)	0.391*** (0.006)	0.346*** (0.006)	0.346*** (0.006)	0.045*** (0.003)	0.045*** (0.003)
Loan FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	289,086	289,086	289,086	289,086	289,086	289,086
Adjusted R^2	0.419	0.419	0.254	0.254	0.445	0.445

Table 8. Lead Arranger RPE, Credit Lines Only

This table examines the effects of lead arranger's RPE-based incentives on syndicate membership. *Syndicate Member* indicates if the bank joins the syndicate as a lender. *Participant Member* and *Co-Lead Member* indicate if the bank joins the syndicate as a non-lead participant or as a secondary co-lead arranger, respectively. *Bank RPE vs Lead* indicates if the bank lists the primary lead arranger as an RPE peer. *Lead RPE vs Bank* indicates if the lead arranger lists the bank as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Loan and Bank×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Syndicate Member	(2) Participant Member	(3) Participant Member	(4) Participant Member	(5) Co-Lead Member	(6) Co-Lead Member
Bank RPE vs Lead	-0.015*** (0.004)	-0.012** (0.005)	-0.011*** (0.004)	-0.011** (0.005)	-0.004 (0.002)	-0.001 (0.003)
Lead RPE vs Bank	0.003 (0.005)	0.008 (0.006)	-0.006 (0.004)	-0.005 (0.005)	0.009** (0.004)	0.013*** (0.005)
Bank RPE vs Lead × Lead RPE vs Bank		-0.009 (0.006)		-0.002 (0.006)		-0.007 (0.004)
Past Lead	-0.082*** (0.009)	-0.082*** (0.009)	-0.176*** (0.007)	-0.176*** (0.007)	0.093*** (0.007)	0.093*** (0.007)
Past Co-Lead	0.493*** (0.006)	0.493*** (0.006)	-0.130*** (0.008)	-0.130*** (0.008)	0.623*** (0.008)	0.623*** (0.008)
Past Participant	0.391*** (0.006)	0.391*** (0.006)	0.346*** (0.006)	0.346*** (0.006)	0.045*** (0.003)	0.045*** (0.003)
Loan FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank × Lead FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	289,086	289,086	289,086	289,086	289,086	289,086
Adjusted R^2	0.419	0.419	0.254	0.254	0.445	0.445

Table 9. Loan Level Outcomes

This table studies the effect of RPE on loan level outcomes. *All-in Drawn Spread* is the amount the borrower pays in basis points over LIBOR plus fees for each dollar drawn. *Lead Arranger's Share* is the fraction of the loan held by the lead arranger at origination. *Other Lenders Fraction* is the fraction of lenders in the syndicate that are not in our core top-15 banks sample (listed in Table 1). *Log Syndicate Size* is the natural log of the number of lenders in the syndicate. *% Banks with RPE vs Lead* is the fraction of potential syndicate members that list the lead arranger as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Borrower and Lead×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)
Panel A: Credit Lines	All-In Drawn Spread	Lead Arranger Share	Other Lenders Fraction	log Syndicate Size
% Banks with RPE vs Lead	0.197** (0.091)	9.302** (4.438)	3.263** (1.545)	-0.091 (0.073)
Year FE	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Observations	15,364	1,641	17,167	17,167
Adjusted R^2	0.760	0.889	0.669	0.723
	(1)	(2)	(3)	(4)
Panel B: Term Loans	All-In Drawn Spread	Lead Arranger Share	Other Lenders Fraction	log Syndicate Size
% Banks with RPE vs Lead	0.027 (0.234)	1.077 (10.192)	-1.349 (2.600)	0.088 (0.104)
Year FE	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Observations	10,512	524	11,366	11,366
Adjusted R^2	0.680	0.815	0.732	0.704

Table 10. Loan Level Outcomes and Borrower Quality, Credit Lines Only

This table studies the effect of RPE on loan level outcomes by borrower quality. *All-in Drawn Spread* is the amount the borrower pays in basis points over LIBOR plus fees for each dollar drawn. *Lead Arranger's Share* is the fraction of the loan held by the lead arranger at origination. *Other Lenders Fraction* is the fraction of lenders in the syndicate that are not in our core top-15 banks sample (listed in Table 1). *Log Syndicate Size* is the natural log of the number of lenders in the syndicate. *% Banks with RPE vs Lead* is the fraction of potential syndicate members that list the lead arranger as an RPE peer. Borrowers rated BBB- and above by S&P Global Ratings are *Investment Grade*, and those rated BB+ and below are *Junk*. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors double clustered by Borrower and Lead×Year are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)
Panel A: Junk and Unrated Credit Lines	All-In Drawn Spread	Lead Arranger Share	Other Lenders Fraction	log Syndicate Size
% Banks with RPE vs Lead	0.214* (0.115)	13.551 (8.638)	4.261** (2.129)	-0.006 (0.085)
Year FE	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Observations	12,001	858	13,382	13,382
Adjusted R^2	0.716	0.862	0.676	0.720
Panel B: Investment Grade Credit Lines	(1)	(2)	(3)	(4)
	All-In Drawn Spread	Lead Arranger Share	Other Lenders Fraction	log Syndicate Size
% Banks with RPE vs Lead	0.047 (0.079)	3.893** (1.854)	-1.871 (2.802)	-0.163 (0.138)
Year FE	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Observations	3,300	740	3,720	3,720
Adjusted R^2	0.777	0.850	0.555	0.484

Table 11. Market Share

This table shows that banks have lower market shares as lead arrangers when they are listed as RPE peers by a higher proportion of potential syndicate members. *Market Share* is the dollar-weighted fraction of syndicated loans in the market originated by the lead arranger. *% Banks with RPE vs Lead* is the fraction of potential syndicate members that list the lead arranger as an RPE peer. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors are in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)	(5)	(6)
	Market Share measured by Number of Deals			Market Share measured by Value of Deals		
% Banks with RPE vs Lead	-3.544*** (1.327)	-3.470*** (1.323)	-3.249** (1.289)	-2.288** (1.022)	-2.284** (1.025)	-2.460** (1.121)
% Lead RPE vs Banks		0.327 (0.623)	0.325 (0.830)		0.260 (0.671)	0.202 (1.003)
log Assets			0.886 (0.904)			0.438 (0.838)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	150	150	124	150	150	124
Adjusted R^2	0.968	0.968	0.967	0.980	0.980	0.981

Table 12. Market Share and Borrower Quality

This table shows that banks have lower market shares as lead arrangers when they are listed as RPE peers by a higher proportion of potential syndicate members. *Market Share* is the dollar-weighted fraction of syndicated loans in the market originated by the lead arranger. *% Banks with RPE vs Lead* is the fraction of potential syndicate members that list the lead arranger as an RPE peer. Borrowers rated BBB- and above by S&P Global Ratings are *Investment Grade*, and those rated BB+ and below are *Junk*. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors are in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)	(5)	(6)
	Market Share measured by			Market Share measured by		
Panel A: Junk and Unrated	Number of Deals			Value of Deals		
% Banks with RPE vs Lead	-3.355** (1.315)	-3.217** (1.293)	-2.927** (1.227)	-2.346*** (0.823)	-2.335*** (0.801)	-1.683** (0.817)
% Lead RPE vs Banks		0.608 (0.644)	0.639 (0.863)		0.792* (0.476)	0.417 (0.579)
log Assets			0.959 (0.954)			1.242 (0.754)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	150	150	124	150	150	124
Adjusted R^2	0.958	0.958	0.957	0.981	0.982	0.988
	(1)	(2)	(3)	(4)	(5)	(6)
	Market Share measured by			Market Share measured by		
Panel B: Investment Grade	Number of Deals			Value of Deals		
% Banks with RPE vs Lead	0.889 (1.828)	0.824 (1.912)	0.590 (1.975)	-0.934 (1.959)	-0.943 (1.963)	-2.476 (2.337)
% Lead RPE vs Banks		-0.285 (1.090)	0.242 (1.720)		-0.636 (1.411)	0.090 (2.208)
log Assets			-0.409 (1.184)			-1.304 (1.510)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Lead Arranger FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	150	150	124	150	150	124
Adjusted R^2	0.981	0.981	0.980	0.960	0.959	0.957

Table 13. Peer Selection

This table studies banks' current-year RPE peer selection as a function of bank-pair observables measured in the prior year. *RPE Peer* is a dummy variable indicating whether the benchmarking bank selected the candidate peer bank as an RPE peer in that year. All variables are defined in Appendix 1. Heteroskedasticity-robust standard errors are in parenthesis.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	RPE Peer						
log # of Deals Together	0.298*** (0.028)					0.146*** (0.021)	0.014 (0.030)
Same Comp. Consultant		0.182*** (0.028)				0.106*** (0.027)	0.018 (0.036)
Stock Correlation			2.462*** (0.260)			1.533*** (0.321)	-0.325 (0.325)
Same Domicile				0.336*** (0.052)		-0.006 (0.076)	0.000 (0.000)
Similar Total Assets					0.046** (0.021)	0.015 (0.023)	-0.049 (0.031)
Similar Trading Assets					0.028 (0.046)	-0.002 (0.045)	-0.034 (0.039)
Similar Mortgage Assets					0.204*** (0.034)	0.125*** (0.029)	0.036 (0.036)
Similar Loan Assets					0.212*** (0.036)	0.149*** (0.034)	0.008 (0.025)
Focal Bank × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Peer Bank × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Pair FE	No	No	No	No	No	No	Yes
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422
Adjusted R^2	0.420	0.298	0.438	0.336	0.453	0.552	0.777

Appendix 1. Variable Descriptions

Variable	Source	Description
Bank RPE vs Lead	Incentive Lab	Binary indicator equal to one if the potential syndicate member bank lists the deal's primary lead arranger as an RPE peer and zero otherwise.
Lead RPE vs Bank	Incentive Lab	Binary indicator equal to one if the deal's primary lead arranger lists the potential syndicate member bank as an RPE peer and zero otherwise.
Lead Arranger	DealScan	Primary lead arranger in charge of syndication following the classification scheme detailed by Ivashina (2009).
Syndicate Member	DealScan	Binary indicator equal to one if the potential syndicate member bank is a member of the loan syndicate in any capacity (other than the primary lead arranger) and zero otherwise.
Participant Member	DealScan	Binary indicator equal to one if the potential syndicate member bank is a non-lead participant member of the loan syndicate and zero otherwise.
Co-Lead Member	DealScan	Binary indicator equal to one if the potential syndicate member bank is a secondary co-lead arranger on the deal and zero otherwise.
Past Member	DealScan	Binary indicator equal to one if the potential syndicate member bank acted as lead arranger, co-lead, or participant on any of the borrower's previous syndicated loan deals.
Credit Line	DealScan	Loans with reported facility type of "364-Day Facility", "Revolver/Line < 1 Yr.", "Revolver/Line >= 1 Yr.", or "Revolver/Term Loan".
Term Loan	DealScan	Loans with reported facility type containing the string "Term Loan" that are not Credit Lines.
Investment Grade	Compustat	A binary indicator equal to one if the borrowing firm is rated BBB- or above by S&P Global Ratings. Firms rated BB+ and below are considered <i>Junk</i> .
% Banks with RPE vs Lead	DealScan	The fraction of banks that list the lead arranger as an RPE peer, weighted by prior market share.
All-in Drawn Spread	DealScan	The amount the borrower pays in basis points over LIBOR plus fees for each dollar drawn.
Lead Arranger Share	DealScan	The fraction of the loan retained by the lead arranger.
Syndicate Size	DealScan	The number of banks in the syndicate.
Other Lenders Fraction	DealScan	The fraction lenders in the loan syndicate that are not included among our core sample banks listed in Table 1.
Market Share	DealScan	The dollar weighted fraction of syndicated loans originated by the lead arranger.
RPE Peer	IncentiveLab	Binary indicator equal to one if the benchmarking bank lists the candidate peer bank as an RPE peer and zero otherwise.
# of Deals Together	DealScan	The number of deals by a bank-pair where one bank is the lead arranger and the other is a syndicate member.
Same Comp Consultant	Incentive Lab	Binary indicator equal to one if both banks in a bank-pair use the same compensation consulting firm and zero otherwise.
Stock Correlation	CRSP	The bank-pairwise stock return correlation of daily returns over the calendar year.
Same Domicile	DealScan	Binary indicator equal to one if both members of a bank-pair are headquartered in the same geographic location (North America or Europe).
Similar Assets	Y-9C Filings	Binary indicator equal to one if the difference in log assets between banks in a bank-pair is less than one sample standard deviation of the difference in log assets between all bank-pairs.

Appendix 2. RPE Pair Detail

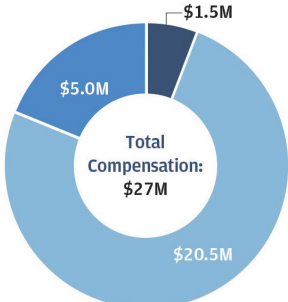
This appendix provides detail on RPE use among sample banks in 2018. An ‘X’ indicates that *Bank A* lists *Bank B* as an RPE peer in 2018. Diagonal elements are omitted since a bank cannot benchmark relative to itself. In the *RPE* column, Banks that benchmark compensation awards against a peer group are coded as ‘Yes’. Banks that do not use RPE awards, banks that benchmark awards against a broad index (e.g. Dow Jones U.S. Banks Index or S&P 500 Financials Index), and banks that subjectively use relative comparisons without any formulaic benchmarking are coded as ‘No’.

		Bank B															# of Peers in Sample
		Bank of America	Bank of Montreal	Barclays	BNP Paribas	Citigroup	Credit Suisse	Deutsche Bank	Fifth Third	Goldman Sachs	JPMorgan Chase	KeyCorp	PNC Group	SunTrust Banks	U.S. Bancorp	Wells Fargo	
Bank A	RPE																
Bank of America	No	•															0
Bank of Montreal	Yes*		•														0
Barclays	No			•													0
BNP Paribas	No				•												0
Citigroup	No					•											0
Credit Suisse	Yes	X		X	X	X	•	X		X	X						7
Deutsche Bank	Yes	X		X	X	X	X	•			X						6
Fifth Third	Yes								•			X	X	X	X		4
Goldman Sachs	Yes	X		X		X	X	X		•	X						6
JPMorgan Chase	Yes	X		X		X	X	X		X	•					X	7
KeyCorp	Yes								X			•	X	X	X		4
PNC Group	Yes	X							X	X	X	•	X	X	X	X	7
SunTrust Banks	Yes	X							X			X	X	•	X	X	6
U.S. Bancorp	Yes	X							X	X	X	X	X	X	•	X	7
Wells Fargo	Yes	X				X			X	X	X	X	X	X	X	•	8
# of Times Cited as Peer		8	0	4	2	5	3	3	5	2	6	5	5	5	5	4	•

*Bank of Montreal's 2018 RPE awards were benchmarked relative to its Canadian performance group, comprised of Bank of Nova Scotia, Canadian Imperial Bank of Commerce, Royal Bank of Canada, Toronto-Dominion Bank, and National Bank of Canada.

Appendix 3. RPE Disclosure Example

This appendix shows an example of RPE disclosure as mandated by SEC Final Rule 33-8732a. The excerpts below are taken from the Compensation Discussion and Analysis sections of JPMorgan's 2016 and 2019 proxy statements. The statements announce the initiation and outcome of a three-year RPE-based performance share unit (PSU) program granted to their named executive officers in fiscal year 2015 and concluded in 2019.

Disclosed PSU Program Recipients:	- James Dimon, Chairman and CEO - Marianne Lake, CFO - Mary Erdoes, CEO of Asset Management - Daniel Pinto, CEO of Corporate & Investment Bank - Matthew Zames, COO	CEO Compensation, FY2015  Legend: Salary, Cash Incentives, PSUs Total Compensation: \$27M																				
Goal Setting Discussion:	After evaluation, the CMDC selected [Return on Tangible Common Equity], as it is a fundamental measure of financial performance that reflects the Firm’s profitability as well as its capital base, thereby incorporating both the income statement and the balance sheet. It measures how well management is using common shareholders’ equity to generate profit. It is a primary measure by which we manage our business, and investors and analysts use it to assess our performance relative to competitors. Payout under this 3-year plan will be calculated annually based on achievement against both absolute ROTCE and relative ROTCE, per the formulaic payout grid below. The CMDC believes having absolute and relative ROTCE helps ensure a fair and balanced outcome for both shareholders and participants.																					
Payout Matrix:	<table><tr><th>Absolute ROTCE</th><th>Payout</th><th>Relative ROTCE</th><th>Payout</th></tr><tr><td>>=14%</td><td>150%</td><td>1st Quartile</td><td>150%</td></tr><tr><td>6% to <14%</td><td>Pay by relative ROTCE Scale</td><td>2nd Quartile</td><td>100% to 125%</td></tr><tr><td><6%</td><td>0%</td><td>3rd Quartile</td><td>70% to 100%</td></tr><tr><td></td><td></td><td>4th Quartile</td><td>25% to 55%</td></tr></table>		Absolute ROTCE	Payout	Relative ROTCE	Payout	>=14%	150%	1st Quartile	150%	6% to <14%	Pay by relative ROTCE Scale	2nd Quartile	100% to 125%	<6%	0%	3rd Quartile	70% to 100%			4th Quartile	25% to 55%
Absolute ROTCE	Payout	Relative ROTCE	Payout																			
>=14%	150%	1st Quartile	150%																			
6% to <14%	Pay by relative ROTCE Scale	2nd Quartile	100% to 125%																			
<6%	0%	3rd Quartile	70% to 100%																			
		4th Quartile	25% to 55%																			
Vesting Timeline:	Performance Share Units – 5-Year Time Horizon PSU goal is set at beginning of performance period and is the same for all 3 years <table><tr><th colspan="3">3-Year Performance Period (cliff-vest)</th><th>2-Year Additional Hold on Fully Vested Awards</th></tr><tr><th>2016</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th></tr><tr><td>Payout calculated on 1/3 units awarded</td><td>Payout calculated on 1/3 units awarded</td><td>Payout calculated on 1/3 units awarded</td><td colspan="2">Ultimate number of units earned</td></tr></table> Performance assessed and payout calculated for each annual period Awards subject to reduction/cancellation/recovery based on Risk/Control features (including protection based vesting) Annual payout calculation results in: ✓ NO ‘catch-up’ for poor performance years ✓ NO ‘rollover’ for very strong years		3-Year Performance Period (cliff-vest)			2-Year Additional Hold on Fully Vested Awards	2016	2017	2018	2019	2020	Payout calculated on 1/3 units awarded	Payout calculated on 1/3 units awarded	Payout calculated on 1/3 units awarded	Ultimate number of units earned							
3-Year Performance Period (cliff-vest)			2-Year Additional Hold on Fully Vested Awards																			
2016	2017	2018	2019	2020																		
Payout calculated on 1/3 units awarded	Payout calculated on 1/3 units awarded	Payout calculated on 1/3 units awarded	Ultimate number of units earned																			
RPE Peer Criteria:	Close competitors with business activities that overlap with at least 30% of our revenue mix.																					
RPE Peers:	<table><tr><td>Bank of America</td><td>Credit Suisse</td><td>Morgan Stanley</td></tr><tr><td>Barclays</td><td>Deutsche Bank</td><td>UBS</td></tr><tr><td>Capital One Financial</td><td>Goldman Sachs</td><td>Wells Fargo</td></tr><tr><td>Citigroup</td><td>HSBC</td><td></td></tr></table>		Bank of America	Credit Suisse	Morgan Stanley	Barclays	Deutsche Bank	UBS	Capital One Financial	Goldman Sachs	Wells Fargo	Citigroup	HSBC									
Bank of America	Credit Suisse	Morgan Stanley																				
Barclays	Deutsche Bank	UBS																				
Capital One Financial	Goldman Sachs	Wells Fargo																				
Citigroup	HSBC																					
Award Outcome, FY2019:	The Firm reported ROTCE of 13%, 12%, and 17% in 2016, 2017, and 2018 respectively, resulting in 1st Quartile relative performance and an expected payout of 150% for each tranche of the 2015, 2016 and 2017 PSU awards referencing those years. [...] On March 25, 2019, the 2015 PSU award vested at 150%.																					

Links to JPMorgan's 2016 and 2019 proxy statements are below.

2016: <https://www.sec.gov/Archives/edgar/data/0000019617/000001961716000933/jpmc2016definitiveproxy.htm>

2019: <https://www.sec.gov/Archives/edgar/data/0000019617/000119312519098338/d695908ddef14a.htm>

Appendix 4. Syndicate Structure Example

This appendix shows an example of how we map loan syndicates from DealScan into our data structure. In March 2011, Under Armour, Inc. (NYSE: UAA) initiated a 4-year, \$300 million revolving credit line. We identify PNC Group as the lead arranger on the deal due to its role as the administrative agent. SunTrust and Bank of America are classified as co-lead arrangers according to their more prominent roles within the syndicate, and all remaining members are classified as participants. We zero-fill observations for sample banks which are not syndicate members, and we exclude PNC from the sample so we can focus on RPE relationships at the lead bank $\times$ potential member bank level.

Data as reported in DealScan:	Lender	Role	Allocation
	PNC	Admin agent	18.46%
	SunTrust	Syndications agent	15.38%
	Bank of America	Documentation agent	12.31%
	BB&T Co	Participant	10.77%
	JPMorgan Chase	Participant	10.77%
	Wells Fargo	Participant	10.77%
	M&T Bank	Participant	10.77%
	HSBC Bank	Participant	10.77%

Data as mapped into our regression dataset:	Lender	Member	Co-Lead	Participant
	Bank of America	1	1	0
	Bank of Montreal	0	0	0
	Barclays PLC	0	0	0
	BNP Paribas	0	0	0
	Citigroup, Inc.	0	0	0
	Credit Suisse	0	0	0
	Deutsche Bank AG	0	0	0
	Fifth Third Bancorp	0	0	0
	Goldman Sachs	0	0	0
	JPMorgan Chase	1	0	1
	KeyCorp	0	0	0
	PNC	N/A	N/A	N/A
	SunTrust	1	1	0
	U.S. Bancorp	0	0	0
	Wells Fargo & Co.	1	0	1