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Financial Analysts' Career Concerns and the Cost of Private Debt

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Abstract

Career-concerned analysts are averse to firm risk. Not only does higher firm risk require more effort to analyze the firm, thus constraining analysts' ability to earn more remuneration through covering more firms, but it also jeopardizes their research quality and career advancement. As such, career concerns incentivize analysts to pressure firms to undertake risk-management activities, thus leading to a lower cost of debt. We find a negative association between analyst career concerns and loan spreads. In addition, our mediation analysis suggests that this association is achieved through the channel of reducing firm risk. Additional tests suggest that the effect of analyst career concerns on loan spreads is more pronounced for firms with higher analyst coverage. Our study is the first to identify the demand for risk management as a key channel through which analysts help reduce the cost of debt.

JEL Classification: G21; G24; G34; M40

Keywords: Analysts' career concerns; Cost of bank loans; Firm risk; Natural experiment

1. Introduction

It has long been known that corporate risk management activities lower a firm's cost of debt by reducing the likelihood of lower-tail outcomes and thus mitigating its default risk (e.g., Smith and Stulz 1985; Bessembinder 1991; Campello et al. 2011). Meanwhile, such activities are also beneficial to stock market participants (e.g., Smith and Stulz 1985; DeMarzo and Duffie 1991; Froot et al. 1993; Meulbroek 2002; Rountree et al. 2008).[1] Therefore, these market participants are likely to demand risk management activities. The decreased risk, in turn, would lead to a lower cost of debt. However, there is little research investigating the role of the stock market's demand for risk management in the cost of debt. Our goal is to fill this knowledge gap in the literature.[2] Specifically, we investigate whether career concerns of sell-side analysts – a critical class of stock market participants – help lower the cost of debt by pressuring firms for risk-management activities.

We focus on financial analysts for two reasons. First, as professionals, analysts are concerned about their own career prospects (e.g., Hong et al. 2000; Harford et al. 2018), which causes them to be risk averse (Holmström 1999). Unlike institutional investors who can diversify their portfolios and thus are regarded as being risk-neutral (e.g., Modigliani and Miller 1958), analysts typically cover small portfolios of firms and industries (e.g., Boni and Womack 2006). This limits their risk-diversification potential. Therefore, focusing on career-concerned analysts allows us to better identify the risk-management channel through which stock markets affect the cost of debt. Second, as the most influential information producers in stock markets, analysts play

[1] For example, Smith and Stulz (1985) argue that corporate risk management helps increase shareholder value by reducing expected taxes and bankruptcy costs. DeMarzo and Duffie (1991) argue that risk management activities benefit stock investors because such activities reduce the variability of a firm's dividend stream, lower information asymmetry, and thus enable them to make better portfolio optimization decisions. Graham and Rogers (2002) suggest that corporate risk management increases debt capacity, therefore increasing interest deductions and firm value.

[2] Prior studies have highlighted this risk-management channel in analyzing the cost-of-debt effect of corporate features, including corporate hedging activities (e.g., Campello et al. 2011) and directors' political connections (e.g., Houston et al. 2014). Below, we also discuss our contribution to this literature.

a crucial intermediary role in facilitating stock pricing (Stickel 1992; Womack 1996; Kelly and Ljungqvist 2012). In particular, prior literature (e.g., Minton and Schrand 1999; Benner and Ranganathan 2012) suggests that analysts can downgrade stock recommendations, lower target prices, and even reduce their coverage on risky stocks. This, in turn, imposes downward price pressure on these stocks (e.g. Womack 1996; Asquith et al. 2005; Kelly and Ljungqvist 2012). Therefore, firms are likely to cater to analysts' preferences and demand.

We develop a risk-management perspective in which career-concerned analysts help lower a firm's cost of debt by pressuring it to reduce risk. As prior research (e.g., Ljungqvist et al. 2007; Groysberg et al. 2011; Harford et al. 2018) suggests, analysts' career prospects are primarily determined by (1) their ability to generate trading volume and investment banking business, and (2) their ability to provide useful and accurate earnings forecasts and stock recommendations. Heightened firm risk is likely to hamper analysts' career by compromising these two abilities. First, higher firm risk and the associated higher degree of complexity, which require analysts to expend more effort (e.g., Moreton and Zenger 2005), discourage them from covering *more* firms. This limits analysts' ability to earn more compensation through generating additional trading commissions and investment banking business (Litov et al. 2012). Second, higher firm risk also weakens analysts' ability to accurately forecast earnings and make stock recommendations (e.g., Dichev and Tang 2009), which, in turn, jeopardizes their career prospects (e.g., Stickel 1992; Hong and Kubik 2003).

Therefore, career concerns create important incentives for analysts to pressure firms to reduce risk, in the hope that the reduced risk helps facilitate their research and career development. Accordingly, when covered by analysts with greater career concerns, firms are under greater pressure to manage risk (e.g., undertaking hedging and limiting excessive risk-taking) and cater to analysts' aversion to firm risk. To the extent that rational lenders incorporate this factor into their lending decisions, they would likely require less compensation from these firms, as reflected in a lower cost of debt (e.g., Campello et al. 2011). These arguments predict that firms covered by analysts with greater career concerns have lower costs of debt.

To examine this risk-management perspective, we focus on bank loans rather than public bonds for two reasons. First, unlike dispersed public bondholders, banks, as concentrated lenders, possess insider access to borrowers' proprietary information (e.g., Fama 1985; Bharath et al. 2008). Thus, compared to bondholders, banks are more sophisticated and better able to incorporate and price the risk factors of borrowers into their lending decisions. Accordingly, using bank loan data can increase the power of our analysis. Second, private debt (i.e., bank loans) has represented more than 50% of total debt in the U.S. since 1980 (e.g., Graham et al. 2008).[3] However, prior literature on financial analysts and costs of debt focuses largely on corporate bonds (e.g., Mansi et al. 2011; Derrien et al. 2016). The economic significance of bank loans in corporate financing makes it important to understand the effect of analysts on the cost of bank loans as well as the channel underlying this effect.

To measure analysts' career concerns, we rely on prior career concern literature (e.g., Gibbons and Murphy 1992; Holmström 1999; Hong et al. 2000; Lamont 2002) which suggests that less-experienced economic agents are more concerned about their career prospects. Based on this notion, we first create three measures to represent each analyst's experience in different aspects: the number of years she has been in this profession by year *t*, the cumulative number of distinct firms she has covered by year *t*, and the cumulative number of distinct industries she has covered

[3] For example, according to the Loan Pricing Association and the Securities Industry and Financial Markets Association, in 2005 the total amount of bank loan issuance was about $1.5 trillion, whereas the corresponding figures were $115 billion and $700 billion for equity issuance and corporate bond issuance, respectively.

during this period. Because a firm is generally followed by multiple analysts, for each experience measure, we compute the average value across all analysts following the firm in year *t* to obtain a firm-year inverse proxy for average career concerns of these analysts. Based on these three firm-year proxies, we further use principal components analysis to construct a composite index of analyst career concerns for our tests.

We measure the cost of bank loans using loan spreads, defined as how many basis points a borrower pays in excess of the London Interbank Offered Rate (LIBOR) or LIBOR equivalent for each dollar drawn down. Using a comprehensive sample of 20,327 bank loan facilities issued to U.S. public firms from 1988 through 2013, we find a significantly *negative* relationship between analyst career concerns and loan spreads, consistent with the argument that analyst career concerns help lower the cost of debt. Our results are also economically meaningful. For example, when the level of analyst career concerns increases by one standard deviation, our coefficient estimate translates into a decrease of 6.14 basis points in loan spreads, on average, implying a reduction in total average interest expenses of roughly $0.93 million.

The risk-management view posits that risk management (and thus firm risk) mediates the influence of analyst career concerns on the cost of debt. Therefore, we further perform a series of mediation analyses to establish this risk-management channel. Specifically, we adopt several measures of firm risk as the mediator, including an accounting-based measure (i.e., the variance of quarterly accounting return on assets), two market-based measures (i.e., total stock return volatility and idiosyncratic risk measured with the variance of residuals from the market model), a measure of default risk based on Ohlson's (1980) O-score, two measures of specific risk-taking activities (i.e., capital expenditure intensity and R&D intensity), and a measure that indicates the existence of derivatives hedging activities. For each risk measure, following Baron and Kenny

(1986), we perform mediation analysis by estimating two additional regressions. First, in the regression of firm risk on analyst career concerns, we find that analyst career concerns are negatively associated with firm risk, suggesting that such concerns help reduce firm risk. Second, when we further add firm risk to the baseline model and regress loan spreads on both analyst career concerns and firm risk, we find that (1) firm risk is positively associated with loan spreads, and (2) the coefficient on analyst career concerns is significantly smaller in magnitude, compared to the corresponding coefficient in our baseline result. Therefore, the mediation analysis results support the risk-management view that firm risk serves as an important channel through which analyst career concerns affect loan spreads.

Our baseline tests could be subject to endogeneity bias. For example, it is possible that firms with lower costs of debt are more likely to attract analysts who have more career concerns. In addition, one may argue that both analyst career concerns and the cost of bank loans could be related to omitted time-variant factors such as firm risk and operational complexity (which cannot be fully observed by researchers), thus leading to biased estimates and inappropriate inferences. To address these concerns, we adopt three different identification strategies. First, we use a natural experiment setting of brokerage house mergers which, due to laying off redundant analysts, led to an *exogenous* change in the average career concerns of analysts who cover affected firms. After splitting these affected firms into two treatment groups (i.e., groups with increased or decreased analyst career concerns), we perform two separate difference-in-differences analyses by comparing the changes in loan spreads of each treatment group to those of their corresponding propensity-score matched group. Second, using industry mean analyst career concerns as an instrument, we conduct an instrumental variable two-stage regression test. Third, we employ a change regression examining the effect of changes in analyst career concerns on subsequent changes in loan spreads. Our evidence of these identification strategies suggests a negative causal effect of analyst career concerns on loan spreads.

We also perform a battery of additional analyses. First, our result holds after controlling for analyst coverage, suggesting that the effect of analyst career concerns is beyond that of analyst coverage documented in prior literature (e.g., Cheng and Subramanyam 2008; Mansi et al. 2011). Second, we find that the decreasing effect of analyst career concerns on loan spreads becomes more salient for firms with higher analyst coverage. This result suggests that higher analyst coverage intensifies pressure imposed by career-concerned analysts on management. Third, an analyst's past poor performance could jeopardize her job security and promotion (e.g., Hong et al. 2000). Thus, we also adopt several refined measures of analyst career concerns by considering not only each analyst's accumulated experience in a given year, but also her forecast performance in the prior year. Our main results hold with these measures. Fourth, because fees charged by banks are important components of corporate loan contracts (e.g., Berg et al. 2016), we also test the effect of analyst career concerns on bank fees. Consistent with our baseline results, we find higher analyst career concerns are associated with lower fees. Lastly, our results also remain essentially unchanged with other robustness checks, including tests using deal-level regressions to control for potential correlation within facilities, tests using median regressions to address the effects of outliers, and tests excluding years 2007-2009 to mitigate the effects of the recent subprime crisis.

Our study makes the following contributions to prior literature. First, we contribute to the literature on the determinants of bank loan pricing. Several studies have emphasized firm risk as the underlying channel through which firm-level characteristics affect loan pricing. For example, Lin et al. (2013) document that directors' and officers' liability insurance coverage increases the cost of bank loans by exacerbating firm risk, while other studies suggest that corporate hedging activities (e.g., Campello et al. 2011) and board members' political connections (e.g., Houston et al. 2014) reduce the cost of bank loans by mitigating firms' downside risk. Unlike prior studies which largely focus on corporate management's characteristics, our study focuses on career-concerned financial analysts, an important *external* constituent of a firm. Our findings suggest that career concerns incentivize analysts to pressure firms for risk management, which in turn helps lower the cost of bank loans.

Our study is distinct from prior literature on analysts and the cost of debt in several important ways. First, this prior literature (e.g., Cheng and Subramanyam 2008; Mansi et al. 2011; Derrien et al. 2016) generally focuses on analyst coverage (i.e., the number of analysts following a firm), whereas our study focuses on analyst career concerns, a construct distinct from analyst coverage. Prior research highlights analysts' role in collecting and distributing information but overlooks their incentives (e.g., career concerns). By comparison, analysts in our study are career-concerned professionals who are averse to firm risk because it jeopardizes their career advancement. Second, our finding is distinct from that of these prior studies. Prior evidence generally suggests that higher analyst coverage helps lower firms' cost of debt by reducing information asymmetry and enhancing shareholder monitoring of management. Our findings suggest that higher analyst career concerns help reduce the cost of bank loans and that this effect is achieved through the channel of mitigating firm risk. Lastly, we find that our result holds with the control of analyst coverage and that analyst coverage plays a moderating role in the association between analyst career concerns and bank loan costs. Therefore, the effect of analyst career concerns on the cost of debt goes beyond that of analyst coverage.

Our study also contributes to the literature on the impact of analyst career concerns. Prior literature generally focuses on how individual analysts' career concerns affect their *own* behavior.

For example, Hong et al. (2000) suggest that analysts with greater career concerns herd more in their forecasts. Several studies (e.g., Dugar and Nathan 1995; Lin and McNichols 1998; Michaely and Womack 1999) suggest that out of career concerns, affiliated analysts (i.e., analysts of an investment bank which is affiliated with a company through underwriting its stock) issue more favorable research reports about the stock than non-affiliated analysts do. Harford et al. (2018) further find that analysts tend to focus more time and effort on the stocks which are more important to their future careers.[4] Unlike these studies, we focus on the impact that analysts' career concerns will have on the behavior and outcomes of those firms they cover, rather than on analysts' own behavior. Our evidence suggests that analyst career concerns impose pressure on firms to reduce firm risk and thus help lower these firms' costs of debt.

2. Literature Review and Hypothesis Development

2.1. Analysts' career concerns

Career concerns refer to an economic agent's concerns about the impact of current performance on her career prospects such as current and future compensation, job security, promotion, and outside employment opportunities (e.g., Baginski et al. 2018).[5] As professionals, financial analysts care about their own career development (e.g., Dugar and Nathan 1995; Hong et al. 2000; Lungqvist et al. 2007; Groysberg et al. 2011). In particular, prior research documents that an analyst's poor performance (e.g., inaccurate earnings forecasts and inappropriate investment recommendations) would jeopardize her job security, long-term reputation, and

[4] Harford et al. (2018) also find that a firm's information environment improves when a larger proportion of analysts consider it to be important to their careers.

[5] Prior literature on managers' career concerns suggests that poor job performance would unfavorably influence the labor market's assessment of a manager's talent (e.g., Holmström 1999), which, in turn, hurts their career prospects such as job security and external employment opportunities (e.g., Fama 1980; Holmström 1999).

compensation (e.g., Stickel 1992; Hong et al. 2000; Hong and Kubik 2003). Therefore, analysts are generally career-concerned. Hong et al. (2000) further find that the negative impact of forecast inaccuracy on analysts' careers is more pronounced for less-experienced analysts, suggesting that these analysts have greater career concerns.

Prior literature also suggests that analysts' career concerns can affect their *own* behavior. For example, Hong et al. (2000) find that inexperienced analysts, who face more career concerns, deviate less from the consensus forecast than more experienced analysts do. Harford et al. (2018) suggest that analysts tend to devote more time to the stocks that are more important for their careers. However, these studies generally do not examine whether analysts' career concerns impose pressure on covered firms to change their behavior.

2.2. Firm risk as a determinant of the cost of debt

A large body of literature (e.g., Merton 1974; Minton and Schrand 1999; Campbell and Taksler 2003; Campello et al. 2011; Lin et al. 2013; Houston et al. 2014) suggests that firm risk is a critical determinant of costs of corporate debt such as bank loans. For example, firms may expropriate debtholder wealth by investing in overly risky projects (e.g., Jensen and Meckling 1976). Excessive risk-taking increases firms' default risk, leading debtholders to ask for a premium to compensate for negative consequences. In addition, as Meulbroek (2002) notes, firms are vulnerable to a variety of risk factors such as financial risk (e.g., inflation and exchange rate fluctuation), employee risk (e.g., key employees leave and labor strike), legal risk (e.g., product liability), and regulatory risk (e.g., environmental laws change), among others. These risk factors also increase the probability that firms will default and, thereby, the cost of debt.

On the other hand, firms can respond to these risk factors by engaging in risk management such as undertaking hedging and limiting excessive risk-taking. By reducing the likelihood of lower-tail outcomes, these risk-management activities decrease expected costs associated with financial distress and bankruptcy (e.g., Smith and Stulz 1985; Stulz 1996; Meulbroek 2002). Therefore, risk management helps lower the cost of debt (Campello et al. 2011).

2.3. Risk-management view

In this study, we propose a risk-management view where career-concerned analysts pressure firms to reduce corporate risk in the hope of facilitating their research; the resulting decreased risk, in turn, leads to a lower cost of debt.

There is anecdotal evidence that firms that are lagging in meeting analysts' expectations about risk management suffer negative consequences in stock markets and that these consequences, in turn, would likely force firms to reduce their risk. On April 16, 2018, for example, Credit Suisse analyst Robert Moskow downgraded his rating on the stock of packaged food giant Kraft Heinz, because the company's employee-related culture harmed its sustainability and "increased the execution risk at the company."[6] As a consequence, the company's shares fell 1.2% in early trading. We note that a firm's internal decision-making process cannot be observed; thus, it is difficult to directly attribute its policy changes to an outside factor such as analyst research. Nevertheless, Forbes (2018) made a comment on Kraft Heinz's leadership regarding their potential response, "When you have a well-respected analyst citing your culture as a key risk, it should be read as an overdue warning sign. Other risks might be outside of leaders' control...But this one – this is something that leadership can, and *should*, work hard to turn around" (emphasis added). Therefore, the market believes analysts' concerns could lead firms to reduce identified risks.

For two reasons, analysts care about the impacts of firm risk on their career prospects. First,

[6] For details, see https://www.thestreet.com/investing/stocks/kraft-heinz-gets-slammed-in-wall-street-downgrade-14556670.

higher firm risk impairs analysts' ability to cover more firms, thus limiting their investment banking business and brokerage commissions. A portion of analyst compensation is derived from investment banking business and trading commissions that analysts help generate for their employers (e.g., Lungqvist et al. 2007; Groysberg et al. 2011; Harford et al. 2018). Clearly, covering more stocks provides analysts with more opportunities to generate investment banking activity and trading commissions (e.g., Litov et al. 2012), thus increasing their overall compensation. However, individual analysts have limited time and resources (e.g., Plumlee 2003; Litov et al. 2012; Cohen and Lou 2012; Harford et al. 2018). Given that a riskier stock requires more efforts and time for analysts to gather data and process complex information (e.g., Moreton and Zenger 2005), covering such a stock constrains their ability to cover more stocks, thus limiting their total compensation. Second, higher firm risk hinders analysts' ability to make accurate earnings forecasts and provide appropriate stock recommendations (e.g., Graham et al. 2005; Dichev and Tang 2009). Earnings forecasts and stock recommendations are among the most important research tasks of analysts (e.g., Dugar and Nathan 1995; Francis and Soffer 1997; Harford et al. 2018). The decrease in analysts' research quality, in turn, may bring negative consequences for their long-term career prospects, such as lower reputation and compensation, a lower likelihood of being promoted, and a higher likelihood of being terminated (e.g., Stickel 1992; Hong and Kubik 2003; Hong et al. 2000). Therefore, analysts would likely pressure firms to undertake more risk-management activities so as to facilitate their research. The greater career concerns that analysts have, the more likely they would pressure firms for such activities.

Indeed, given their crucial role in stock price formation (e.g., Stickel 1992; Womack 1996), career-concerned analysts are *able* to take disciplinary actions against firms for inadequate risk-management activities. First, they can downgrade recommendations on a stock with excessive risk (e.g., Benner and Ranganathan 2012). Such unfavorable stock recommendations can cause significant price reactions (e.g., Womack 1996) and may further trigger the board to dismiss the firm's CEO (e.g., Wiersema and Zhang 2011). Second, analysts can lower target prices for firms with excessive risk (e.g., CFA Institute 2015, pp. 25–27). Downward revisions in target prices can lead to negative stock price reactions (e.g., Asquith et al. 2005). Lastly, analysts might even avoid following firms with high performance volatility (e.g., O'Brien and Bhushan 1990; Minton and Schrand 1999; Lang et al. 2003) and firms with more difficult characteristics to assess (e.g., Litov et al. 2012; Theeke et al. 2018). This, in turn, impairs the firms' information environment, leading to higher costs of capital (e.g., Easley and O'Hara 2004; Kelly and Ljungqvist 2012). These negative analyst responses arising from inadequate risk-management activities incentivize firms to cater to sell-side analysts' aversion to firm risk.

When covered by analysts with greater career concerns, firms are more likely to manage their risk (e.g., employing hedging and limiting excessive risk-taking) to facilitate these analysts' research. Note that risk-management practices per se are costly activities for firms because they either consume firms' scarce resources or require firms to cut some risky but value-enhancing projects. Therefore, in the absence of external pressure, firms would likely not avail themselves of every risk-management opportunity. As analyst career concerns increase, firms face greater pressure to appease analysts and thus are likely to increase risk-management activities.

On the other hand, risk-management activities reduce the likelihood of firms' lower-tail outcomes and thus lower their default risk. To the extent that rational lenders such as banks incorporate this factor into their lending decisions, they would likely demand lower interest rates for firms covered by analysts with greater career concerns. These arguments lead to the following hypothesis:

Hypothesis: *Firms covered by analysts with greater career concerns have a lower cost of bank loans.*

3. Research Design

3.1. Sample selection

We collect bank loan information from the Loan Pricing Corporation's (LPC's) DealScan database, which contains detailed information on individual loan facilities. We obtain accounting information from Standard and Poor's Compustat database and retrieve analyst information from the Institutional Brokers Estimate System (I/B/E/S). We exclude firms from the financial services (SIC code 6000-6900) and regulated utilities (SIC code 4900-4999) industries. After merging the databases and removing observations with incomplete information, our final sample consists of 20,327 loans issued to 4,011 unique firms from 1988 through 2013.[7]

3.2. Measures of analyst career concerns

We use three measures to capture the level of analyst career concerns for a covered firm. Because our empirical analyses are at the firm-year level, we first measure each individual analyst's career concerns in a given year, and then calculate firm-year-level measures of analyst career concerns by averaging the career concerns of all sell-side analysts who cover the firm in a given year. To capture an analyst's career concerns, we follow Hong et al. (2000) and focus primarily on the analyst's research experience. Hong et al. (2000) find that the negative impact of forecast inaccuracy on analysts' career prospects is more pronounced for less-experienced analysts. In addition, prior literature (e.g., Hong et al. 2000; Lamont 2002) suggests that less-experienced analysts tend to herd more, producing forecasts that are closer to the consensus. Therefore, less-

[7] To mitigate the effect of outliers or misrecorded data, all firm-level continuous variables are winsorized at the 1% and 99% levels.

experienced analysts are likely to have greater career concerns (i.e., greater concerns about the impact of current performance on career prospects).

Our first firm-year measure, *Avg. No. of years as analyst*, is the average number of years as analyst for all analysts who cover the firm at year t, where we measure each individual analyst's experience by the total number of years that she has been in the I/B/E/S database by year t (e.g., Hong et al. 2000; Lim 2001). Prior career concern literature (e.g., Gibbons and Murphy 1992; Holmström 1999) also suggests that agents in early years of their profession generally have more career concerns because the market is still assessing their ability, and it is more difficult for them to find another comparable job. A higher value of *Avg. No. of years as analyst* indicates a lower level of career concerns among analysts who cover the firm at year t.

In addition to time, analysts' research experience is also likely to increase with the number of firms as well as the number of industries she has covered in her prior career. Accordingly, we create two other proxies for an analyst's experience: one is the *cumulative* number of unique firms that an analyst has covered *by* year t since she first appeared in I/B/E/S, and the other is the *cumulative* number of unique industries (based on the four-digit SIC codes) that she has covered during this period. We then compute their corresponding firm-year measures, *Avg. No. of firms covered* and *Avg. No. of industries covered* by using the same method as for *Avg. No. of years as analyst*. A higher value of each measure indicates fewer career concerns of analysts.

The above three proxies are conceptually related to the construct of analyst career concerns. However, they are likely to represent different aspects of career concerns. Thus, following prior studies (e.g., Callahan et al. 2003; Larcker et al. 2007), we use principal components analysis (PCA) with orthogonal, varimax rotation (Kaiser 1958) to create an aggregated index of analyst career concerns. We present the results of the PCA analysis in Table 1, Panel A. This analysis yields a single factor with an eigenvalue substantially greater than one (2.3093). In addition, the three measures load on this principal component in a consistent way, and their loadings are all above 0.50. For ease of interpretation, we multiply this component by –1 and use the transformed variable, *Analyst career concern*, as our primary measure of analyst career concerns throughout various tests below. A higher value of *Analyst career concern* implies a higher level of analyst career concerns.

[Insert Table 1 here]

3.3. Baseline regression model

We use the following empirical model as our baseline model to examine the effect of analyst career concern on a firm's cost of borrowing:

$$Log(AISD_t) = \alpha + \beta Analyst\ career\ concern_{t-1} + \gamma Firm\ attrubutes_{t-1} + \delta Loan\ characteristics_t + \varepsilon_t \quad (1)$$

Following prior literature (e.g., Houston et al. 2014; Hasan et al. 2017; Chava et al. 2018), our dependent variable, *Log(AISD)*, is the natural logarithm of the amount that the borrower pays, in basis points, over LIBOR for each dollar drawn down (i.e., the all-in spread drawn, or AISD). Following prior literature (e.g., He and Tian 2013; Lin et al. 2013; Hasan et al. 2014), we use one-year lagged *Analyst career concern* to mitigate concerns arising from reverse causality.

Following other studies (e.g., Strahan 1999; Graham et al. 2008; Hasan et al. 2017), we control for the following firm characteristics in our model. *Log(Asset)* is the natural log of the book value of the borrower's total asset of the borrower; *Profitability* is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total assets; *Market to book*, the ratio of the market value of assets to the book value of assets, measures a firm's growth opportunities; *Leverage* is the ratio of total debt to total assets; *Tangibility* is the ratio of tangible assets to total assets; *Z-Score* is the modified Altman's (1968) Z-score (= [1.2 Working Capital + 1.4 Retained Earnings + 3.3 EBIT + 0.999 Sales]/Total Assets); and *Cashflow volatility* is the standard deviation of the borrower's quarterly operating cash flows (OANCFY) in the previous three years scaled by total assets.

We further control for several loan characteristics that may correlate with pricing in the loan contract. *Log(Loan size)* is the natural log of the loan facility amount in millions of dollars. *Log(Loan maturity)* is the natural log of maturity in months. *Syndicate size* is the number of lenders in the loan syndicate. Additionally, prior studies find that relationship lending has a significant effect on loan price (Sharpe 1990; Boot 2000). We thus create a dummy variable, *Relationship loan*, to capture the existence of any prior lending by the same lead banks. Lastly, we control for year effects, firm effects, borrower credit rating effects, loan purpose effects, and loan type effects in the regression models. Appendix A provides detailed definitions and measurements for all variables.

3.4. Summary statistics

Panel B of Table 1 reports the summary statistics of analyst career concern, firm characteristics, and loan characteristics. We find that the mean values of *Avg. No. of years as analyst*, *Avg. No. of firms covered*, and *Avg. No. of industries covered* are 7.09, 20.88, and 10.38, respectively. Thus, our sample firms, on average, are covered by analysts who have worked for seven years, analyzed 21 firms, and covered 10 four-digit SIC industries in this profession. We also find that the mean value of *Analyst career concern* is -0.048.

For firm characteristics, we find that the average profitability (*Profitability*) is 0.137, average market to book ratio (*Market to book*) is 1.815, average leverage ratio (*Leverage*) is 0.274, average tangibility (*Tangibility*) is 0.330, average modified Altman's (1968) Z-score (*Z-Score*) is

1.874, and average cashflow volatility (*Cashflow volatility*) is 0.046. In terms of loan variables, we find that bank loan spreads (*AISD*) have a mean of 180 basis points, a median of 150 basis points, and a standard deviation of 131 basis points. In our sample, the average loan size (*Loan size*) is $379 million, with a mean maturity (*Loan maturity*) of 47 months. The mean syndicate size (*Syndicate size*) is approximately nine lenders. The sample statistics of firm and loan variables are similar to those of prior studies (e.g., Strahan 1999; Graham et al. 2008; Hasan et al. 2014, 2017).

Panel C of Table 1 reports the Pearson correlations. We find that the log of bank loan spreads (*Log(AISD)*) is significantly and negatively correlated with *Analyst career concern*, which provides preliminary evidence to support our hypothesis. As expected, all control variables are significantly associated with bank loan spreads as well, indicating a need to examine the relationship between analyst career concerns and the cost of bank loans in a multivariate environment.

4. Empirical Results

4.1. Baseline analyses

We start with ordinary least square (OLS) regressions and use firm-clustered, heteroskedasticity-robust standard errors to account for the potential autocorrelation in the panel tests. Columns 1 to 3 of Table 2 report results using the three component measures of analyst career concerns (i.e., *Avg. No. of years as analyst*, *Avg. No. of firms covered,* and *Avg. No. of industries covered*). We find that all the coefficients on these component measures are positive and significant. Because a higher value of each measure indicates fewer career concerns, these results suggest that analysts with fewer career concerns are associated with higher costs of bank loans. The findings are consistent with our hypothesis.

In Column 4, we further use *Analyst career concern* as the testing variable. The estimated coefficient is -0.0228, significant at the 1% level (*t*-value = -5.1109). Because a higher value of *Analyst career concern* indicates more career concerns, this result is consistent with our hypothesis that there is a negative association between analyst career concerns and the costs of bank loans. The estimated coefficient on *Analyst career concern* is also economically meaningful. For instance, a one-standard-deviation increase in *Analyst career concern* reduces loan spreads by about 3.4% (i.e., 0.0228 × 1.496). The average loan spread of the sample firms is 180 basis points, so the 3.4% decrease implies a decrease of 6.14 basis points in loan spreads (i.e., 180 × 3.4%). Given that the mean sample loan size is $379 million and the average loan's time to maturity is around four years, a one-standard-deviation increase in *Analyst career concern* results in an average $0.93 million (= $379 million × 0.000614 × 4) interest expense deduction. We note that our estimate is comparable to those reported in prior studies. For example, Bharath et al. (2008) and Hasan et al. (2014) find that a one-standard-deviation increase in accounting quality and cash effective tax rate reduces loan spreads by 6.65 and 4.87 basis points, respectively.

[Insert Table 2 here]

4.2. Robustness checks

We conduct a set of robustness checks on our results. First, we adopt alternative measures of analyst career concerns by considering not only each individual analyst' accumulated experience in a given year, but also her past forecast performance. The rationale for this adjustment is that past poor performance per se heightens an analyst's career concerns by hurting her job security and promotion (e.g., Hong et al. 2000; Hong and Kubik 2003). Thus, relative to other analysts, an inexperienced analyst with past poor performance is more likely to be concerned about her career prospects. Therefore, we create refined measures of analyst career concerns in the following way.

For each analyst *k* who follows firm *i* in year *t*, we create a dummy variable with a value of one if her years in this profession are below the sample median and her earnings forecast error for firm *i* in year *t-1* (i.e., the absolute difference between her forecast and the corresponding firm-year's actual earnings per share (EPS), deflated by the actual EPS) is higher than the sample median, and zero otherwise. We then create a firm-year measure of analyst career concerns (*Pct of junior analysts with poor perf*) by aggregating the values of these dummy variables for all analysts who follow firm *i* in year *t* deflated by the corresponding firm-year's analyst coverage. Likewise, we create two other firm-year measures of analyst career concerns (*Pct of analysts cover fewer firms & poor perf*, and *Pct of analysts cover fewer ind & poor perf*) by identifying first, among those analysts who follow firm *i* in year *t*, the analysts who have analyzed fewer firms or fewer industries than the sample median and whose earnings forecast error for firm *i* in year *t-1* is higher than the sample median, and then deflating the number of such analysts by the corresponding firm-year's analyst coverage.

For the sake of brevity, we report the regression results using these three alternative measures of analyst career concerns in Appendix B. As Columns 1 through 3 show, *Pct of junior analysts with poor perf*, *Pct of analysts cover fewer firms & poor perf*, and *Pct of analysts cover fewer ind & poor perf* are all negatively associated with *Log(AISD)*. These results are consistent with our baseline findings.

We further perform a battery of other robustness checks. First, we re-estimate our baseline model using deal-level data to control for potential correlation within facilities. Second, we use a median regression to address the effects of outliers. Lastly, we use a reduced sample in which we exclude the years 2007 through 2009 to mitigate the effects of the recent subprime crisis. For brevity, we report the results in Appendix C. We find that our results hold for all these robustness checks.

Berg et al. (2016) argue that fees charged by banks are also important components of the total cost of borrowing. If greater analyst career concerns reduce bank loan spreads, we expect it to have a similar effect on the fees charged by banks. In Appendix D, our results show that *Analyst career concern* is also negatively related to various bank fees (including the upfront, commitment, facility, and letter-of-credit fees). Overall, our results remain robust to all these tests.

4.3. Tests exploring the risk-management channel

In this paper, we posit that analysts who have greater career concerns are more likely to encourage firms to undertake risk management. The resulting lower firm risk, in turn, leads to lower costs of borrowing. To establish risk management as the channel underlying the relation between *Log(AISD)* and *Analyst career concern*, following Baron and Kenny (1986), we perform a series of mediation analyses. Prior literature (e.g., Lang et al. 2012; Chen et al. 2019; Tsang et al. 2019) has adopted this methodology to provide direct evidence on underlying channels in other settings.

To establish the mediation effect in this analysis, the following three conditions should be met. First, the independent variable (*Analyst career concern*) should significantly relate to the dependent variable (*Log(AISD)*). Second, the independent variable (*Analyst career concern*) should significantly relate to the mediator variable (i.e., firm risk). Finally, the dependent variable (*Log(AISD)*) is regressed on both the independent variable (*Analyst career concern*) and the mediator (firm risk). If the mediator variable mediates the association between *Log(AISD)* and *Analyst career concern*, the mediator should be significant and the significance of the independent variable of interest (*Analyst career concern*) is reduced after the mediator variable is added to the regression. Following Krull and MacKinnon (2001), we use a Sobel (1982) test to examine whether the mediation effect is statistically significant.

We first examine the mediation effect of a firm's overall risk. Following Graham et al. (2008) and Boubakri et al. (2013), we first use *ROA volatility* as the accounting-based measure of a firm's overall risk. *ROA volatility* is the standard deviation of quarterly ROA in year t. We report the test results in Table 3. In Column 1, we repeat Table 2, Column 4's baseline regression result for ease of comparison, because it is the first-stage result of our mediation analysis. As discussed above, we document a significantly negative association between *Log(AISD)* in year t and *Analyst career concern* in year t-1. Column 2 reports the results of the second-stage mediation analysis. The coefficient on *Analyst career concern* is negative and significant when we use *ROA volatility* in year t as the dependent variable. Consistent with the risk-management view, this result suggests that analysts' career concerns help reduce a firm's overall risk. This significant result also confirms that the second condition of mediation analysis is satisfied.

[Insert Table 3 here]

In Column 3, we include both *Analyst career concern* and *ROA volatility* as testing variables when we use *Log(AISD)* as the dependent variable. We find that *ROA volatility* is positively related to *Log(AISD)*, consistent with firm risk increasing the cost of bank loans. Importantly, though *Analyst career concern* remains negatively and significantly associated with *Log(AISD)*, its coefficient (-0.0116) is smaller in magnitude compared to the corresponding coefficient in Column 1 (-0.0228). The mediation effect is equal to the decrease in the coefficient on *Analyst career concern* that arises from including the firm risk measure as an additional explanatory variable in the cost of bank loan model. Using a Sobel test, we find that this mediation effect is significant with $p < 0.01$. Thus, the results support our risk-management view that firm risk serves as an important channel through which analyst career concerns affect bank loan spreads.

It is also worth noting that the mediation effect by firm risk is partial because the coefficient on *Analyst career concern* remains significant in Column 3. One possible interpretation is that any individual proxy for firm risk (e.g., *ROA volatility*) can only capture a portion of a firm's total risk.[8] Nevertheless, the mediation effect in the *ROA volatility* analysis is economically large. The total effect of *Analyst career concern* on bank loan spreads is -0.0228 (Column 1) and the direct effect of *Analyst career concern* on bank loan spreads is -0.0116 (Column 3). The indirect mediation effect, which equals the difference between the total effect and the direct effect, is -0.0112 (i.e., -0.0228 – (-0.0116)). Thus, the mediation effect represents approximately 49% (i.e., 0.0112/0.0228) of the total effect.

Following prior literature (e.g., Xu and Malkiel 2003; Bali and Cakici 2008; Lin et al. 2013), we further use two stock market-based measures of firm risk. One is *Stock volatility*, computed as the standard deviation of daily stock returns in year t. The other measure, *Idiosyncratic risk*, is defined as the annualized standard deviation of the residuals from the Capital Asset Pricing Model using daily stock returns in year t. Table 3, Column 1's result, again, serves as the first-stage benchmark, and Columns 4 through 7 report the second- and third-stage results of mediation analysis based on these two measures of firm risk. These results satisfy the requirements of the second- and third-stage regressions for mediation analysis. For example, the negative coefficients on *Analyst career concern* in Columns 4 and 6 suggest that analysts' career concerns help reduce firm risk. Further, our Sobel test results in Columns 5 and 7 show that the mediation effect is statistically significant ($p < 0.01$) when we use either *Stock volatility* or *Idiosyncratic risk* as the measure of firm risk.

We further examine how firms' default risk mediates the relationship between analyst

[8] Alternatively, analyst career concerns may also reduce the cost of bank loans through other channels.

career concerns and loan spreads. Following prior studies (e.g., Griffin and Lemmon 2002), we use the Ohlson (1980) O-score to capture a firm's default risk (*Default risk*). A higher value of O-score (*Default risk*) indicates a higher probability of a firm going bankrupt (i.e., higher financial distress). The second- and third-stage regression results of the mediation analysis based on *Default risk* are reported in Table 3, Columns 8 and 9, with Column 1's results serving as the first-stage benchmark. Our Sobel test result shows that the coefficient on *Analyst career concern* decreases significantly in magnitude when *Default risk* is added to the loan spreads regression, supporting the mediation effect of default risk.

In addition to overall firm risk, we examine how specific risk-taking or risk-management activities mediate the effect of analyst career concerns on the cost of bank loans. Following prior studies, we examine three types of activities, capital expenditures (Coles et al. 2006; Kini and Williams 2012), R&D expenditures (Coles et al. 2006; Kini and Williams 2012; Cassell et al. 2012), and derivatives hedging (Geczy et al. 1997; Graham and Rogers 2002). Capital and R&D expenditures are widely viewed as risk-taking activities while derivatives hedging represents a typical activity to mitigate financial risk.

We measure *Capital expenditure intensity* as capital expenditures divided by total assets in year t, *R&D intensity* as R&D expenditures divided by the total number of employees in year t, and *Derivative hedging* as a dummy variable which equals one if there is any type of derivative that is used for hedging purposes in year t, and zero otherwise. We obtain firms' derivatives hedging information from the Calcbench database. Firms with higher values of *Capital expenditure intensity* and *R&D intensity* are riskier, while firms which engage in derivatives hedging (*Derivative hedging* = 1) are less risky than firms without such activities. In Table 4, we provide the mediation effect test results in using these three risk measures. In Column 1, we also repeat Table 2, Column 4's baseline result for ease of comparison.[9] All our results satisfy the three conditions for the presence of a mediation effect. Importantly, our Sobel test results show that the mediation effect is statistically significant for all three measures of risk-related activities.

[Insert Table 4 here]

Overall, our results in Tables 3 and 4 suggest that firm risk is a plausible channel through which analyst career concerns help reduce the cost of bank loans.[10]

4.4. The moderating role of analyst coverage

Our focus in this paper is on how analyst career concerns affect the cost of bank loans through the risk-management channel. Yet, prior literature on financial analysts and the cost of debt generally focuses on analyst coverage rather than their career concerns. In this section, we examine the moderating role of analyst coverage. Higher analyst coverage means that more analysts will interact with management in various venues. To the extent that more analysts exert more pressure on firms to manage firm risk, higher analyst coverage is likely to intensify the effect of analyst career concerns on firm risk. Therefore, we expect that the negative association between analyst career concerns and loan spreads becomes stronger for firms with higher analyst coverage.

We test our conjecture and present results in Table 5. In Column 1, we first add *Analyst coverage* as a control variable to the baseline model, where *Analyst coverage* is defined as the number of analysts who cover a firm in year t-1. The more analysts following a firm, the more research reports they can produce and disseminate. Accordingly, to the extent that higher analyst

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[9] *Derivative hedging* is largely a time-invariant dummy variable. Thus, in Column 6 where *Derivative hedging* is the dependent variable, we control for industry fixed effects rather than firm fixed effects.

[10] Prior literature suggests that less experienced analysts are less likely to produce high-quality research reports (e.g., (e.g., Mikhail et al. 1997 and 2003; Hong et al. 2000); thus, these analysts are less likely to reduce information asymmetry and enhance shareholder monitoring. Therefore, according to the arguments of the information production and monitoring perspectives, less experienced analysts (i.e., analysts with *greater* career concerns) would be associated with *higher* costs of bank loans. However, we find a negative association between analyst career concerns and bank loans spreads. As such, this result is not likely to be driven by analysts' "information production" or "monitoring" roles.

coverage helps mitigate information asymmetry (e.g., Mansi et al. 2011) and managerial agency problems (e.g., Jensen and Meckling 1976; Yu 2008; Chen et al. 2014), debtholders would likely ask for lower compensation when lending to firms with higher analyst coverage. Consistent with this notion, prior studies (e.g., Cheng and Subramanyam 2008; Derrien et al. 2016) find that higher analyst coverage increases firms' credit ratings and reduces the cost of bonds. In Table 5, Column 1, we find that firms with higher analyst coverage have lower loan spreads. This result suggests that the inference of prior literature (e.g., Cheng and Subramanyam 2008; Derrien et al. 2016) holds with bank loans. Importantly, we find that *Analyst career concern* remains negatively associated with loan spreads even after controlling for *Analyst coverage*, suggesting that the effect of analyst career concerns on the cost of bank loans goes beyond that of analyst coverage.

In Column 2, we add both a standalone *Analyst coverage* and the interaction between *Analyst coverage* and *Analyst career concern* to the baseline model. We find that the coefficient on the interaction term, *Analyst career concern* × *Analyst coverage*, is negative and significant, suggesting that the effect of analyst career concerns on the cost of bank loans is increasingly negative as analyst coverage increases. This result confirms our conjecture of the moderating effect of analyst coverage on the relationship between analyst career concerns and the cost of bank loans.

[Insert Table 5 here]

5. Tests with Correction for Endogeneity Bias

In our baseline regressions, we use a lead-lag design to address reverse causality concerns, and also control for firm-fixed effects to mitigate time-invariant omitted variables bias. However, our baseline regressions could still suffer from other endogeneity problems. Below we use three identification strategies to further alleviate endogeneity concerns.

5.1. Difference-in-differences analysis

5.1.1. Natural experiment setting

Our first identification strategy is to use a quasi-natural experiment—mergers of brokerage houses which cause an exogenous shock to analyst career concerns. The basic idea is that when a stock is covered by both brokerage houses before the merger, the merged house typically lays off at least one redundant analyst after the merger to eliminate excess research capacity and improve efficiency (see, e.g., Wu and Zang 2009; Hong and Kacperczyk 2010). Different analysts have different levels of professional experience and thus different levels of career concerns. Consequently, after an analyst who initially covered a stock was let go due to a broker merger event, the average career concerns of analysts covering the stock were changed. The changes in analyst career concerns caused by such broker mergers are exogenous because they are unlikely to be driven by covered firms' cost of debt or other characteristics. Therefore, brokerage house mergers serve as a quasi-natural experiment to isolate the effects of analyst career concerns from other variables affecting a firm's bank loan cost.

We adopt a difference-in-differences (DiD) methodology to examine how changes in analyst career concerns affect subsequent changes in bank loan costs. We call the stocks that experienced a change in analyst coverage due to brokerage house mergers "affected stocks." For an affected stock, the redundant analyst(s) who were let go and thus stopped covering the stock can be either more or less experienced than other analysts who continued covering the stock. Therefore, a brokerage house merger could lead to either increased or decreased career concerns of analysts covering a stock. Accordingly, among affected stocks (firms), there are two sets of treatment firms: firms with increased analyst career concerns and firms with decreased analyst career concerns.

5.1.2. Identifying treatment and control firms

We first obtain brokerage house mergers based on Hong and Kacperczyk (2010) and Kelly and Ljungqvist (2012). We exclude three mergers in which Merrill Lynch was involved as the bidder broker, because Merrill Lynch's analyst forecast data are dropped from the I/B/E/S database per the broker's request.

To construct a sample of affected firms that are covered by the merged brokerage houses prior to merging and that lose analysts because of these exogenous shocks, we adopt the following procedures. We first combine the list of brokerage mergers with the I/B/E/S unadjusted detail history dataset to identify firms that are covered by both the target and the bidder brokerage houses one year before the merger and for which one of the two analysts covering the same stock is no longer employed at the combined brokerage after the merger. To exclude potentially endogenous coverage terminations, we drop firms that are covered by both brokerage houses before the merger but no longer covered by the surviving entity after the merger.[11]

We then split the remaining affected firms into two sets of treatment firms: firms with decreased analyst career concerns and firms with increased analyst career concerns after these merger events. We create two dummy variables to indicate these sets: *Decreased analyst career concern* (*Increased analyst career concern*) is a dummy variable that equals one if a firm's *Analyst career concern* is decreased (increased) after the merge event, and zero otherwise.

We then proceed to identify, from the pool of firms not affected by brokerage house mergers, a match firm for each treatment firm with decreased analyst career concerns, using a propensity score matching method suggested in recent studies (e.g., Irani and Oesch 2013; Hasan et al. 2014). Specifically, we first run a logistic regression for each matching year (i.e., brokerage house merger

[11] The existing literature (e.g., Kelly and Ljungqvist 2012; He and Tian 2013; Irani and Oesch 2013) suggests that such coverage changes could be endogenous because the surviving entity chooses to terminate coverage of the firm.

year), where the dependent variable is *Decreased analyst career concern* and the independent variables are *Analyst career concern*, *Log(asset)*, *Market to book*, *Annual stock return*, *Stock volatility*, and *Stock turnover*. The logistic regression provides the predicted propensity score. We then match, without replacement, each treatment firm with a match firm using the closest propensity score. To ensure close matches, following Hasan et al. (2014), we use the caliper matching method in which "caliper" refers to the difference in the predicted probabilities between the treatment and match firms. By matching within a caliper of 10%, we identify the treatment-match pairs for firms with decreased analyst career concerns. We label the corresponding DiD analysis "the decreased-concern DiD analysis."

We also repeat the same matching procedure, using firms with increased analyst career concerns as treatment firms. After the propensity score matching, we obtain the treatment-match pairs for these firms. We label the corresponding DiD analysis "the increased-concern DiD analysis."

Next, we obtain the corresponding loan-year observations for both sets of DiD analyses. To conduct a DiD analysis, we require both treatment and match firms in each matched pair to have at least one loan facility five years before and after the matching year. We drop loans in year zero because that is the transition year, and merger transactions generally span several months. Our final samples include 2743 loan-year observations for 360 matched pairs for the decreased-concern DiD analysis, and 2625 loan-year observations for 331 matched pairs for the increased-concern DiD analysis. We use a dummy variable *Post merger loan* to differentiate loans originated before from after the merger. *Post-merger loan* equals one if the loan is originated after the merger year, and zero otherwise.

5.1.3. Difference-in-differences estimation

We use the following standard DiD model to capture the effect of changes in analyst career concerns on subsequent changes in the cost of bank loans:

$$Log(AISD_t) = \beta_0 + \beta_1 Changed\ analyst\ career\ concern + \beta_2 Post\ merger\ loan + \beta_3\ Changed\ analyst\ career\ concern \times Post\ merger\ loan + \sum \beta Firm\ characteristics_{t-1} + \sum \gamma Loan\ characteristics_t + \varepsilon_t \quad (2)$$

In this model, the test variable of interest is the interaction term *Changed analyst career concern* × *Post merger loan*, where *Changed analyst career concern* is "*Decreased analyst career concern*" for the decreased-concern DiD analysis, and "*Increased analyst career concern*" for the increased-concern DiD analysis. The coefficient on this interaction captures the difference-in-differences estimate in bank loan spreads between treatment and match firms across the pre- and post-merger sample periods. We predict a positive coefficient on *Decreased analyst career concern* × *Post merger loan* and a negative coefficient on *Increased analyst career concern* × *Post merger loan*. As in the baseline model, we control for several firm and loan characteristics.

We perform two separate sets of DiD analysis. In Column 1 (2), Table 6, we report the results for the decreased-concern (increased-concern) DiD analysis. Consistent with our expectations, we find that the coefficient on *Decreased analyst career concern* × *Post merger loan* is significantly positive and the coefficient on *Increased analyst career concern* × *Post merger loan* is significantly negative. Thus, our DiD regression results suggest a negatively *causal* effect of analyst career concerns on the cost of bank loans.

[Insert Table 6 here]

5.2. Instrumental variable approach

Our second identification strategy is to use a two-stage least squares approach. In the spirit of prior studies (e.g., John et al. 2008; Lin et al. 2011; Lin et al. 2013), we use mean *Analyst career concern* of industry peers (*Industry analyst career concern*) as the instrumental variable. We define industries using four-digit SIC codes. This instrument is valid for two reasons. First, analysts who cover a particular industry may share certain characteristics. For example, to the extent that younger generations lead older generations in the use of technology in their daily life, younger analysts are more likely than older analysts to cover technology companies. Therefore, industry-level analyst career concerns should be significantly related to analyst career concerns of individual firms within the industry. Second, little reason exists to suggest that industry peers' analyst career concerns affect an individual firm's loan spreads through channels other than affecting the level of career concerns of analysts who cover the firm. Therefore, we expect that the instrument satisfies the exclusion restriction.

Table 7 present the results of the instrumental variables regression analysis. We estimate the first stage regression of *Analyst career concern* on *Industry analyst career concern* and several control variables and present results in Column 1. As can be seen, *Industry analyst career concern* is positively associated with *Analyst career concern*, suggesting that our instrument satisfies the relevance condition. The second-stage results using *Log(AISD)* as the dependent variable are reported in Column 2. The coefficient on the fitted value of analyst career concerns, *Fitted analyst career concern*, is negative and significant at the 1% level, which reinforces our earlier results.

In Table 7, we also report results for post-estimation tests. First, we conduct the under-identification test of whether our equation is identified, using the Kleibergen-Paap rk Lagrange Multiplier (LM) statistic. For our data, the model is identified. Second, we conduct the weak identification test of whether our instrument is relevant and strong, using the Kleibergen-Paap rk Wald F-statistic (Kleibergen and Paap 2006). For our sample, the F-statistic is much higher than the "rule of thumb" of 10, indicating that our instrument is relevant and strong.

[Insert Table 7 here]

5.3. Change regression

Our third strategy is to use the change regression approach to examine the relation between changes in bank loan costs and lagged changes in analyst career concerns. Though not completely addressing endogeneity, the first-difference regression can estimate a better causal relationship between analyst career concerns and loan costs than a simple panel regression. Specifically, the dependent variable is *ΔLog (AISD)*, which takes the difference of loan spreads between year t and year t-1. The independent variable is *ΔAnalyst career concern*, which takes the difference of *Analyst career concern* between year t-1 and year t-2.

Follow Lin et al. (2013), we limit the sample to firms with multiple loan years and keep only the largest loan facility per borrower per year when a firm has more than one loan in a year. Our sample size is reduced to 6,781 for the change regression. We report the results of the change regression in Table 8. The coefficient on *ΔAnalyst career concern* is negative and significant, which confirms the above main results and further mitigates endogeneity concerns.

[Insert Table 8 here]

6. Conclusion

Focusing on bank loans, we investigate a risk-management channel through which analysts could reduce the cost of debt. Not only does firm risk increase a firm's cost of bank loans, but it also jeopardizes analysts' career prospects by constraining their ability to cover more firms and impairing their research quality. Consequently, career-concerned analysts would likely exert pressure on a firm to mitigate risk, thus reducing its cost of bank loans. As such, we expect analyst career concerns help reduce the cost of bank loans through the channel of mitigating firm risk.

Consistent with this risk-management view, we find a significantly negative relationship between analyst career concerns and loan spreads. Our mediation analysis results suggest that firm risk serves as a channel underlying the association between analyst career concerns and loan spreads. In addition, we find that the effect of analyst career concerns on loan spreads is more pronounced for firms with higher analyst coverage. Our main results also remain robust with tests using alternative measures of analyst career concerns, tests correcting for endogeneity bias, and tests using bank fees as proxies for the costs of borrowing.

Our study makes three major contributions to prior literature. First, we contribute to the literature on how firm-level characteristics affect the cost of bank loans through the channel of affecting firm risk. We find that analyst career concerns lower firms' cost of bank loans by reducing firm risk. Second, our study also adds to the literature on the effects of analysts on the cost of debt. Unlike prior studies that treat analysts as information providers and generally focus on the role of higher analyst coverage in improving information environments and shareholder monitoring, we treat analysts as economic agents who care about career prospects. We identify a new, risk-management channel through which career-concerned analysts are likely to help reduce the cost of debt. Lastly, we contribute to the literature on the impact of analyst career concerns. Unlike prior literature which generally focuses on the effect that analysts' career concerns have on their own behavior, we tie such career concerns to the behavior and outcomes of those firms they cover.

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TABLE 1. Principal Component Analysis, Summary statistics, and Correlations

Panel A: Principal Component Analysis			
	Avg. No. of years as analyst	**Avg. No. of firms covered**	**Avg. No. of industries covered**
Loadings	0.5550	0.6110	0.5645
Eigenvalue		2.3093	

Panel B: Summary statistics

Variable	N	Mean	Standard deviation	25th percentile	50th percentile	75th percentile
Analyst career concern						
Avg. No. of years as analyst	20,327	7.09	3.64	4.50	6.83	9.00
Avg. No. of firms covered	20,327	20.88	12.22	13.36	19.33	26.00
Avg. No. of industries covered	20,327	10.38	6.97	5.92	9.00	13.00
Analyst career concern	20,327	-0.048	1.496	-0.729	0.105	0.889
Pct of junior analysts with poor perf	20,327	0.29	0.421	0	0	0.75
Pct of analysts cover fewer firms & poor perf	20,327	0.24	0.394	0	0	0.5
Pct of analysts cover fewer ind & poor perf	20,327	0.28	0.413	0	0	0.667
Firm characteristics						
Log(Asset)	20,327	6.901	1.783	5.627	6.867	8.107
Profitability	20,327	0.137	0.105	0.093	0.135	0.183
Market to book	20,327	1.815	1.419	1.149	1.467	2.052
Leverage	20,327	0.274	0.180	0.137	0.265	0.390
Tangibility	20,327	0.330	0.239	0.140	0.266	0.478
Z-Score	20,327	1.874	1.426	1.135	1.871	2.589
Cashflow volatility	20,327	0.046	0.056	0.027	0.038	0.054
Loan characteristics						
AISD (in basis points)	20,327	179.821	131.346	75	150	250
Loan size (in $ millions)	20,327	379.343	790.086	50	150	400

Loan maturity (in months)	20,327	47.240	23.855	30	57	60.00
Syndicate size	20,327	8.690	9.038	2	6	12
Relationship loan (dummy variable)	20,327	0.486	0.5	0	0	1

Panel C: Pearson correlations

		1	2	3	4	5	6	7	8	9	10	11	12
1	*Log(AISD)*												
2	*Analyst career concern*	-0.0789											
		0.000											
3	*Log(Asset)*	-0.439	-0.046										
		0.000	0.000										
4	*Profitability*	-0.272	-0.045	0.123									
		0.000	0.000	0.000									
5	*Market to book*	-0.143	0.033	-0.080	0.169								
		0.000	0.000	0.000	0.000								
6	*Leverage*	0.162	0.031	0.178	-0.082	-0.222							
		0.000	0.000	0.000	0.000	0.000							
7	*Tangibility*	-0.064	0.019	0.119	0.101	-0.115	0.250						
		0.000	0.000	0.000	0.000	0.000	0.000						
8	*Z-Score*	-0.222	0.102	-0.006	0.569	0.035	-0.249	-0.150					
		0.000	0.000	0.338	0.000	0.000	0.000	0.000					
9	*Cashflow volatility*	0.044	-0.017	-0.045	-0.063	0.027	-0.018	-0.018	-0.075				
		0.000	0.016	0.000	0.000	0.000	0.003	0.004	0.000				
10	*Log(Loan size)*	-0.415	-0.045	0.808	0.198	-0.034	0.149	0.125	0.062	-0.034			
		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
11	*Log(Loan maturity)*	0.108	0.022	0.064	0.098	-0.076	0.110	0.036	0.008	-0.005	0.203		
		0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.203	0.463	0.000		
12	*Syndicate size*	-0.274	-0.023	0.531	0.098	-0.023	0.130	0.068	0.007	-0.032	0.575	0.123	

		0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.274	0.000	0.000	0.000	
13	*Relationship loan*	-0.155	-0.052	0.294	0.054	-0.032	0.115	0.042	0.002	-0.015	0.283	0.003	0.215
		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.702	0.016	0.000	0.659	0.000

Panel A presents the results of applying principal component analysis to three proxies of analyst career concerns. Panel B presents the summary statistics for our sample. *Analyst career concern* and firm characteristics are computed using information from the year immediately preceding the year in which a firm obtains a bank loan (i.e., year *t*-1), while the loan characteristics are computed using information for a loan that a firm obtains in year *t*. Panel C presents Pearson correlations, where P-values are presented under the correlation values. Appendix A provides detailed definitions and measurements for all variables.

TABLE 2. Baseline Regressions: The Relation between Analyst Career Concerns and Bank Loan Cost

VARIABLES	(1) Log(AISD)	(2) Log(AISD)	(3) Log(AISD)	(4) Log(AISD)
Log(Avg. No. of years as analyst)	0.0943***			
	[4.8078]			
Log(Avg. No. of firms covered)		0.0498***		
		[5.8057]		
Log(Avg. No. of industries covered)			0.0309**	
			[2.4965]	
Analyst career concern				-0.0228***
				[-5.1109]
Log(Asset)	-0.1485***	-0.1436***	-0.1494***	-0.1423***
	[-3.8360]	[-3.8148]	[-3.6416]	[-3.7892]
Profitability	-0.8817***	-0.8952***	-0.7768***	-0.8974***
	[-6.4309]	[-6.1225]	[-10.8371]	[-6.0814]
Market to book	-0.0222	-0.0227	-0.0178	-0.0232
	[-1.7001]	[-1.6790]	[-1.2869]	[-1.7125]
Leverage	0.4349***	0.4409***	0.5780***	0.4459***
	[4.1359]	[4.1098]	[6.6493]	[4.1597]
Tangibility	-0.4896**	-0.4951**	-0.3325*	-0.4897**
	[-2.4493]	[-2.3853]	[-2.0365]	[-2.3759]
Z-Score	-0.0326	-0.0343	-0.0253	-0.0338
	[-1.1388]	[-1.1804]	[-1.1196]	[-1.1533]
Cashflow volatility	0.0147	0.0166	0.0283**	0.0163
	[1.0385]	[1.1367]	[2.4482]	[1.1286]
Log(Loan size)	-0.0013	-0.0003	-0.0371***	-0.0002
	[-0.1047]	[-0.0203]	[-4.6815]	[-0.0189]
Log(Loan maturity)	-0.0057	-0.0067	0.0029	-0.0064
	[-0.3992]	[-0.4712]	[0.1920]	[-0.4543]
Syndicate size	0.0007	0.0007	0.0009*	0.0007
	[1.3643]	[1.2723]	[1.9939]	[1.2929]
Relationship loan	0.0127	0.0159	0.0251***	0.0150
	[1.0142]	[1.2682]	[3.6002]	[1.2322]
Constant	5.9937***	6.0060***	6.1936***	6.1396***
	[24.0279]	[22.5878]	[20.6953]	[22.2396]
Observations	20,327	20,327	20,327	20,327
Adjusted R-squared	0.7023	0.7012	0.7021	0.7015
Borrower rating	Y	Y	Y	Y
Loan type	Y	Y	Y	Y
Loan purpose	Y	Y	Y	Y
Year effects	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y

Our sample contains 20,327 loans from 1988 through 2013. The dependent variable is *Log (AISD)*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn). *Analyst career concern* and firm characteristics are computed using information from the year immediately prior to the year in which a firm obtains a bank loan (i.e., year t-1), while the loan characteristics are computed using information for a loan that a firm obtains in year t. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within-firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 3. The Mediation Effect of Overall Firm Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ROA volatility		Stock volatility		Idiosyncratic risk		Default risk	
VARIABLES	Log (AISD)	ROA volatility	Log (AISD)	Stock volatility	Log (AISD)	Idiosyncratic risk	Log (AISD)	Default risk	Log (AISD)
Analyst career concern	-0.0228***	-0.0005***	-0.0116***	-0.0266***	-0.0135***	-0.0064***	-0.0149***	-0.0207***	-0.0137***
	[-5.1109]	[-3.0265]	[-3.6792]	[-3.3158]	[-3.6287]	[-4.0919]	[-3.7837]	[-3.5898]	[-4.0232]
ROA volatility			1.2845***						
			[3.4672]						
Stock volatility					0.0968***				
					[6.6488]				
Idiosyncratic risk							0.2201***		
							[5.4965]		
Default risk									0.0592***
									[4.5185]
Sobel test (*p-value*)			<0.01		<0.01		<0.01		<0.01
Log(Asset)	-0.1423***	-0.0020***	-0.1213***	-0.2995***	-0.1005**	-0.0733***	-0.0956**	-0.3334***	-0.0992**
	[-3.7892]	[-5.5077]	[-3.8246]	[-10.4149]	[-3.0909]	[-11.7439]	[-3.0093]	[-12.7808]	[-3.0491]
Profitability	-0.8974***	-0.0256***	-0.8556***	-0.9233***	-0.8150***	-0.1903*	-0.8323***	-0.2794	-0.9993***
	[-6.0814]	[-5.4948]	[-4.2637]	[-3.0266]	[-4.6832]	[-2.3263]	[-3.9349]	[-0.7753]	[-4.6265]
Market to book	-0.0232	-0.0021***	-0.0199	0.1069***	-0.0397**	0.0271***	-0.0378*	-0.1037***	-0.0317
	[-1.7125]	[-8.3355]	[-1.2703]	[4.2728]	[-2.3662]	[7.0721]	[-2.2649]	[-4.4775]	[-1.7115]
Leverage	0.4459***	-0.0019	0.4885***	0.4915***	0.3297**	0.1594***	0.3493**	2.6113***	0.2885**
	[4.1597]	[-0.7736]	[5.7661]	[3.5204]	[2.6573]	[3.7680]	[3.1659]	[14.7222]	[2.3922]
Tangibility	-0.4897**	-0.0153***	-0.5774**	-0.2723	-0.5292**	-0.1120*	-0.5741**	-0.3672*	-0.6067**
	[-2.3759]	[-4.3375]	[-2.4560]	[-1.3608]	[-2.4194]	[-2.0601]	[-2.5770]	[-1.9093]	[-2.4903]
Z-Score	-0.0338	-0.0022***	-0.0408	-0.0532*	-0.0329	-0.0020	-0.0463	-0.0404	-0.0486
	[-1.1533]	[-4.1596]	[-1.4044]	[-1.7448]	[-1.1182]	[-0.2132]	[-1.2813]	[-1.1287]	[-1.3171]
Cashflow volatility	0.0163	-0.0002	0.0130	-0.0363	0.0243*	0.0092*	0.0223	0.0619**	0.0161
	[1.1286]	[-0.2330]	[0.9269]	[-1.5246]	[2.0201]	[2.0520]	[1.7663]	[2.6552]	[1.2689]
Log(Loan size)	-0.0002		0.0043		0.0013		-0.0008		-0.0079
	[-0.0189]		[0.3184]		[0.1066]		[-0.0704]		[-0.7512]
Log(Loan maturity)	-0.0064		-0.0038		-0.0678***		-0.0634***		-0.0680***
	[-0.4543]		[-0.2828]		[-5.1404]		[-4.7128]		[-4.5701]
Syndicate size	0.0007		0.0002		0.0006		0.0005		0.0002
	[1.2929]		[0.3645]		[0.9312]		[0.9161]		[0.2793]
Relationship loan	0.0150		0.0166		0.0212		0.0154		0.0183
	[1.2322]		[0.9350]		[1.4095]		[0.9813]		[1.3044]
Constant	6.1396***	0.0386***	5.8763***	4.1898***	5.8956***	0.9533***	5.9416***	0.9592***	6.2624***
	[22.2396]	[10.1337]	[24.3675]	[15.5080]	[22.6187]	[15.6895]	[23.2070]	[3.1209]	[22.1730]
Observations	20,327	20,327	20,327	20,327	20,327	20,327	20,327	20,327	20,327

Adjusted R-squared	0.7015	0.5641	0.7069	0.6122	0.7087	0.6621	0.7092	0.6681	0.7066
Borrower rating	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loan type	Y		Y		Y		Y		Y
Loan purpose	Y		Y		Y		Y		Y
Year effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y	Y	Y	Y	Y	Y

This table presents the results on the mediation effect of overall firm risk on the relationship between analyst career concerns and the cost of bank loans. The variable in the headline of each column is the dependent variable of the corresponding regression. *Log(AISD)* is the natural log of *AISD*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn) in year t. *ROA volatility* is the standard deviation of quarterly ROA in year t. *Stock volatility* is the standard deviation of daily stock returns in year t. *Idiosyncratic risk* is the annualized standard deviation of the residuals derived by the Capital Asset Pricing Model (CAPM) using daily stock returns in year t. *Default risk* is measured by the Ohlson (1980) O-score. *Analyst career concern* is the measure of analysts' career concerns in year t-1. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 4. The Mediation Effect of Specific Risk-Taking or Risk-Management Activity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital expenditure		R&D intensity		Derivative hedging	
VARIABLES	Log (AISD)	Capital expenditure	Log (AISD)	R&D intensity	Log (AISD)	Derivative hedging	Log (AISD)
Analyst career concern	-0.0228***	-0.0040***	-0.0128***	-0.1913***	-0.0112***	0.2226***	-0.0122***
	[-5.1109]	[-3.0842]	[-4.8572]	[-7.2705]	[-4.8157]	[7.2496]	[-5.0426]
Capital expenditure			0.1392***				
			[3.6443]				
R&D intensity					0.0053***		
					[3.6574]		
Derivative hedging							-0.1080***
							[-5.0609]
Sobel test (*p-value*)			<0.01		<0.01		<0.01
Log(Asset)	-0.1423***	0.0171*	-0.1326***	1.2951*	-0.0748**	0.2485***	-0.1132***
	[-3.7892]	[1.9880]	[-3.8641]	[2.2892]	[-2.6513]	[13.1569]	[-3.7738]
Profitability	-0.8974***	-0.0519	-0.8527***	-14.1653	-0.9015**	-0.0096	-0.9563***
	[-6.0814]	[-0.6834]	[-4.5588]	[-0.9687]	[-3.1104]	[-0.0380]	[-4.3294]
Market to book	-0.0232	-0.0156***	-0.0247	-0.2984	-0.0335*	-0.0381	-0.0217
	[-1.7125]	[-4.1422]	[-1.5921]	[-0.7907]	[-2.1216]	[-1.1644]	[-1.5144]
Leverage	0.4459***	0.1251***	0.4978***	4.1524**	0.4358***	-0.0503	0.4461***
	[4.1597]	[3.6898]	[8.0247]	[2.9857]	[5.4706]	[-0.4941]	[4.9840]
Tangibility	-0.4897**	-0.3616***	-0.7230**	-2.6245	-0.6794**	-0.3615***	-0.6039*
	[-2.3759]	[-4.1578]	[-3.2942]	[-1.2039]	[-2.5278]	[-2.7300]	[-2.3532]
Z-Score	-0.0338	-0.0248	-0.0288	-1.3696	-0.0396	0.0197	-0.0360
	[-1.1533]	[-1.6409]	[-1.0879]	[-0.9532]	[-0.9967]	[1.4383]	[-1.2886]
Cashflow volatility	0.0163	0.0107***	0.0152	0.0748	0.0026	-0.0616	0.0102
	[1.1286]	[3.5108]	[1.0540]	[0.6185]	[0.2184]	[-0.6543]	[0.7492]
Log(Loan size)	-0.0002		-0.0023		-0.0123		-0.0072
	[-0.0189]		[-0.1928]		[-1.2934]		[-0.7407]
Log(Loan maturity)	-0.0064		-0.0015		-0.0512***		0.0448**
	[-0.4543]		[-0.1125]		[-4.4975]		[3.0169]
Syndicate size	0.0007		0.0003		-0.0008		-0.0000
	[1.2929]		[0.5316]		[-0.9181]		[-0.0424]
Relationship loan	0.0150		0.0150		0.0146		0.0302
	[1.2322]		[1.0595]		[0.8890]		[1.7451]
Constant	6.1396***	0.5821***	5.9096***	0.2441	6.3179***	-2.1347***	5.8846***
	[22.2396]	[6.5729]	[22.3611]	[0.0431]	[22.4211]	[-15.9627]	[22.9364]
Observations	20,327	20,327	20,327	20,327	20,327	20,327	20,327
Adjusted R-squared	0.7015	0.8566	0.7096	0.8785	0.7087	0.1410	0.7064
Borrower rating	Y	Y	Y	Y	Y	Y	Y
Loan type	Y		Y		Y		Y

Loan purpose	Y		Y		Y		Y
Year effects	Y	Y	Y	Y	Y	Y	Y
Industry effects						Y	
Firm effects	Y	Y	Y	Y	Y		Y

This table presents the results on the mediation effect of specific risk-related activities on the relationship between analyst career concerns and the cost of bank loans. The variable in the headline of each column is the dependent variable of the corresponding regression. *Log(AISD)* is the natural log of *AISD*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn) in year t. *Capital expenditure* is capital expenditure divided by total assets in year t. *R&D intensity* is R&D expenditure divided by total number of employees in year t. *Derivative hedging* is a dummy variable which equals one if there is any type of derivative that is used for hedging purpose in year t, and zero otherwise. *Analyst career concern* is the measure of analysts' career concerns in year t-1. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 5. The Moderation Effect of Analyst Coverage

VARIABLES	(1) Log(AISD)	(2) Log(AISD)
Analyst career concern	-0.0183***	-0.0096**
	[-12.1824]	[-2.3896]
Analyst coverage	-0.0116***	-0.0114***
	[-6.5454]	[-6.0128]
Analyst career concern×Analyst coverage		-0.0013**
		[-2.6071]
Log(Asset)	-0.0716**	-0.0725**
	[-2.9674]	[-3.0591]
Profitability	-0.9290***	-0.9306***
	[-4.1638]	[-4.1338]
Market to book	-0.0200	-0.0198
	[-1.5584]	[-1.5383]
Leverage	0.5272***	0.5271***
	[9.5443]	[9.6237]
Tangibility	-0.5669**	-0.5670**
	[-2.9653]	[-2.9450]
Z-Score	-0.0272	-0.0272
	[-1.1779]	[-1.1766]
Cashflow volatility	0.0031	0.0029
	[0.2973]	[0.2836]
Log(Loan size)	-0.0251***	-0.0251***
	[-3.5459]	[-3.5635]
Log(Loan maturity)	-0.0036	-0.0036
	[-0.3227]	[-0.3179]
Syndicate size	-0.0005	-0.0005
	[-0.9046]	[-0.8862]
Relationship loan	0.0471***	0.0467***
	[3.6092]	[3.5815]
Constant	6.0134***	6.0180***
	[25.3338]	[25.4755]
Observations	20,327	20,327
Adjusted R-squared	0.7050	0.7051
Borrower rating	Y	Y
Loan type	Y	Y
Loan purpose	Y	Y
Year effects	Y	Y
Firm effects	Y	Y

This table presents the results on the moderation effect of analyst coverage on the relationship between analyst career concerns and the cost of bank loans. The variable in the headline of each column is the dependent variable of the corresponding regression. *Log(AISD)* is the natural log of *AISD*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn) in year t. *Analyst career concern* is the measure of analysts' career concerns in year t-1. *Analyst coverage* is the number of analysts that cover a firm in year t-1. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 6. Difference-in-Differences Regressions Using a Quasi-Experiment: Brokerage House Mergers

VARIABLES	(1) Log(AISD)	(2) Log(AISD)
Post-merger loan	0.07418**	0.11667***
	[2.32086]	[3.91223]
Decreased analyst career concern	0.03209	
	[0.90454]	
Increased analyst career concern		-0.00793
		[-0.21191]
Decreased analyst career concern×Post-merger loan	0.17696***	
	[3.66749]	
Increased analyst career concern×Post-merger loan		-0.11270**
		[-2.22256]
Log(Asset)	-0.09714***	-0.17289***
	[-5.98727]	[-10.47993]
Leverage	0.97400***	0.91392***
	[9.18598]	[8.86692]
Tangibility	-0.57818***	-0.16000*
	[-5.51215]	[-1.65724]
Cashflow volatility	0.03785	-0.59449
	[0.21860]	[-1.27592]
Market to book	-0.03260**	-0.10603***
	[-2.06106]	[-6.99441]
Profitability	0.17167	-0.41064*
	[0.66253]	[-1.81492]
Z-Score	-0.08456***	-0.05879**
	[-3.68774]	[-2.56942]
Log(Loan size)	-0.05795***	-0.13264***
	[-4.23872]	[-10.33981]
Log(Loan maturity)	0.02466	0.02870*
	[1.47498]	[1.89996]
Syndicate size	0.00411***	0.00423***
	[3.24138]	[3.64296]
Relationship loan	0.00114	0.00209
	[0.04933]	[0.09806]
Constant	4.08219***	5.31467***
	[22.80182]	[27.21541]
Observations	2,743	2,625
Adjusted R-squared	0.72262	0.73733
Loan type	Y	Y
Loan purpose	Y	Y
Year effects	Y	Y
Industry effects	Y	Y

The table presents difference-in-differences regression results. The variable in the headline of each column is the dependent variable of the corresponding regression. *Log(AISD)* is the natural log of *AISD*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn). *Decreased (Increased) analyst career concern* is a dummy variable which equals one if a firm experiences analyst career concern decrease (increase) after the brokerage merger. *Post-merger loan* is a dummy variable that equals one if a loan is originated after the merger year and zero if a loan is originated before the merger year. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 7. Endogeneity Test – Instrumental Variable Regression

VARIABLES	(1) First-stage	(2) Second-stage
Industry analyst career concern	0.92150***	
	[46.09824]	
Fitted analyst career concern		-0.03825***
		[-5.50788]
Log(Asset)	0.00433	-0.17491***
	[0.22144]	[-11.27576]
Profitability	0.03467	-0.80977***
	[0.14839]	[-5.17917]
Market to book	-0.00174	-0.01936*
	[-0.11629]	[-1.84354]
Leverage	0.15151	0.44868***
	[1.18904]	[5.80871]
Tangibility	-0.11604	-0.42493***
	[-0.71665]	[-3.71520]
Z-Score	0.02495	-0.01908
	[1.10926]	[-1.07154]
Cashflow volatility	0.01816	0.01630
	[1.29961]	[1.23413]
Log(Loan size)		-0.00739
		[-0.96998]
Log(Loan maturity)		0.00781
		[0.79196]
Syndicate size		0.00090
		[0.97179]
Relationship loan		0.01310
		[0.97910]
Constant	0.12472	6.29526***
	[0.64547]	[46.95897]
Observations	20,327	20,315
Adjusted R-squared	0.69887	0.70894
Borrower rating	Y	Y
Loan type		Y
Loan purpose		Y
Year effects	Y	Y
Firm effects	Y	Y
Kleibergen-Paap rk LM statistic		354.65
(Underidentification test)		(p=0.000)
Kleibergen-Paap rk Wald F statistic		6041.1
(Weak identification test)		

This table provides the results using an IV instrumental variable 2SLS regression. The dependent variable in the first-stage regression is *Analyst career concern* in year t-1. *Industry analyst career concern* is the industry-level analyst career concerns in year t-1, where industry classifications are based on the four-digit SIC codes. The dependent variable in the second-stage regression is *Log(AISD)*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn) in year t. All other variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

TABLE 8. Change Regression

VARIABLES	(1) Δ Log(AISD)
Δ Analyst career concern	-0.0074**
	[-2.8108]
Δ Log(Asset)	-0.1171**
	[-3.4195]
Δ Profitability	-0.6765**
	[-2.8030]
Δ Market to book	-0.0340**
	[-2.5606]
Δ Leverage	0.7273***
	[8.3716]
Δ Tangibility	-0.2924
	[-1.6181]
Δ Z-Score	-0.0012
	[-0.0434]
Δ Cashflow volatility	0.6138*
	[2.0825]
Δ Log(Loan size)	-0.0832***
	[-7.3211]
Δ Log(Loan maturity)	-0.0716***
	[-5.2074]
Δ Syndicate size	0.0013
	[0.8807]
Δ Relationship loan	-0.0740***
	[-7.2134]
Constant	0.1453***
	[15.6152]
Observations	6,781
Adjusted R-squared	0.1823
Borrower rating	Y
Loan type	Y
Loan purpose	Y
Year effects	Y
Industry effects	Y

This table provides the results using a change regression. We examine how changes in *Analyst career concern* affect subsequent year changes of bank loan spread. The dependent variable *ΔLog (AISD)* is the difference of Log(*AISD*) between year t and year t-1, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn). *ΔAnalyst career concern* is the difference of *Analyst career concern* between year t-1 and year t-2. All other variables are the first differences of the corresponding variables defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

APPENDIX A. Variable definition and measurement

Variable	Definition
Analyst career concerns	
Avg. No. of years as analyst	The average number of years as analyst for all analysts who cover the firm at year t.
Avg. No. of firms covered	For individual analysts, we calculate the cumulative number of unique firms that the analyst has covered by year t since she first appeared in I/B/E/S. We then take the average across all sell-side analysts who cover a firm in a given year to generate the firm-year-level measure.
Avg. No. of industries covered	For individual analysts, we calculate the cumulative number of unique industries (based on the four-digit SIC codes) that the analyst has covered by year t since she first appeared in I/B/E/S. We then take the average across all sell-side analysts who cover a firm in a given year to generate the firm-year-level measure.
Analyst career concern	An aggregated index of analyst career concerns based on *Avg. No. of years as analyst*, *Avg. No. of firms covered*, and *Avg. No. of industries covered*, using principal components analysis.
Pct of junior analysts with poor perf	For each analyst *k* who follows firm *i* in year *t*, we create a dummy variable with a value of one if her years in this profession are below the sample median and her earnings forecast error (i.e., bias) for firm *i* in year *t-1* (i.e., the absolute difference between her forecast and the corresponding firm-year's actual EPS, deflated by the actual EPS) is higher than the sample median, and zero otherwise. We then create a firm-year measure by aggregating the values of these dummy variables for all analysts who follow firm *i* in year *t* deflated by analyst following for firm *i* in year *t*.
Pct of analysts cover fewer firms & poor perf	We identify first, among those analysts who follow firm *i* in year t, the analysts who have analyzed fewer firms than the sample median and whose earnings forecast error for firm *i* in year *t-1* (i.e., the absolute difference between her forecast and the corresponding firm-year's actual EPS, deflated by the actual EPS) is higher than the sample median, and then deflating the number of such analysts by firm *i*'s analyst following in year *t*.
Pct of analysts cover fewer ind & poor perf	We identify first, among those analysts who follow firm *i* in year t, the analysts who have analyzed fewer industries than the sample median and whose earnings forecast error for firm *i* in year *t-1* (i.e., the absolute difference between her forecast and the corresponding firm-year's actual EPS, deflated by the actual EPS) is higher than the sample median, and then deflating the number of such analysts by firm *i*'s analyst following in year *t*.
Firm attributes	
Log(Asset)	The natural log of the book value of the borrower's total assets.
Profitability	The ratio of EBITDA to total assets.
Market-to-Book	The ratio of the market value of assets to the book value of assets, which measures a firm's growth opportunities.
Leverage	The ratio of total debt to total assets.
Tangibility	The ratio of tangible assets to total assets.
Z-score	The modified Altman's (1968) Z-score (= (1.2 Working Capital+1.4 Retained Earnings+3.3 EBIT+0.999 Sales)/Total Assets).
Cashflow volatility	The standard deviation of the borrower's quarterly operating cash flows (OANCFY) in the previous five years and scaled by total assets.
Analyst coverage	The number of analysts who cover a firm.
Loan attributes	
Log(AISD)	The natural logarithm of the amount the borrower pays in basis points over LIBOR for each dollar drawn down.
Log (Loan size)	The natural log of the loan facility amount in millions of dollars.

Log (Loan maturity)	The natural log of maturity in months.
Syndicate size	The number of lenders in the loan syndicate.
Relationship	Dummy variable equal to one if there was prior lending relationship between the lead bank and borrower in the past five years, and zero otherwise.
Borrower rating	The numeric measure of S&P debt rating. A higher value indicates higher credit risk.
Loan type dummies	Dummy variables for loan types, including term loan, revolver, and miscellaneous.
Loan purpose dummies	Dummy variables for loan purposes, including corporate purpose, debt repayment, working capital, takeover, and miscellaneous.
Mediator variable	
ROA volatility	The standard deviation of quarterly ROA in year t.
Stock volatility	The standard deviation of daily stock returns in year t.
Idiosyncratic risk	The annualized standard deviation of the residuals from the Capital Asset Pricing Model (CAPM) using daily stock returns in year t.
Default risk	Ohlson's (1980) O-score, computed as O = -1.32 – 0.407× Log (Total Assets) + 6.03× (Total Liabilities / Total Assets) – 1.43 × (Working Capital / Total Assets) + 0.076 × (Current Liabilities / Current Assets) – 1.72× (1 if Total Liabilities > Total Assets, 0 otherwise) – 0.521 × ((Net Income$_t$ - Net Income$_{t-1}$)/(|Net Income$_t$| + |Net Income$_{t-1}$|))
Capital expenditure intensity	Capital expenditures divided by total assets in year t.
R&D intensity	R&D expenditures divided by the total number of employees in year t.
Derivative hedging	A dummy variable which equals one if there is any type of derivative that is used for hedging purposes in year t, and zero otherwise.

APPENDIX B. Alternative analyst career concern measures

VARIABLES	(1) Log(AISD)	(2) Log(AISD)	(3) Log(AISD)
Pct of junior analysts with poor perf	-0.0668***		
	[-3.6033]		
Pct of analysts cover fewer firms & poor perf		-0.0549***	
		[-3.7469]	
Pct of analysts cover fewer ind & poor perf			-0.0256*
			[-2.0753]
Log(Asset)	-0.1583***	-0.1498***	-0.1972***
	[-4.1041]	[-5.0520]	[-5.3196]
Profitability	-0.8617***	-0.8804***	-0.6452***
	[-6.9155]	[-4.9797]	[-6.5597]
Market to book	-0.0198	-0.0160	-0.0043
	[-1.5966]	[-1.4597]	[-0.5033]
Leverage	0.4496***	0.4090***	0.5348***
	[5.3241]	[5.2770]	[7.2616]
Tangibility	-0.4638**	-0.5612**	-0.3179**
	[-2.3911]	[-2.6062]	[-2.3748]
Z-Score	-0.0338	-0.0331	-0.0224
	[-1.3604]	[-1.3464]	[-0.8991]
Cashflow volatility	0.0120	0.0123	0.0097
	[0.9475]	[0.8976]	[1.7277]
Log(Loan size)	-0.0047	-0.0132	-0.0339***
	[-0.3868]	[-1.3249]	[-3.9782]
Log(Loan maturity)	-0.0106	0.0270*	-0.0030
	[-0.8082]	[2.0012]	[-0.2612]
Syndicate size	0.0013**	0.0008	0.0016**
	[2.7126]	[1.3622]	[2.5026]
Relationship loan	0.0125	0.0136	0.0110
	[1.2663]	[1.0884]	[0.8805]
Constant	6.2819***	6.4353***	6.5587***
	[21.5789]	[30.2444]	[24.5179]
Observations	20,367	20,367	20,367
Adjusted R-squared	0.7099	0.7068	0.7033
Borrower rating	Y	Y	Y
Loan type	Y	Y	Y
Loan purpose	Y	Y	Y
Year effects	Y	Y	Y
Firm effects	Y	Y	Y

This table provides the results using refined measures of analyst career concerns (i.e., *Pct of junior analysts with poor perf*, *Pct of analysts cover fewer firms & poor perf*, and *Pct of analysts cover fewer ind & poor perf*) which consider not only each individual analyst' accumulated experience in a given year, but also her forecasting performance in the prior year. The variable in the headline of each column is the dependent variable of the corresponding regression. *Log(AISD)* is the natural log of *AISD*, where *AISD* is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn). *Pct of junior analysts with poor perf*, *Pct of analysts cover fewer firms & poor perf*, and *Pct of analysts cover fewer ind & poor perf* are measures of analyst career concerns in year t-1. All variables are defined in Appendix A. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

APPENDIX C. Robustness tests

VARIABLES	(1) Deal-level	(2) Median regression	(3) Exclude 2007-2009
Analyst career concern	-0.0185***	-0.0256***	-0.0204***
	[-3.7719]	[-5.1962]	[-3.8803]
Log(Asset)	-0.1656***	-0.1689***	-0.1332***
	[-11.4017]	[-16.5415]	[-9.3281]
Profitability	-0.8967***	-0.9236***	-0.9828***
	[-5.1599]	[-7.0381]	[-5.4445]
Market to book	-0.0073	-0.0150**	-0.0165*
	[-0.7520]	[-2.1263]	[-1.6735]
Leverage	0.3730***	0.3915***	0.3682***
	[4.4396]	[5.9657]	[4.4423]
Tangibility	-0.5025***	-0.4721***	-0.5176***
	[-3.8721]	[-5.1247]	[-4.0257]
Z-Score	-0.0451**	-0.0493***	-0.0392**
	[-2.3695]	[-3.4766]	[-1.9995]
Cashflow volatility	0.0151	-0.0130	0.0123
	[1.2085]	[-0.4513]	[1.0469]
Log(Loan size)	0.0560***	0.0017	0.0001
	[4.0710]	[0.2285]	[0.0107]
Log(Loan maturity)	-0.0621***	0.0108	0.0103
	[-4.3558]	[1.0692]	[1.0050]
Syndicate size	-0.0025**	0.0021**	0.0004
	[-2.2263]	[2.5462]	[0.4660]
Relationship loan	0.0231*	0.0201	0.0246*
	[1.6657]	[1.5332]	[1.7775]
Constant	6.2145***	6.6781***	6.1571***
	[51.2636]	[73.9152]	[52.7199]
Observations	14,459	20,327	18,353
Adjusted R-squared	0.6710	0.6582	0.7130
Borrower rating	Y	Y	Y
Loan type	Y	Y	Y
Loan purpose	Y	Y	Y
Year effects	Y	Y	Y
Firm effects	Y	Y	Y

The dependent variable is *Log (AISD)*, where AISD is the amount the borrower pays in basis points over LIBOR for each dollar drawn down (i.e., the all-in spread drawn) in year t. *Analyst career concern* is the measure of analysts' career concerns in year t-1. In Column 1, we re-run our main model specifications by using deal-level regression to control for potential correlation within deals. In Column 2, we use median regressions to address the effects of outliers. In Column 3, we use a reduced sample in which we exclude data from 2007 through 2009 to mitigate the effect of the recent subprime crisis. Appendix A provides detailed definitions and measurements for all variables. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

APPENDIX D. Effects of analyst coverage on the fees charged by banks

VARIABLES	(1) Upfront fee	(2) Commitment fee	(3) Facility fee	(4) Letter of credit fee
Analyst career concern	-0.0146***	-0.0127**	-0.0217***	-0.0119**
	[-4.0645]	[-2.2651]	[-4.4589]	[-2.5698]
Log(Asset)	-0.1715***	-0.1005***	-0.1185**	-0.1754***
	[-5.5766]	[-6.4208]	[-3.1384]	[-6.1928]
Profitability	-0.2153	-0.2524	-1.0153*	-0.1804
	[-0.6483]	[-1.3107]	[-2.2601]	[-0.6310]
Market to book	-0.0248*	-0.0205	-0.0021	-0.0216
	[-1.9734]	[-1.5280]	[-0.0844]	[-1.1866]
Leverage	0.2855*	0.2269**	0.6541***	0.4032**
	[2.2920]	[2.5416]	[3.7720]	[3.1939]
Tangibility	-0.2553	-0.2754**	-0.3623	-0.3164
	[-0.9432]	[-2.1203]	[-1.1306]	[-0.9630]
Z-Score	-0.0366	-0.0367	0.0018	-0.0452
	[-0.9173]	[-1.5639]	[0.0367]	[-1.4079]
Cashflow volatility	0.6928	-0.0134***	2.2076**	0.6717
	[1.3046]	[-3.4591]	[3.4123]	[1.5986]
Log(Loan size)	-0.0301	-0.0134	-0.0052	-0.0344
	[-1.0811]	[-1.1167]	[-0.5774]	[-1.3123]
Log(Loan maturity)	-0.0442	0.0377**	0.0905***	-0.0668**
	[-1.5998]	[2.0474]	[9.5797]	[-2.5756]
Syndicate size	0.0046	0.0011	0.0034***	0.0022
	[1.6413]	[0.7010]	[3.7668]	[0.9861]
Relationship loan	0.0083	-0.0064	0.0061	0.0072
	[0.3968]	[-0.3863]	[0.4888]	[0.3803]
Constant	6.4776***	4.3092***	3.1541***	6.9260***
	[35.1734]	[31.7101]	[11.9078]	[25.7740]
Observations	6,269	9,053	5,396	6,318
Adjusted R-squared	0.5384	0.5764	0.6984	0.5452
Borrower rating	Y	Y	Y	Y
Loan type	Y	Y	Y	Y
Loan purpose	Y	Y	Y	Y
Year effects	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y

The dependent variables are the natural logarithm of various fees charged by banks, including the fee paid on completion of a syndicated loan (*Upfront fee*), the fee paid on the unused amount of loan commitment (*Commitment fee*), the annual fee paid on the entire committed amount (*Facility fee*), and the fee paid on drawn amounts on the letter of credit sub-limit (*Letter of credit fee*) in year t. *Analyst career concern* is the measure of analysts' career concerns in year t-1. Appendix A provides detailed definitions and measurements for all variables. We report robust t-statistics that adjust for heteroskedasticity and within firm clustering in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.