Information Asymmetry, Agency Conflicts, and the Cost of Capital

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Abstract

Employing the exogenous increase in information asymmetry caused by the loss of equity analysts due to brokers' closures or mergers, I study the causal relation between information asymmetry and the cost of capital. In particular, I focus on understanding how information asymmetry differentially affects the cost of debt and the cost of equity and how managerial and debt agency conflicts affect this relation. I find that an increase in information asymmetry results in higher cost of equity (debt) when the shock is greater and when incentives to engage in debt-equity wealth transfers are low (high). These results suggest that for some firms, differently from what usually assumed, the cost of debt can actually be more sensitive than the cost of equity. I argue that these findings are consistent with the hypothesis that an information asymmetry increase is not necessarily costly for shareholders, since it can facilitate debt-equity wealth transfers that can reduce equity risk.

1 Introduction

An area that has attracted significant interest by both academia and the popular/business press is how information asymmetry affects the firms' cost of capital. The topic has been a centerpiece of theoretical research for decades (e.g., Leland and Pyle 1977, Myers and Majluf 1984, Diamond 1985, Easley and O'Hara 2004) and has spurred a growing empirical literature on how information asymmetry affects firms' cost of equity (e.g., Welker 1995, and Derrien and Kecskés 2013) and cost of debt (e.g., Pittman and Fortin, 2004, Ashbaugh-Skaife et al. 2006, and Tang 2009).

The existing literature has focused on the effect of information asymmetry on individual securities (just debt or equity). Conversely, comprehensive empirical investigations of these two phenomena together and variation among them are still very limited, despite the fact that several studies assume or suggest that debt and equity have a different information sensitivity. Indeed, consistent with the pecking order theory of Myers and Majluf (1984), debt is usually considered to be less information sensitive than equity, hence, an information asymmetry shock should be more relevant for the latter. However, this argument underweights the fact that information asymmetry is not only about the firm's performance or management quality, but also about potential wealth transfers from debt to equity (Garleanu and Zwiebel 2009) like risk-shifting (Jensen and Meckling 1976) and strategic default (Hart and Moore 1994, 1998). While information asymmetry about firm value is generally detrimental for shareholders (and, generally, investors), information asymmetry about risk is potentially beneficial for them (while being detrimental to debtholders). In other words, an increase in information asymmetry is not necessarily a purely negative shock for shareholders, but it could be beneficial. This also suggests that the different effects on cost of equity and of debt are interrelated and studying the two phenomena together is as much, if not more, important than studying them separately.

This paper studies how information asymmetry differentially affects cost of debt and of equity as well as how it affects the weighted average cost of capital (WACC). In particular, this study focuses on understanding how managerial agency and debt agency conflicts affect the relation between information asymmetry and cost of capital. An increase in information asymmetry means that it is more difficult for investors to accurately asses the firm's value and performance as well as monitor management[1]. Investors account for this increased uncertainty and increased agency costs by raising the cost of capital, as suggested by existing literature. However, as aforementioned, this also means that it is more difficult (or more costly) for bondholders to assess potential transfers from debt to equity and monitor management, i.e., it is easier for the management to engage in activities like risk-shifting and strategic default that create value for the shareholders but increase the riskiness of debt. As the existing literature suggests (e.g., Garlappi et al. 2008, and Favara et al. 2012), incentives to engage in debt-equity transfers are associated with lower equity risk, so the increased ease of engaging in these actions should reasonably result in a lower cost of equity. Consequently, the effect could be reduced, if not reversed, if the latter phenomenon is significant. Noteworthy is that this argument is also consistent with the results of Derrien et al. (2016) that higher information asymmetry results in riskier debt.

Following this argument, I hypothesize that an increase in information asymmetry results in higher cost of equity (debt) when the shock is greater and when incentives to engage in debt-equity transfers are low (high). The shock is large for shareholders of smaller firms (or, similarly, of firms with lower analyst coverage) since these firms usually have less analysts, information about them is usually less available and, generally, information asymmetry is significantly higher. On the other hand, the shock is particularly large for bondholders of less creditworthy firms. These firms have usually larger amount of debt, proximity to default is often linked to higher agency costs of debt (e.g., Davidenko and Strebulaev 2007, and Eisdorfer 2008), default is a bigger determinant of cost of debt for these firms (Huang and Huang 2003) and, generally, information about firm's performance and management are more relevant for bondholders when the firm is in distress. An increase in information asymmetry is particularly costly for bondholders when management/shareholders have high incentives to engage in risk-shifting/strategic default. Such increase makes it more difficult (or costly) to assess these incentives and monitor their activities[2]. On the other hand, the shock tends to be particularly costly for shareholders when there are low incentives to engage in debt-equity transfers. The reason is that the shock affects the ability of shareholders to accurately value the firm and the management, but it does not yield any benefit in terms of ease to engage in

[1]For instance, Yu (2008) shows that the presence of strong analysts from top brokers reduce incentives to engage in earnings management.

[2]Li et al. (2005) shows that an information asymmetry increase leads firms to substitute public debt with bank debt, particularly for firms with high risk-shifting risk.

risk-shifting/strategic default. The purpose of this paper is to empirically test these hypotheses.

The common shortcoming of a large part of the existing empirical literature is that the causal link between information asymmetry and cost of debt or equity is difficult to establish due to the endogenous relation between cost of capital, firm transparency and information asymmetry. To tackle this endogeneity issue, a recent strand of empirical literature on the effects of information asymmetry (e.g., Kelly and Ljungqvist, 2012 and Derrien and Kecskés 2013) has employed a quasi-natural experiment related to variation in analyst coverage. Equity analysts are a major source of information about firms and their presence tend to decrease information asymmetry. The basic idea is to observe an increase in information asymmetry due to the disappearance of analysts resulting from mergers or closures of brokerage firms. These coverage terminations are plausibly exogenous since they are not driven by firms' fundamentals, performance or stock market behavior. Indeed, they are the results of brokers' business strategies. This literature finds that both the cost of equity and cost of debt increase after the positive shock to information asymmetry. This methodology allows me to study the effect on the cost of equity and the cost of debt in an unified sample and test my hypothesis concerning the effects of debt agency conflicts. To the best of my knowledge, my paper is the first to employ this quasi-natural shock to study how information asymmetry differentially affects equity and debt and how this effect vary across variables that capture incentives to engage in debt-equity transfers.

Using a sample of 595 firms that lost analysts due to 27 broker closures or mergers between 2003 and 2008, I study the effect of an information asymmetry shock on the cost of their equity and their debt. I identify an equal number of control firms that are similar ex-ante. Specifically, I match on time, industry, credit rating, analyst coverage, leverage, profitability, and size in order to assure the treated and control firms are similar before the analyst disappearance. I identify the effect of a shock to information generation by comparing the two groups via a difference-in-differences methodology.

Similar to recent literature on cost of debt and credit markets, I use yield spreads derived from TRACE transactions as a proxy for the change in cost of debt. However, unlike similar existing literature, I did not use stock market returns alone as a proxy for the change in cost of equity, but also changes in implied cost of capital (Claus and Thomas 2001, and Gebhardt et al. 2001). This methodology allows to better identify the component of stock price change that is due to change in cost of equity (and not change in expected cash flows) and to better assess the magnitude of this change.

Consistent with Derrien et al. (2016), I find that the information asymmetry shock results in a significant increase in the cost of debt of around 23 basis points (bps). Despite using a different sample (time and data source), magnitude and significance of my results are very close to the ones presented in this previous work. Similarly to previous literature, I also find that the magnitude of the effect tends to be larger for firms with non-investment grade credit. As aforementioned, the loss of an analyst is particularly costly for bondholders of these firms. On the other hand, the effect on the cost of equity appears to be around -4 bps and not significant. However, the effect appears to be larger for small firms. Indeed, information asymmetry between management and shareholders tends to be particularly serious for these firms. The two different results for equity and debt can be ascribed to sample composition, but particularly to the interplay between managerial and debt agency conflicts.

Consistent with my hypotheses, I observe that the increase in cost of equity appears to be particularly relevant for firms for which the loss of an analyst is more costly (small firms) and firms where incentives to engage in risk-shifting (higher credit-worthiness and lower risk-taking incentives of CEO) or strategic default (lower liquidity costs and lower bargaining power of equity) are lower. The effect on cost of equity of these firms is up to over 70 bps and generally significant. On the other hand, the cost of debt tends to increase more significantly when the shock is particularly relevant (non-investment grade firms) and when incentives to engage in risk-shifting and/or strategic default are higher. Cost of debt for these firms tends to increase by around 40 bps. To summarize, my results suggest that the effect of information asymmetry on the cost equity and debt depends on several factors like the relative importance of information and incentives for management and shareholders to act against bondholders interests. Therefore, the relative effect on equity and debt depends on the specific characteristics of the firm. Generally speaking, the cost of equity tends to be more sensitive than the cost of debt when firms are smaller, more financially healthy and when incentives to engage in debt-equity transfers are lower. On the other hand, the cost of debt tends to be more sensitive than the cost of equity when firms are larger, more distressed and when incentives to engage in debt-equity transfers are higher.

It is important to underline that my sample is composed mainly of larger companies since an inclusion requirement is having public debt. Moreover, non-investment grade firms represent a significant portion of my sample (around 40%[3]), while very highly rated ones (equal or above A+) only around 7%. Firms in my sample tend also to have a large proportion of intangible assets and high institutional ownership, variables that are linked to higher costs of debt. The accumulated effects of this sample bias, relative to the broaden universe of publicly traded firms, is that I reasonably underestimate the effect on the cost of equity, while I reasonably overestimate the one on the cost of debt.

This also means that, on average, my results are not necessarily inconsistent with the common assumptions about equity and debt sensitivity to information asymmetry suggested by the pecking order theory. Considering all firms and not just my sample, it is reasonable to assume that a large part of the universe would be represented by smaller firms, with low institutional ownership[4] and where debtholders are highly concentrated (Diamond 1991 and Sufi 2007), i..e firms whose cost of equity is particularly sensitive, while cost of debt is relatively less sensitive. So, on average, it is reasonable to assume that the cost of equity is more sensitive to information asymmetry than the cost of debt..

I also find that the shock result in an increase in WACC of around 8 (14 bps pre-tax), but it is significant only for the pre-tax measure. Generally speaking, increase in WACC appears to be around 30 bps (39 bps pre-tax) and particularly significant for smaller firms. This is clearly a direct consequence of the result I obtained for cost of debt and cost of equity. Even if the other parameters play a role regarding the magnitude, cost of equity generally increases for smaller firms. On the other hand, cost of debt tend to increase or, at most, be close to zero for these firms since they are predominantly non-investment grade. Combining these two results leads to a general increase in WACC for smaller firms.

As a robustness check, I also study the shock effects on a smaller sample that excludes events resulting from merger or closure of smaller brokers or events post-Lehman bankruptcy. The first alternative specification aims to exclude the loss of analysts that are reasonably marginal in terms of information asymmetry and focus on the losses related to the four major brokers in my sample. The results are consistent with the ones obtained using the full sample, but magnitude and significance of the observed phenomena appear to be higher for the cost equity. Instead, the idea of the second

[3] In Derrien et al. (2016), they account for around 20%.

[4] the Thomson Reuters database median in the 2002-2008 period is less than 50%. The 10th percentile in my sample is around 50%.

specification is to exclude disappearances that may overlap with other events not accounted for in our analysis and that, hence, could hamper the validity of the results. I observe results largely consistent with the ones obtained using the main sample, but the effect on equity appears to be of smaller magnitude and the one on debt of larger. A possible interpretation is that excluded observations are not necessarily of lower quality, but that during periods of crisis, equity is relatively more sensitive and debt is relatively less sensitive. Following my previous argument, this would suggest that the equity agency conflicts tends to prevail during these periods. This point deserves clearly a more through analysis and it would be interesting to investigate whether some of the results in previous literature on cost of equity are driven by what happens in crisis periods.

My main contribution is to the growing literature on cost of debt and cost of equity. Consistent with existing theoretical and empirical literature, I show that greater information asymmetry results in higher cost of debt and, hence, how the latter is affected by firm disclosure and transparency. This result was obtained using a different sample, based exclusively on TRACE data, than Derrien et al. (2016), suggesting that this result is robust. Furthermore, I show that the effect on both cost of equity and cost of debt vary along different firm characteristics that account for information asymmetry as well as incentives to engage in risk-shifting or strategic default. This suggests that the resulting effect of information asymmetry on cost of capital is also driven by an interplay among different sources of agency conflicts and that the relation between information asymmetry and cost of equity is not necessarily monotonic. Although the argument is different, this is closely related to the result of Rivera (2015) that an increase in shareholder/management moral hazard problem is related to an increase in risk-shifting incentives. I also show that WACC tends to increase for smaller companies, whose debt and, particularly, equity costs tend to be particularly sensitive to information asymmetries. This result also suggests that, at least for smaller firms, WACC (and more generally cost of capital) is one of the channel through which information asymmetry influences financial policy decisions given its extensive use by practitioners.

I also contribute to the literature about assets prices and debt agency conflicts. There is a growing literature linking asset prices and incentives to engage in risk-shifting or strategic default (e.g., Davidenko and Strebulaev 2007, Garlappi et al. 2008, and Favara et al. 2012). My results show that these incentives tend also to affect the relation between information asymmetry and cost of debt and cost of equity. In particular, I show that they tend to amplify the effect on cost of debt of information asymmetry and attenuate the one on cost of equity.

Moreover, the results highlight furthermore the importance of financial reporting quality and of equity analysts. While their importance for the equity markets is well established, our results suggest that their impact on firms and investors goes well beyond since their presence (or lack thereof) has an effect on the cost of equity and of debt, hence, wide indirect effects on an array of financial decisions that rely on these parameters. As argued by Derrien et al. (2016), existing academic literature as well as practitioners ignore or underestimate this effect.

Finally, I contribute to the growing literature that employs analyst coverage shocks to study the causal effect of information asymmetry. Indeed, existing literature focused on the equity market (Kelly and Ljungqvist 2012), corporate policies (Derrien and Kecskés 2013), earning management (Irani and Oesch 2014) and the debt market (Derrien et al. 2016). My work adds results about the effects on the overall cost of capital and about the different effects on cost of debt and equity. Moreover, I showed that the quasi-natural experiment is compatible with easily accessible and rich databases like TRACE, hence, can be employed for a wide range of studies beyond corporate finance ones. Lastly, I highlighted how the selection of events and treated firm is a crucial and important step when using this shock. For instance, not all events are of equal magnitude and the inclusion of losses of analysts working for minor brokers may affect the strength and significance of the results. Furthermore, using events that happened during different periods of the business cycle can be problematic. Other unaccounted events may overlap during periods of crisis, resulting in a less clean identification strategy. Alternatively, the studied effects may vary across the business cycles, hence not separating different events may lead to misleading results. Indeed, I show that the effects appear to be somewhat different in the post-Lehman period.

2 Hypotheses

There is a vast and diverse theoretical literature on cost of capital, particularly the cost of equity, and information asymmetry, e.g., Myers and Majluf (1984), Diamond (1985), Merton (1987), Botosan (1997) and Easley and O'Hara (2004). While the arguments vary, theoretical literature generally supports the idea that information asymmetry increases cost of capital and, particularly, cost of equity. Related literature (e.g., Leland and Pyle 1977, Stiglitz and Weiss 1981 and Diamond 1985), also suggests that information asymmetry increase expected losses to debtholders and, hence, the cost of debt. The relation about information asymmetry, disclosure and cost of capital has been the focus on several empirical studies that, however, cannot clearly establish a causal relation. The reason is that the relation between cost of capital and information asymmetry tend to be endogenous. Consequently, disentangling the causal effect via standard OLS technique is substantially impossible. IV methodologies are also not an optimal choice to use since they require a, hard to find, valid and strong instrument.

For this reasons, recent papers focused on using quasi-natural experiments where a shock to information asymmetry happens. In particular, a growing number of papers used the disappearance of equity analyst coverage due to brokers' mergers or closures as the exogenous shock to information asymmetry. Indeed, the information produced by analysts can be considered as a mitigatory of the information asymmetries existing between managers and investors. Kelly and Ljungqvist (2012) shows that the loss of an analyst increases the information asymmetry level and the cost of equity. Derrien and Kecskés (2013) shows that the shock of information asymmetry increases the cost of equity as well as impact corporate policies. Derrien et al. (2016) focused on the cost of debt and found that the loss of an analyst results in an increase in the cost of debt and a higher default probability.

H1: The loss of an analyst results in an increase in cost of equity and in cost of debt.

The effect should be larger and more significant, greater is the information asymmetry shock. For shareholders, the loss of analyst is particularly costly for smaller firms (and, similarly, for firms with less analysts). Smaller firms usually have less analysts, information about them is usually less available and, generally, information asymmetry is significantly higher. Existing literature has, indeed, found a consistent relation between size and the magnitude of the effects of the loss of an analyst. On the other hand, credit-worthiness is generally considered the best proxy for how relevant is the loss of an analyst for bondholders.[5]More fragile firms have usually larger amount of debt,

[5] I want to underline that I do not exclude the fact that there is a relation between the effect on cost of debt and size, but I expect that other variables play a more important role. Derrien et al. (2016) find that the effect for smaller firms is indeed higher, but they do not test whether this is simply the result of the fact that smaller firms have lower credit quality. Moreover, size can be seen as a proxy for bondholders concentration, hence monitoring is easier in

proximity to default is often linked to higher agency costs of debt (e.g., Davidenko and Strebulaev 2007 and Eisdorfer 2008) and, generally, information about firm's performance and management are more relevant for bondholders when the firm is in distress.

H2: The increase in cost of equity is higher for small firms and the increase in cost of debt is higher for less credit-worthy firms.

However, the loss of an analyst affects not only the information asymmetry existing between investors and management about firm's performance or management quality, but also the one existing between shareholders and bondholders (Jensen and Meckling 1976, Garleanu and Zwiebel 2009) about potential wealth transfers from bondhodlers to shareholders. While the former, the information asymmetry about firm's value, is detrimental to both shareholders and bondholders, the latter, information asymmetry about risk, could be beneficial to shareholders while being detrimental for bondholders. In other words, the loss of analyst has both a negative and positive effect for shareholders. On one hand, more information asymmetry means that it is harder (or more costly) for shareholders to assess the value of the firm and monitor the management. Shareholders account for this by demanding a higher cost of equity. On the other hand, more information asymmetry means also that it is harder (or more costly) for bondholders to asses potential debt-equity wealth transfers and monitor management that, hence, can make more easily decisions skewed toward shareholder's interests like risk-shifting (Jensen and Meckling 1976) and strategic default (Hart and Moore 1994, 1998). As existing literature suggests, the possibility to engage in debt-equity transfers could reduce equity risk. It decreases the equity exposition to cash-flow risk by allowing firms to time the default and maximize shareholders payoff in this scenario (Garlappi et al. 2008, and Favara et al. 2012), it allows firms to delay bankruptcy (Chen 2011), and it makes easier for firms to engage in project that have tendentially a low equity risk but have a very high downside risk (Eisdorfer 2010). Hence, reasonably, the increased ease to engage in these actions should translate into a lower cost of equity. So, for shareholders, the net effect of the loss of analyst depends on the relative magnitude of these two opposite phenomena.

Specularly, the loss of an analyst is particularly costly for bondholders if incentives are high

smaller firms (Diamond 1991 and Sufi 2007) and bondholders bargaining power is higher. In other words, the relation between size and effect on cost of debt is more ambiguous than what some existing literature suggests.

since it is more difficult to assess the risks of the firm and monitor the management. The riskiness of these incentives is also naturally higher when the firm is less financially sound, since default (strategic or not) is a bigger determinant of cost of debt (Huang and Huang 2003).

Consistent with existing literature, I use bargaining power of equity and liquidation costs as measure of incentives to engage in debt-equity transfers, particularly strategic default. Indeed, both these measures represent the amount of assets that bondholders are willing to forgive to avoid a costly liquidation. I also use risk-taking incentives of the management to measure incentives to engage in risk-shifting.

H3: The increase in cost of equity is higher when the information asymmetry between shareholders and management is higher and incentives to engage in debt-equity wealth transfers (low liquidation costs, low bargaining power of equity, low risk-taking incentives) are lower.

H4: The increase in cost of debt is higher when incentives to engage in debt-equity wealth transfer are lower and the creditworthiness of the firm is lower.

existing literature and H1 suggest that both source of capital are affected. A logical consequence is that also weighted average cost of capital (WACC) is affected. However, the aforementioned double effect on cost of equity could affect the final result. Generally, WACC should increase when both the cost of equity and the cost of debt are significantly sensitive, i.e., when the cost of the shock is relatively high for both shareholders and bondholders. This is the case for smaller firms, since they also tend to have riskier debt.

H5: The loss of an analyst results in an increase in the weighted average cost of capital (WACC) that is particularly significant for smaller companies.

3 Data and sample construction

The sample construction largely follows the approach used by existing literature and, particularly, Derrien and Kecskés (2013) and Derrien et al. (2016). The list of brokers mergers and disappearance was kindly provided by the authors of those papers.

Since all the bond transaction data are obtained from TRACE, I had to restrict the time period to 2003-2008. The treated firms were identified using I/B/E/S and, particularly, the stopping files, i.e., information regarding the cessation of analysts' estimates. This information was used by Derrien et al. (2013 and 2015) to identify the time of disappearance of analysts. The list of events is consistent with ones used in previous literature like Kelly and Ljungqvist (2012) and Hong and Kacperczyk (2010). I used this list together with I/B/E/S to identify which firms were affected by the broker closures/mergers and lost an analyst. In case the disappearance was a product of a merger, I focused on firms who were also covered by the acquiring institution before the merger. Important to point out that disappearance due to mergers are less "clean" since it is not always easy to understand what actually happens after the merger takes place.

The control group, composed of an equal amount of firms, was constructed in order to match the treatment one. Financial firms were excluded and I required that the treated and control firm were in the same industry, i.e., had the same first two digits of the NAICS code. Firms were also matched according to credit rating. The credit rating was constructed based on Mergent FISD that reports several information about each issue as size, maturity and rating. I converted Standard & Poor's and Moody's rating from a letter scale to a number scale (for instance AAA/Aaa = 1) where higher numbers correspond to lower credit rating. The rating for each month of each issue is an average between the two agencies' ratings. The firm rating is an issue size-weighted average of the rating of its different bond issues. I required that the difference between the rating of the control and treated firms is not more than 3 points. I also matched the firms according to number of analyst. In particular, I required that the difference being not more than five. Finally, I matched the firms based on total assets, profitability (ROA) and leverage (Total Debt / Total Equity) based on Mahalanobis distance. As last step, I dropped matches whose distance was too big (the top 2.5% in terms of Mahalanobis distance) or matches that appeared to be of overall low quality.

The matching procedure results in 595 analyst disappearances. Control firms were, in summary, matched by industry, time, rating, number of analysts, total assets, profitability and leverage. There are total of 27 events in the sample, 15 mergers and 12 closures. The matching results are reported in Table 1 where I compare the 25th, 50th and 75th percentile. Additionally, I run tests for the equality of medians and distributions (Kolgomorov-Smirnov test) of both the matching variables and other variables (like yield spread and market capitalization). Overall, the matching process results in a balanced control group. Treated firms appear to have one more analyst than control firms, but I think this is well within reasonable margins. It appears also that the size right tail for the treated firm to be fatter, but I am comfortable that this is not a major issue. Finally I checked if my treated firms actually lose more analysts than my control. To no surprise, the treatment effect is equivalent to a loss of 0.88 analysts (t-stat = -4.48), a result fully consistent with the construction of my sample.

[Insert Table 1 about here]

All information about analysts' coverage was obtained, as aforementioned, from I/B/E/S. Firm fundamentals data were obtained from COMPUSTAT and stock information from CRSP. All continuous variables were winsorized at the 2.5th and 97.5th percentile. Differently from Derrien et al. (2016), I relied exclusively on the TRACE (Enhanced) database for bond yield data. The advantage of using TRACE is that it substantially covers all transactions that happens in the corporate credit market, allowing us to have data about bonds that are probably not included in older databases. Hence, it is not surprising that our sample is made of firms that are smaller (total assets and market capitalization) than the one in Derrien et al. (2016). The downside is that the quality of data is lower and the time period is more restricted.

3.1 Cost of debt

Following previous literature, I use corporate bond yields from TRACE as proxies of cost of debt. An alternative would be using actual bonds issues, but the amount and frequency of data is significantly lower.

For each bond-issue month, I computed a volume-weighted average yield. To adjust for maturity risk, I matched each issue to a Treasury bond with same duration. In case no Treasury bond was available, I interpolated the Treasury yield from other bonds. I calculated the difference between the bond yield and the matching Treasury yield as the yield spread. I defined the firm cost of debt (or yield spread) as an issue size-weighted average of issues yield spreads. A further step could be calculating the spread between this and the yield of a portfolio of matching firms, but I avoided this step since it does not really affect results as pointed out by Derrien et al. (2016). If in one month there were no trades and, hence, no cost of debt was possible to compute, I used the previous month cost of debt. I carried on yield spreads up to 6 months. The change in cost of debt is proxied as the change in yield spread between t-3 and t+3 (a six months period), where t is the month of the analyst disappearance.

3.2 Cost of equity

As first proxy for the change in cost of equity and following existing literature, I use the stock return[6] in the period between t-2 and t+2 centering on the end of disappearance month t. The smaller window is consistent with the one used by Derrien and Kecskés (2013)[7]. The implicit assumptions behind using stock returns as a proxy for the change in cost of equity is that the stock price is consistent with a simple dividend discount model and that expected cash flows are not changing around the analysts disappearances. Hence, using returns means implicitly assuming that they reflect exclusively changes in the cost of equity and not change in expected cash flows.

$$P_t = \frac{E[D_{t+1}]}{R}$$

Using stock returns, even if adjusted, carries also other issues. First, stock returns are extremely noisy, hence it is difficult to accurately identify the treatment effect. Second, while they can give an idea about the sign of the effect, it is impossible to obtain a reasonable estimate of its magnitude. To overcome these issued, I also used implied cost of capital (ICC) methods to estimate the cost of equity and its change around the analysts disappearance. ICC methods are largely used in accounting (e.g., Hann et al. 2013) and finance (e.g., Pastor et al. 2008 and Lee et al. 2009) literature. ICC models rely on several assumptions, but they are less stringent than the ones behind the (excess or not) stock returns used by previous literature.

A possible issue with using ICC methods is that they employ analysts forecasts. If, as suggested by Hong and Kacperczyk (2010), the analysts that disappear are the more conservative ones, it could be possible to observe an increase of expected cash flows and cost of equity just because bias is increasing. However, as suggested by the aforementioned paper, this phenomenon appears to be

[6]Similar result are obtained using the excess return over matching firms.

[7]The results with a bigger window similar to the one used for bonds are comparable, but generally much noisier.

relatively small and restricted to companies with very few analysts that accounts for a tiny fraction (~5%) of my sample. Moreover, they observe the phenomenon in a 3 years periods and it is sensible to assume that the phenomenon does not unfold over my much shorter period[8]

Particularly, I used the average between two different popular ICC methodologies based on the residual income valuation model; the one suggested by Claus and Thomas (2001) and the one used by Gebhardt et al. (2001).

Claus and Thomas (CT) model is:

$$P_t = B_0 + \sum_{i=1}^{5} \frac{ROE_{t+k} - R}{(1+R)^i} \times B_{t+i-1} + \frac{(ROE_{t+5} - R)(1+g)}{(R-g)(1+R)^5} \times B_{t+4}$$

where P_t is the price at time t, R is the implied cost of capital, B_t is the book equity (per share) and ROE_t is the return on equity. ROE is estimated using analysts' median EPS forecasts ($FEPS_t$). If analysts' forecasts were absent. I estimated the EPS applying the long-term growth rate forecast to previous fiscal year forecast. I required that at least one and two-years ahead forecasts were available. Book equity was determined based on clean surplus accounting, $B_{t+k} = B_{t+k-1} + FEPS_{t+k} - d \times FEPS_{t+k}$. The dividend payout ratio d was estimated using the current ratio if earnings were positive, otherwise it was proxied by the ratio between dividends and 6% of total assets. I required latest book equity to be positive. g is set equal to the risk free rate.

The Gebhardt et al. model (GLS) is:

$$P_t = B_0 + \sum_{i=1}^{11} \frac{ROE_{t+k} - R}{(1+R)^{11}} \times B_{t+i-1} + \frac{ROE_{t+12} - R}{R(1+R)^{11}} \times B_{t+11}$$

The variables are as previously defined. I assumed that ROE after time $t+3$ converges linearly to the median industry ROE. In calculating the median, I excluded firms with negative earnings.

All the final variables were winsorised at 1st and 99th percentile. The cost of capital R was found numerically[9]. Due to the requirements, the sample is smaller and consists in 566 disappearances.

[8]Even if unreported, I tested if there is an effect on bias in the 6 months period around the disappearance of an analyst and I did not observe any.

[9]The initial value of the cost of equity is set equal to 9% and the results are robust to changing it.

3.3 Debt-equity transfer incentives and loss of an analyst relevance

As aforementioned, main goal of this study is to understand how the loss of an analyst affects differently cost of debt and cost of equity and how it affects the overall cost of capital for different companies. My main argument is that the effect on cost of debt and, particularly, cost of equity depends on both the relative importance of the loss as well as on the incentives that managers have to engage in actions that negative affects shareholders and/or bondholders. As baseline measure of relevance of the loss, I use size for equity and rating for debt. Indeed, previous literature showed that the impact of the loss of an analyst varies significantly across these two dimensions.

As aforementioned, the loss of an analyst is particularly costly for these smaller firms and particularly for shareholders that lost access to a source of information about the firm. I categorized as "small" the companies in the bottom quartile of total book assets in my sample. I used total assets instead of market capitalization since it is a more stable measure and is less dependent on stock market behavior. Important to underline that firms that I categorize as small are only relatively small since, as aforementioned, I am excluding firms without public debt and, hence, smaller firms.

An alternative measure for the relevance of loss of an analyst is the number of analysts before the shock. Indeed, the loss of an analyst for a firm with several analyst is generally less relevant than for a firm with only few analysts. I classify firms in the bottom quartile as firms with few analysts. However, number of analyst is potentially a less informative measure than size since it ignores other sources of information like buy-side analysts and does not consider the importance of the analysts[10].

On the other hand, proximity to default (here proxied by credit rating) appeared to be especially relevant for the effect on cost of debt. Indeed, information about the firm are more important for bondholders when the company is closer to default, while monitoring is relatively less important if the firm is solid. In few words, regardless of the size of the firm, the loss of an analyst is particularly costly for bondholders holding more risky debt. I divided my sample in investment grade and non-investment grade, based on the numeric rating scale: >10 for non-investment grade and <=10 for investment grade.

[10] Around 75% of my observations is due to the loss of analysts working for major brokers and previous literature has shown that the analysts disappearing are of good quality

The other set of measure has the goal of capturing incentives to engage in debt-equity wealth transfers as risk-shifting or strategic default. As aforementioned, credit-worthiness (hereby measured by credit rating) is the first measure I use as a proxy for incentives to engage in these actions, particularly risk-shifting. Other measures aim to measure bargain power of equity, liquidation costs and incentives to engage in risky projects.

Liquidation costs is one of the most common measure of incentives to engage in debt-equity transfers. Indeed, higher are the liquidation costs, higher is the share of assets that bondholders are willing to concede in order to avoid liquidation. In other words, higher are liquidation costs, larger is the amount of debt that bondholders are willing to forgive. As a proxy for liquidation costs I use two measures: *intangibility* and *non-utility.* Intangibility is measured as one minus the expected liquidation value of tangible assets weighted by total book assets. I use the same values initially suggest by Berger et al. (1996) and largely used in related literature (e.g., Garlappi et al. 2008, and Favara et al. 2012). I categorize as "low intangible" the bottom 25th firms in my sample. All data were obtained from Compustat.

$$Intangible = 1 - \frac{0.715 \times Receivables + 0.547 \times Inventory + 0.535 \times PPE}{Total\ Assets}$$

The other measure is a dummy that has value of 0 if the firm is a utility and 1 otherwise. Utility firms have usually a large amount of tangible assets that are very easy to sell in case of bankruptcy (Davidenko and Strebulaev 2007), hence, liquidation costs are usually particularly low. No similar patterns have been observed for other industries.

The other measure I use is a proxy for bargaining power of equity. Indeed, higher is the bargaining power of shareholders, bigger is the share of bargaining surplus they can obtain and, as before, higher is the share of assets that bondholders are willing to concede in order to avoid liquidation. As a proxy for bargaining power I use the percentage of shares held by institutional investors. Institutional investors favor the creation of equity committee that results in deviation from the absolute priority rule (LoPucki and Whitford 1990) and they are usually able to bargain more efficiently. I use data from Thomson Reuters and I categorize as "low institutional shareholding" the bottom 25th percentile of firms in my sample. Since, in my sample, the 25th is still a very high percentage, I also used an alternative definition that corresponds to the bottom 10th percentile.

Existing literature suggests using also measures related to the percentage of shares held by the management. However, given the size of firms in my sample, management/CEOs generally hold a very small fraction of the shares, hence, firms are relatively similar based on this measure[11].

Last but not the least, I used a proxy for the management's incentives to engage in risky project. Following Davidenko and Strebulaev (2007), I used the numbers of unexpired options held by the CEO normalized by the numbers of shares outstanding. Data were obtained from ExecuComp and I categorized as "low CEO options ownership" the bottom 50th percentile of firms in my sample.

4 Cost of equity and cost of debt sensitivity to information asymmetry

The first analysis consists in verifying results observed in previous literature in my sample. As aforementioned, my sample is by construction quite different from the ones used in existing studies. While Derrien et al. (2016) relies on TRACE data only for the most recent years in their sample, I rely exclusively on TRACE data. Previous studies that analyzed the stock market had bigger samples encompassing also firms (usually small and, hence, with potential high information asymmetry) that do not have debt traded on the secondary market. Furthermore, I am using a better and more precise methodology to estimate the effect on the cost of equity. The results suggest that cost of debt increases after the loss of an analyst, particularly for firms with lower credit rating. The effect on equity appears to be less significant and generally relevant only for smaller firms.

4.1 Sensitivity of cost of debt

Table 2 presents the base results for the effects of the loss of an analyst on the bond market. Particularly, Panel A reports the effect observed on the base sample. The result for the bond yield is significant and suggests that it results in an increase in cost of debt of 23 bps. This result is between the 25 bps showed by Derrien et al. (2016) and the 20 bps figure suggested by Tang (2009). Important to notice that this increase of cost of debt translates to over $5 million of additional annual

[11] The relation between effect on cost of debt and these measures is however significant and positive.

interest expenses for my median firm based on its long-term debt, so it appears to be economically significant. It appears that these results about the cost of debt are quite robust. Indeed the effect is similar in terms of both magnitude and significance even when using a smaller sample (Panel B).

I also tests whether the effect is different for lowly-rated firms (non-investment grade rating) and for smaller firms (total assets). To study this phenomenon, I employed a triple diff-in-diff approach. In other words, I tested whether the difference in diff-in-diffs, obtained as in Table 2, between the groups was significant. In the first test, I compared non-investment grade firms to investment-grade ones. In the second, small firms to bigger ones.

Results are reported in Table 3 (Table 4 for restricted sample). The magnitude of the effect of the loss of an analyst appears to be indeed of higher magnitude for low rating firms (even if not significantly), while size appears to not be a relevant discriminant. This seems to suggest that the loss of an analyst matters particularly to firms that are closer to default, regardless what is their size. As aforementioned, this is consistent with the argument that creditworthiness is a better measure of the relevance of information asymmetry for debt than size.

The results for debt presented by Derrien et al. (2016) were definitely stronger, both in terms of magnitude and significance. Firstly, it is important to highlight that I use total assets instead of market capitalization as measure of size and, as aforementioned, the relation between size and cost of debt is ambiguous. Moreover, sample differences could have determined this result. Indeed, for instance, my sample includes a much lower proportion of very highly rated firms than theirs[12].

[Insert Table 2 about here]

4.2 Sensitivity of cost of equity

Table 2 presents the base results for the effects of the loss of an analyst on the cost of equity. Particularly, Panel A reports the effect observed using stock returns as a proxy for the change in cost of equity. On the other hand, Panel B reports results using implied cost of capital estimates.

[12]The treatment effect for these firms in my sample is around 0.

Concerning the stock market, the shock generates a negative return of around -1%, that however is not significantly different from zero. Non significant result is also obtained by using ICC, that is around -4 bps. This result is different from, for instance, Derrien and Kecskés (2013) that reported a, albeit only marginally, significant negative return in a similar window. The reason of this result can be traced also to the sample construction. As aforementioned, firms in my sample tend to be significantly bigger than the ones used in study of cost of equity. For instance, my 25th percentile corresponds to around the median in more comprehensive samples that include also firms without public debt.

The conditional analysis reported in Tables 3 and 4, indeed, appears to confirm this idea. Even if not (always) significantly, the magnitude effect on cost of equity appears to be larger for smaller firms. It is important to underline that these "smaller" firms are not really small. On the other hand, the relation with creditworthiness appears to be less clear.

[Insert Tables 3 and 4 about here]

4.3 Sensitivity of Weighted Average Cost of Capital (WACC)

Previous results suggest that cost of debt generally increases, while cost of equity is generally not affected. This suggests that the overall cost of capital should increase, but the significance of this increase is not an automatic consequence. For simplicity, I assumed that leverage is not affected by the shock, so the results reflect the change in WACC as if the firms did not change their capital structure[13]. I also calculated WACC assuming the there is no taxation or assuming the tax rate is 35%.

The results are reported in Tables 2 report and suggest that WACC indeed increases by around 8 bps (14 bps pre-tax). However, only the pre-tax effect appears to be significant; this is consistent with the fact that the observed change in WACC is generally driven by the general increase in the cost of debt.

[13] Unreported results suggests this.

Conditional results are reported in Table 4 and show a clear demarcation between smaller and bigger firms (around 30 bps) and, at a lesser extent, between non-investment grade firms and investment grade firms (around 15-20 bps). Both these results are driven by what observed when looking at the two securities separately. Cost of equity tends to increase for smaller firms since the shock is bigger for these firms. Similarly, cost of debt tends to increase since these firms are predominately non-investment grade.

To summarize, the loss of an analyst appears to be generally costly for small firms. On the other hand, it appears to be trivial for large companies.

5 Sensitivity to information asymmetry under different conditions

The results in section 4 appear to be puzzling. Equity is generally considered to be more sensitive to information asymmetry than debt, starting from the pecking order theory popularized by Myers and Majluf (1984). Nevertheless, my results suggest that while the shock has a significant effect on the cost of debt, the effect on cost of equity is generally not. As aforementioned, this is partially due to the sample construction. The information provided by analyst is particularly relevant for small firms that, however, account for a small fraction of the employed sample. On the other hand, lowly rated debt is the one more sensitive to information asymmetry and it accounts for a significant fraction of the sample. However, as aforementioned, it is also important to highlight that there are two sources of information asymmetry that affect shareholders of firms with public debt; the one between them and the management and the one between them and bondholders. Hence, the effect of a shock on the cost of equity depends on on which of these two sources of information asymmetry more significantly increase due to the loss of an analyst. Here I proceed to test under which conditions the cost of debt and/or cost of equity increase significantly. I report only the result on cost of equity obtained using ICC estimates since they better capture the effect and give better magnitude estimates. The results suggests, indeed, that the increase in cost of equity appears to be particularly relevant for firms for which the loss of an analyst is more costly (small firms) and firms where incentives to engage in risk-shifting (higher credit-worthiness and lower risk-taking incentives of CEO) or strategic default (lower liquidity costs and lower bargaining power of equity) are lower.

On the other hand, cost of debt tends to increase more significantly for firms when the shock is particularly relevant (non-investment grade firms) and when incentives to engage in risk-shifting and/or strategic default are higher.

As suggested by results in section 4, size is the major discriminant for the relevance of the loss of an analyst for shareholders and creditworthiness for bondholders. However, proximity default is also considered a proxy for risk-shifting incentives and, more generally, debt-equity transfers (e.g., Davidenko and Strebulaev 2007, and Eisdorfer 2008). Hence, it is interesting to study how the effect of the cost of equity and debt vary across these two dimensions. The results are reported in Table 5 and are largely consistent with my expectations. The effect on the cost of equity appears to be significant and positive (~50 bps) only for small firms with investment-grade debt, while it appears to be negative (albeit not significantly) for large firms with non-investment grade debt (i.e., firms for which the information asymmetry has potentially high benefits, but low costs). The difference between the two groups of firms is around 77 bps and significant. Reasonable interpretation is, indeed, that for the former firms the increase in information asymmetry is primarily a cost for shareholders since there are not incentives to engage in debt-equity transfers. On the other hand, the increase in information asymmetry for the other set of firms is beneficial given the higher incentives and the low costs. The effect on the cost of debt follows a similar but specular path, i.e., it is non significant only for small investment-grade firms. The low level of incentives to engage in debt-equity transfers and the general higher concentration of debtholders of smaller firms, are reasonably the forces behind this result. I conducted the same analysis using number of analyst instead of size. The results are reported in Table 6 and are generally similar to the ones observed using size. Effect on cost of equity is positive and significant for firms with few analysts and with investment-grade debt, instead the effect on the cost of debt appears to be more relevant for firms with more analysts[14].

[Insert Tables 5 and 6 about here]

The other set of variables I used are proxy for liquidation costs. Table 7 reports results obtained using "Intangibility" and Table 8 the ones obtained using the "Not utility" dummy variables. Even if

[14]Using size or number of analysts yield similar but less strong results also for the following tests. This is consistent with my argument that size is a more comprehensive measure than number of analysts.

not significantly, the effect on the cost of equity appears to be larger for firms with a high proportion of tangible assets compared to firms with a low proportion. As expected the phenomena appears to be particularly strong for small firms, while the effect on large firms with a large percentage of intangible appears to be negative. The difference between small firms with a low proportion of intangible assets and large firms with a high proportion (i.e., that are at the two extremes in terms of size and incentives) is around 60 bps and only marginally insignificant. Results for the cost of debt are similar, but specular. In particular the difference between non-investment grade firms with a high proportion of intangible assets and highly-rated firms with a low proportion is around 44 bps and significant. Similar but stronger result were obtained using the non-utility dummy. Cost of equity tends to increase significantly for utility firms, while tend to decrease (even if not significantly) for other ones. The difference between utilities and non-utilities is around 52 bps and significant. The effect on the cost of debt is substantially the opposite, i.e., around -42 bps. The results for equity are even stronger if I analyze only large firms (there are no small utility firms), where the difference between non-utility and utilities is around 63 bps. Noteworthy is that the effect on the cost of equity for large non-utility firms is actually negative and significant. To summarize, the results suggest the existence of a relation between liquidation costs and the effect on the cost of equity and cost of debt of information asymmetry.

[Insert Tables 7 and 8 about here]

Another important variable I used is a proxy for bargaining power of equity, i.e., "institutional ownership". Table 9 reports the results obtained using this variable where low institutional ownership corresponds to the bottom 25th percentile of my sample [15]. The effect on the cost of equity of firm's with low institutional ownership appears to be over 40 bps higher than the ones for firms with high institutional ownership. The difference between small firms with a low institutional ownership and large firms with a high one is more than 65 bps. In a opposite way, the effect on the cost of debt of firms with high institutional ownership appears to be nearly 40 bps higher than other firms. In particular, the difference between non-investment grade firms with a high institutional ownership and highly-rated firms with a low one is around 60 bps and significant. The results suggest the

[15] Results obtained with the lower threshold are similar, but more noisy.

existence of a relation between bargaining power of equity and the effect on the cost of equity and cost of debt of information asymmetry.

[Insert Table 9 about here]

The last variable I looked at is a proxy for risk-taking incentives of the CEO, i.e., options owned by the CEO. The results are reported in Table 10. Even if not significantly, the cost of equity increase appears to be higher for firms with low CEO options ownership. In particular, the effect is significant and positive only for small companies with low CEO options ownership and it is around 66 bps. In particular, the difference between the effect on these firms and larger ones with high CEO option ownership is nearly 80 bps and significant. The results for debt are quite similar, but specular. The difference between non-investment grade firms with high CEO options ownership and investment-grade firms with a low one is around 30 bps and only marginally insignificant.

[Insert Table 10 about here]

Generally speaking, the difference in terms of incentives to engage in debt-equity transfers appears to be particularly relevant for shareholders of bigger firms and bondholders holding investment-grade debt, i.e., firms where I assumed the loss of an analyst to be less relevant. This suggests that the debt-equity transfers incentives have a second-order effect and play a role mainly when the increase of information asymmetry is not always very costly. This argument is confirmed by results in Table 11 that present the effects on groups of firms constructed based on size, rating and one of the incentives proxies. Sample sizes if some of these groups could be quite small, so these results should be taken with a grain of salt. However, they suggest that the effect of incentives is generally not significant for the cost of equity of small financially health firms, since the loss of analyst has a very high cost and the potential benefits from equity-debt transfers are trivial.

[Insert Table 11 about here]

To summarize, the results suggest that there is a relation between debt agency conflicts and the effect of information asymmetry on the cost of equity and the cost of debt. The relation appears to be similar for the two types of securities, but with opposite sign. Debt agency conflicts appear to amplify the effect of information asymmetry on the cost of debt, but they appear to dampen the effect on the cost of equity. Consequently, the cost of debt and information asymmetry appears to be positively related and the curve is steeper, higher are debt agency conflicts. The cost of equity and information asymmetry appear to be positively related, but the steepness is lower (if not negative), higher are debt agency conflicts. In other words, the relation between cost of debt and information asymmetry is generally monotonic, while the one between the cost of equity and information asymmetry tend to be non-monotonic and convex when debt agency conflicts are significant. This result is consistent with the argument that information asymmetry about risk could be beneficial to shareholders, while it is always detrimental to bondholders. Generally speaking, the cost of equity tends to be more sensitive than the cost of debt when firms are smaller, more financially healthy and when incentives to engage in debt-equity transfers are lower. On the other hand, the cost of debt tends to be more sensitive than the cost of equity when firms are larger, more distressed and when incentives to engage in debt-equity transfers are higher. Interesting to point out that the the result for large firms (i.e., firms with initial low information asymmetry) is similar to the one obtained by Hackbarth et al. (2015) that show that a shock that made strategic default easier resulted in lower equity risk, but higher credit spreads.

It is important to underline that my results are not necessarily inconsistent with the pecking order theory. As aforementioned, my sample is biased toward larger firms. Furthermore, firms in my sample also tend to have a higher institutional ownerships than the average (the 10th percentile in my sample is close to the median in the 2002-2008 period). In other words, it is reasonable to assume the whole universe of publicly traded firms is composed by firms that are smaller, finance themselves mainly through bank debt and have low institutional ownership. Hence, on average is reasonable to expect that the effect on equity dominates the one on debt[16].

[16]Preliminary results for a only-equity sample suggest that the average effect on the cost of equity is around 17 bps and significant

5.1 Sensitivity of Weighted Average Cost of Capital (WACC)

The previous results have an interesting consequence, sensitivity of WACC should be generally unrelated to debt agency conflicts. Indeed, as aforementioned, the proxies I used are related to the cost of debt and the cost of equity in a similar but specular way. This means that on average the effect on the overall cost of capital should cancel out. To conserve space, I report in Table 12 only the results for my base specification where I use size and creditworthiness. The effect on the WACC of non-investment grade firms appears to be naturally larger than investment grade firms of comparable size, but the magnitude and significance is trivial compared to the difference between small and big firms. To summarize, WACC tends to increase only for those firms whose equity is sensitive to the information asymmetry shock.

[Insert Table 12 about here]

6 Robustness

In order to test the robustness of the results, I conducted two further tests using sub-samples of my data. The idea is to have smaller samples where retained events and treated firms offer a cleaner identification. For simplicity, I present the results for my basic specification since other results tend to follow a similar pattern.

The first sub-sample encompasses only firms that lost an analyst due to closures and mergers of major brokers. Indeed, the loss of an analyst of a minor broker could be considered less relevant and the impact on information asymmetry trivial. In few words, excluding these events means focusing on events that correspond to more significant increases in information asymmetry. The resulting sample consists of 418 firms that lost a major analyst. The retained firms are similar to the ones in the whole sample in terms of ratings, leverage, etc... Results are reported in Table 13 and appear to be stronger in terms of magnitude than our main results, suggesting that my main results are quite robust. In particular, the effects on equity appear to be particularly stronger; the effect on smaller firms is nearly 30 bps higher and the one on larger and closer to default firms is nearly

15 bps lower. These results are consistent with the idea that the information asymmetry shock resulting from the loss of these analysts is indeed more significant.

[Insert Table 13 about here]

The second sub-sample excludes any disappearance of analysts happening after Lehman-Brothers bankruptcy. Indeed, in those cases, I cannot exclude that other contemporaneous events are affecting my results. In few words, this sub-sample aims to reduce the possible confounding created by overlapping events that are not considered in the analysis. Furthermore, the results on the full sample could be misleading if the studied phenomena vary across the business cycle. The exclusion procedure results in a sample of 453 firms that lost an analyst between 2003 and May 2008. Results are reported in Table 14. The results for equity are generally quite similar to the one observed in the full sample, but the magnitude appears to be smaller. On the other hand, results for bonds appear to be of significantly larger bigger magnitude and significance. The loss of an analyst appears to increase the cost of debt of over XX bps and the difference between non-investment and investment grade firms is around 30 bps and significant. As in the previous case, these results support my main results. However, they also suggest that during periods of crisis the relative weight of the studied phenomena is different, i.e., equity agency conflicts tend to prevail, while debt agency conflicts[17] are of secondary importance. This points definitely requires a deeper and more thoughtful analysis.

[Insert Table 14 about here]

7 Conclusions

In this paper, I study the causal relation between information asymmetry and the cost of capital. Following existing theoretical literature, I hypothesize that an increase in information asymmetry results in higher cost of equity and cost of debt. However, I argue that an information asymmetry

[17] Chen (2011) shows that the benefits of engaging in risk-shifting are lower during economic downturns

shock is not necessarily costly for shareholders, since it also facilitates debtholders-shareholders wealth transfers like risk-shifting and strategic default. Consistent with existing literature that argue that these strategic actions are related to lower equity risk, I hypothesize that an increase in information asymmetry results in higher cost of equity (debt) when the shock is greater and when incentives to engage in debt-equity transfers are low (high).

Consistent with previous literature I find that the loss of an analyst leads to an increase in the cost of debt that is statistically and economically significant. On the other hand, the effect on the cost of equity appears to be trivial. I also find that the effect on the cost of equity has generally large magnitude for smaller firms and the one the cost of debt for firms with non-investment grade debt. These results are similar to what obtained by previous literature and reflect the type of firms whose equity or debt is particularly sensitive to information asymmetry.

Consistent with my hypotheses, I observe that the increase in cost of equity appears to be particularly relevant for firms for which the loss of an analyst is more costly (small firms) and firms where incentives to engage in risk-shifting (higher credit-worthiness and lower risk-taking incentives of CEO) or strategic default (lower liquidity costs and lower bargaining power of equity) are lower. On the other hand, the cost of debt tends to increase more significantly when the shock is particularly relevant (non-investment grade firms) and when incentives to engage in risk-shifting and/or strategic default are higher. Generally speaking, these results suggest that the cost of equity tends to be more sensitive than the cost of debt when firms are smaller, more financially healthy and when incentives to engage in debt-equity transfers are lower. On the other hand, the cost of debt tends to be more sensitive than the cost of equity when firms are larger, more distressed and when incentives to engage in debt-equity transfers are higher. As a result of these forces, I observe that the weighted average cost of capital (WACC) tends to increase only for smaller companies.

I also find that she shock effects appear to be particularly strong when excluding firms who lost analysts working for minor firms. The difference is particularly striking for the cost of equity, suggesting that the effect of the loss of a major analyst is particularly costly. The results are also relatively consistent when excluding events that happened after the Lehman bankruptcy. However, the effect on debt appears to be stronger, while the one on equity appears to be weaker. This suggest that the relation between information asymmetry, agency conflicts and cost of capital may vary across the business cycle. These results generally support my findings, but also highlight that attention should be given to the selection fo events, particularly when extending the sample beyond 2008.

The paper clearly opens different future research paths. It could be interesting to extend the sample also to firms without public debt. This would allow to better understand how the different phenomena work, since my sample is restricted to a specific type of firm. Similarly, it would be interesting to extend the sample beyond 2008, since it would allow us to understand better whether and how the studied phenomena vary across time and, for instance, during period of crisis. Existing theoretical literature (e.g., Chen 2011), indeed, suggests that the relation between equity risk and debt-equity transfers vary across the business cycle. As previously mentioned, this latter exercise requires particular caution in order to avoid the inclusion of endogenous or noisy events.

It would also be interesting to better understand the relation between information asymmetry, managerial agency conflicts, and debt agency conflicts. Existing literature tends to underweight the role of information asymmetry and the literature about the relation between managerial agency conflicts and debt agency conflicts is relatively limited. For instance, Rivera (2015) shows that an increase in managerial moral hazard tends to result in higher incentives to engage in risk-shifting.

Finally, it would be interesting to improve the exogenous shock employed in this paper and in existing literature. All equity analysts' disappearances are largely treated equally, despite analysts having different characteristics. In particular, Collina (2018) shows that analysts' precision is an important variable for investors and that is associated with several market outcomes of the publication of an analyst report. It would be useful to distinguish between analysts who provide precise and informative reports and analysts who provide largely uninformative output.

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Table 1: Descriptive statistics

This table presents descriptive statistics about treated and control firms. The base sample consists in 595 firms that lost an analyst between 2003 and 2008 due to the merger or closure of a broker. Firms are matched by time, industry, profitability, leverage, size, number of analysts and credit rating. Credit rating is expressed in a numeric scale from 1 to 22 (where 1 is the best rating). Profitability is ROA. Leverage is the ratio between total debt and total equity. 1-year EPS forecast is the median EPS analyst forecast. The Kolgomorov-Smirnov test is a test for the equality of distributions.

	25th percentile		Median		75th percentile		P-value	
	Treat	Control	Treat	Control	Treat	Control	Median	K-Smirnov
Matching variables								
Total assets (log $M)	8.37	8.35	9.25	9.17	10.15	9.86	0.35	0.14
Profitability	2.96%	3.13%	5.45%	5.51%	9.00%	8.73%	0.95	0.23
Leverage	1.00	1.04	1.52	1.48	2.54	2.31	0.32	0.12
Credit rating (22-point scale)	7	7.3	9	9	12.2	12.1	0.56	0.74
Number of analysts	10	9	15	14	19	18	0.03	0.05
Bond market								
Yield spread (bps)	88	96	172	175	299	280	0.95	0.69
Long-term debt ($M)	943	888	2250	2207	5568	4754	0.95	0.15
Other								
Market cap ($M)	3,360	3,115	9,016	8,527	23,691	23,404	0.39	0.18
Book-to-market	0.26	0.26	0.41	0.41	0.66	0.62	0.97	0.26
1-year EPS forecast	1.27	1.34	2.25	2.07	3.50	3.32	0.18	0.17
Book value per share	8.91	9.06	14.72	14.54	21.26	21.68	0.97	0.29

Table 2: Effect of the loss of an analyst on the cost of debt and cost of equity

This table reports the change in the cost of debt and in the cost of equity resulting from the loss of an analyst. Panel A reports results obtained using stock returns as a proxy for change in cost of equity (base sample), panel B ones obtained using implied cost of capital (ICC) models. Stock returns are also calculated after risk adjustment, i.e. as excess return over a matching benchmark portfolio (number of observations in parenthesis). ICC was estimated using the Claus and Thomas (2001) and Gebhardt et al (2001) models. Mean changes for both treated and control firms are presented, as well as the difference between the two groups (difference-in-differences). ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A	**Treated**	**Control**	**Diff-in-Diffs**	**p-value**
Bond spread change (bps)	89	66	23**	0.02
Stock return	-1.61%	-0.54%	-1.07%	0.31
N	595			

Panel B	**Treated**	**Control**	**Diff-in-Diffs**	**p-value**
Bond spread change (bps)	91	66	25**	0.02
ICC change (bps)	28	32	-4	0.67
WACC	70	56	14*	0.08
WACC (pre-tax)	49	41	8	0.17
N	566			

Table 3: Effect of the loss of an analyst on the cost of debt and cost of equity (returns) conditional upon rating and size

This table reports the change in bond yield spread (change in cost of debt) and stock return (change in cost of equity) resulting from the loss of an analyst conditional on credit rating and size. Small firms group includes the bottom quartile. Non-investment grade includes firms whose rating is above 10 according to the used numeric scale. The diff-in-diffs are reported for all four sub-sample changes, as well as the difference between the groups (triple diff-in-diffs). ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Non-Investment Grade	Investment Grade	Diff	p-value
Bond diff-in-diffs	31**	17**	13	0.36
Stock diff-in-diffs	-2.42%	-0.25%	-2.17%	0.25
N	225	370		
	Small	**Big**	**Diff**	**p-value**
Bond diff-in-diffs	19	23	-5	0.77
Stock diff-in-diffs	-1.45%	-0.94%	-0.51	0.77
N	151	444		

Table 4: Effect of the loss of an analyst on the cost of debt and cost of equity (ICC) conditional upon rating and size

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on credit rating and size. Small firms group includes the bottom quartile. Non-investment grade includes firms whose rating is above 10 according to the used numeric scale. The diff-in-diffs are reported for all four sub-sample changes, as well as the difference between the groups (triple diff-in-diffs). ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Non-Investment Grade	**Investment Grade**	**Diff**	**p-value**
Bond diff-in-diffs	37**	17**	19	0.23
Stock diff-in-diffs	-10	-1	-9	0.45
WACC	17*	3	14	0.23
WACC (pre-tax)	27**	6	21	0.13
N	214	352		
	Small	**Big**	**Diff**	**p-value**
Bond diff-in-diffs	31*	23***	8	0.65
Stock diff-in-diffs	24	-13	37*	0.08
WACC	30**	1	29**	0.03
WACC (pre-tax)	39***	6	33**	0.04
N	140	426		

Table 5: Effect of the loss of an analyst on the cost of debt and cost of equity conditional upon rating, size and their interaction

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on size, rating and their interaction. Small firms group includes the bottom quartile. Non-investment grade includes firms whose rating is above 10 according to the used numeric scale. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	**Equity**	**Debt**
Big X Investment Grade (IG)	-7.98	19.56**
	(0.41)	(0.02)
Big X Non-investment Grade (NIG)	-27.56	31.35*
	(0.24)	(0.09)
Small X Investment Grade (IG)	48.99**	2.95
	(0.02)	(0.89)
Small X Non-investment Grade (NIG)	12.62	43.55*
	(0.64)	(0.05)
Observations	566	566
R-squared	0.01	0.03
Differences		
Small - Big (IG)	56.97**	-16.61
	(0.01)	(0.48)
Small - Big (NIG)	40.18	12.2
	(0.26)	(0.68)
NIG - IG (Big)	-19.58	11.79
	(0.44)	(0.55)
NIG - IG (Small)	36.37	40.60*
	(0.26)	(0.09)
Small (IG) - Large (NIG)	76.55**	-28.4
	(0.01)	(0.19)

Table 6: Effect of the loss of an analyst on the cost of debt and cost of equity conditional upon rating, number of analysts and their interaction

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on number of analysts, rating and their interaction. Few analysts group includes the bottom quartile. Non-investment grade includes firms whose rating is above 10 according to the used numeric scale. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Equity	(2) Equity	(3) Debt	(4) Debt
Few analysts	6.63		11.76	
	(0.73)		(0.46)	
Many analysts	-5.01		29.86***	
	(0.60)		(0.00)	
Many x Investment Grade (IG)		-7.73		22.66***
		(0.41)		(0.00)
Many x Non-investment Grade (NIG)		0.60		44.68**
		(0.98)		(0.01)
Few x Investment Grade (IG)		47.93**		-2.20
		(0.03)		(0.91)
Few x Non-investment Grade (NIG)		-27.36		23.25
		(0.35)		(0.34)
Observations	566	566	566	566
R-squared	0.00	0.01	0.02	0.03
Differences				
Few - Many	11.64		-18.1	
	(0.59)		(0.31)	
Few - Many (IG)		55.66**		-24.86
		(0.03)		(0.22)
Few - Many (NIG)		-27.96		-21.43
		(0.46)		(0.48)
NIG - IG (Many)		-8.33		22.02
		(0.26)		(0.22)
NIG - IG (Few)		-75.29		25.45
		(0.41)		(0.48)
Few (IG) - Many (NIG)		47.33*		-46.88*
		(0.09)		(0.06)

Table 7: Effect on the cost of debt and cost of equity conditional upon intangibility

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on intangibility, size (for equity) and rating (for debt). Low intangibility includes the bottom quartile firms. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	**Equity**	**Equity**	**Debt**	**Debt**
Low Intangibility (In)	9.42		10.78	
	(0.65)		(0.35)	
High Intangibility (In)	-11.17		28.47***	
	(0.38)		(0.00)	
Big x Low In		-0.07		
		(1.00)		
Big x High In		-19.71		
		(0.15)		
Small x Low In		42.06		
		(0.30)		
Small x High In		13.96		
		(0.64)		
Investment Grade X Low In				-8.36
				(0.46)
Investment Grade X High In				24.49***
				(0.01)
Non-investment Grade X Low In				31.61
				(0.12)
Non-investment Grade X High In				36.07*
				(0.05)
Observations	564	564	564	564
R-squared	0.00	0.01	0.02	0.03
Differences				
Low In - High In	20.59		-17.69	
	(0.39)		(0.22)	
Low In - High In (Big)		19.64		
		(0.47)		
Low In - High In (Small)		28.10		
		(0.57)		
Low In - High In (IG)				-32.85**
				(0.02)
Low In - High In (NIG)				-4.46
				(0.87)
Low In (Small) - High In (Big)		61.77		
		(0.15)		
Low In (IG) - High In (NIG)				-44.43**
				(0.04)

Table 8: Effect on the cost of debt and cost of equity conditional upon industry (utilities)

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on industry and rating. Utility group includes utilities. The treatment effect for the different groups is reported, as well as the difference between the groups, for all firms or only big ones. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	**Equity**	**Equity**	**Equity**	**Equity**	**Debt**	**Debt**	**Debt**	**Debt**
Utility	44.63**		44.63**		-14.44		-14.44	
	(0.03)		(0.03)		(0.49)		(0.49)	
Non-Utility	-7.42		-18.81*		27.41***		26.30***	
	(0.42)		(0.07)		(0.00)		(0.00)	
Utility X Investment Grade		75.86***		75.86***		-4.65		-4.65
		(0.00)		(0.00)		(0.83)		(0.83)
Utility x Non-investment Grade		-26.33		-26.33		-36.68		-36.68
		(0.41)		(0.41)		(0.44)		(0.44)
Non-Utility X Investment Grade		-6.55		-15.41		19.13**		21.71**
		(0.48)		(0.13)		(0.02)		(0.01)
Non-Utility x Non-investment Grade		-8.822		-27.68		40.75***		38.28**
		(0.64)		(0.28)		(0.00)		(0.05)
Observations	566	566	426	426	566	566	426	426
R-squared	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03
Differences								
Utility - Non-utility	52.05**		63.44***		-41.85*		-40.74*	
	(0.02)		(0.00)		(0.06)		(0.07)	
Utility - Non-utility (IG)		82.41***		91.27***		-23.78		-22.18
		(0.00)		(0.00)		(0.31)		(0.26)
Utility - Non-utility (NIG)		-17.51		1.35		-77.43		-74.96
		(0.64)		(0.97)		(0.12)		(0.14)
Utility (IG) - Non-utility (NIG)		84.68***		103.54***		-45.4*		-42.93
		(0.00)		(0.00)		(0.08)		(0.14)

Table 9: Effect on the cost of debt and cost of equity conditional upon institutional ownership

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on institutional ownership, size (for equity) and rating (for debt). Low institutional ownership group includes the bottom quartile firms. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) equity	(2) equity	(3) debt	(4) debt
High Institutional Ownership (IO)	-15.38		28.32***	
	(0.13)		(0.00)	
Low Institutional Ownership (IO)	28.31*		-8.80	
	(0.08)		(0.54)	
Big X High IO		-25.50**		
		(0.02)		
Big X Low IO		24.09		
		(0.18)		
Small X High IO		17.20		
		(0.46)		
Small X Low IO		39.75		
		(0.27)		
Investment Grade X High IO				22.19***
				(0.01)
Investment Grade X Low IO				-20.75
				(0.13)
Non-investment Grade X High IO				38.46**
				(0.01)
Non-investment Grade X Low IO				12.38
				(0.69)
Observations	563	563	563	563
R-squared	0.01	0.01	0.02	0.03
Differences				
High IO - Low IO	-43.69**		37.12**	
	(0.02)		(0.02)	
High IO - Low IO (Big)		-49.59**		
		(0.02)		
High IO - Low IO (Small)		-22.55		
		(0.60)		
High IO - Low IO (IG)				42.94***
				(0.00)
High IO - Low IO (NIG)				26.08
				(0.45)
High IO (Big) - Low IO (Small)		-65.25*		
		(0.08)		
High IO (NIG) - Low IO (IG)				59.21***
				(0.00)

Table 10: Effect on the cost of debt and cost of equity conditional upon CEO options ownership

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on CEO options ownership, size (for equity) and rating (for debt). Low CEO options ownership group includes the bottom half firms. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

VARIABLES	(1) equity	(2) equity	(3) debt	(4) debt
High CEO Options Ownership (OO)	-10.81		33.68***	
	(0.42)		(0.00)	
Low CEO Options Ownership (OO)	-1.07		19.76**	
	(0.92)		(0.05)	
Big X High OO		-11.78		
		(0.45)		
Big X Low OO		-8.78		
		(0.45)		
Small X High OO		-8.73		
		(0.73)		
Small X Low OO		66.33*		
		(0.06)		
Investment Grade X High OO				22.95*
				(0.06)
Investment Grade X Low OO				17.67*
				(0.09)
Non-investment Grade X High OO				48.57**
				(0.02)
Non-investment Grade X Low OO				25.30
				(0.28)
Observations	504	504	504	504
R-squared	0.00	0.01	0.03	0.03
Differences				
High OO - Low OO	-9.74		13.92	
	(0.57)		(0.35)	
High OO - Low OO (Big)		-3.00		
		(0.88)		
High OO - Low OO (Small)		-75.36**		
		(0.04)		
High OO - Low OO (IG)				5.28
				(0.75)
High OO - Low OO (NIG)				23.27
				(0.45)
High OO (Big) - Low OO (Small)		-78.11**		
		(0.04)		
High OO (NIG) - Low OO (IG)				30.90
				(0.18)

Table 11: Effect on the cost of debt and cost of equity, multiple variables interaction

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst conditional on incentives proxy (Var), size and rating. Variables are as previously defined. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

	(1)	(2)	(3)	(4)	(5)	(6)
		Equity			Debt	
VARIABLES	**Intangibility**	**Institutional Ownership**	**CEO Options Ownership**	**Intangibility**	**Institutional Ownership**	**CEO Options Ownership**
Big X Investment Grade X Var High	-1.06	-20.95*	-8.69	27.40***	23.81***	25.61*
	(0.93)	(0.06)	(0.57)	(0.01)	(0.01)	(0.06)
Big X Investment Grade X Var Low	-13.62	25.34	-5.71	-7.98	-14.53	18.10
	(0.57)	(0.16)	(0.63)	(0.51)	(0.32)	(0.10)
Big X Non-investment Grade X Var High	-78.35*	-35.46	-34.81	32.18	35.18*	37.38
	(0.06)	(0.17)	(0.37)	(0.20)	(0.07)	(0.20)
Big X Non-investment Grade X Var Low	21.85	17.73	-1.39	18.96	-19.75	21.38
	(0.65)	(0.76)	(0.96)	(0.39)	(0.53)	(0.34)
Small X Investment Grade X Var High	48.53	57.97**	45.92**	6.23	11.20	-20.19
	(0.30)	(0.02)	(0.05)	(0.81)	(0.64)	(0.27)
Small X Investment Grade X Var Low	56.36**	26.88	65.93	-12.67	-63.05**	69.55
	(0.03)	(0.41)	(0.14)	(0.61)	(0.04)	(0.25)
Small X Non-investment Grade X Var High	-9.39	-1.99	-30.03	40.36	43.13*	47.24
	(0.83)	(0.95)	(0.40)	(0.14)	(0.10)	(0.12)
Small X Non-investment Grade X Var Low	40.56	46.44	48.41	52.04	27.38	89.39
	(0.41)	(0.37)	(0.39)	(0.19)	(0.52)	(0.16)
Observations	564	563	504	564	563	504
R-squared	0.02	0.02	0.01	0.03	0.03	0.04

Table 12: Effect of the loss of an analyst on the WACC conditional upon rating, size and their interaction

This table reports the change in weighted average cost of capital (WACC) resulting from the loss of an analyst conditional on size, rating and their interaction. Small firms group includes the bottom quartile. Non-investment grade includes firms whose rating is above 10 according to the used numeric scale. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	**WACC (Pre-tax)**	**WACC**
Big X Investment Grade	3.50	0.44
	(0.58)	(0.93)
Big X Non-investment Grade	11.57	3.96
	(0.48)	(0.76)
Small X Investment Grade	22.18*	22.44**
	(0.09)	(0.04)
Small X Non-investment Grade	47.19**	32.90**
	(0.02)	(0.04)
Observations	566	566
R-squared	0.02	0.02
Differences		
Small - Big (IG)	18.68	22.00*
	(0.20)	(0.07)
Small - Big (NIG)	35.62	28.94
	(0.17)	(0.16)
NIG - IG (Big)	8.07	3.52
	(0.64)	(0.80)
NIG - IG (Small)	25.01	10.46
	(0.30)	(0.59)

Table 13: Effect of the loss of an analyst on the cost of debt and cost of equity conditional upon rating, size and their interaction, only closures/mergers of major brokers

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst of a major broker conditional on size, rating and their interaction. Variables are as previously defined. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Equity	(2) Equity	(3) Equity	(4) Debt	(5) Debt	(6) Debt
Small	52.63*			42.21*		
	(0.07)			(0.08)		
Big	-17.03			22.70**		
	(0.14)			(0.01)		
Non-investment Grade (NIG)		-8.51			46.10**	
		(0.73)			(0.02)	
Investment Grade (IG)		-0.05			16.99*	
		(1.00)			(0.06)	
Big X Investment Grade (IG)			-8.83			20.23**
			(0.44)			(0.04)
Big X Non-investment Grade (NIG)			-39.86			29.57
			(0.18)			(0.17)
Small X Investment Grade (IG)			63.18**			-6.37
			(0.02)			(0.77)
Small X Non-investment Grade (NIG)			45.59			74.60**
			(0.31)			(0.04)
Observations	418	418	418	418	418	418
R-squared	0.009	0.001	0.014	0.024	0.028	0.034
All observations	-2			27**		
	(0.81)			(0.03)		
Small - Big	69.66**			19.51		
	(0.02)			(0.45)		
NIG - IG		-8.46			29.11	
		(0.76)			(0.17)	
Small - Big (IG)			72.01**			-26.60
			(0.01)			(0.27)
Small - Big (NIG)			85.45			45.03
			(0.11)			(0.29)
NIG - IG (Big)			-31.03			9.34
			(0.32)			(0.70)
NIG - IG (Small)			-17.59			80.97*
			(0.73)			(0.06)
Small (IG) - Large (NIG)			103.4***			-35.94
			(0.01)			(0.25)

Table 14: Effect of the loss of an analyst on the cost of debt and cost of equity conditional upon rating, size and their interaction, excluding post-Lehman bankruptcy events

This table reports the change in bond yield spread (change in cost of debt) and implied cost of capital (change in cost of equity) resulting from the loss of an analyst before Lehman bankruptcy conditional on size, rating and their interaction. Variables are as previously defined. The treatment effect for the different groups is reported, as well as the difference between the groups. Standard errors were bootstrapped. P-values in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Equity	(2) Equity	(3) Equity	(4) Debt	(5) Debt	(6) Debt
Small	12.12			32.95**		
	(0.51)			(0.04)		
Big	-14.76			30.83***		
	(0.13)			(0.00)		
Non-investment Grade (NIG)		-10.69			49.97***	
		(0.55)			(0.00)	
Investment Grade (IG)		-5.22			19.05**	
		(0.53)			(0.01)	
Big X Investment Grade (IG)			-12.91			21.37***
			(0.16)			(0.01)
Big X Non-investment Grade (NIG)			-19.12			53.13***
			(0.44)			(0.01)
Small X Investment Grade (IG)			38.14**			6.04
			(0.05)			(0.78)
Small X Non-investment Grade (NIG)			-0.73			46.24**
			(0.98)			(0.04)
Observations	453	453	453	453	453	453
R-squared	0.01	0.00	0.01	0.04	0.05	0.05
All observations	-7			31***		
	(0.43)			(0.00)		
Small - Big	26.88			2.12		
	(0.20)			(0.91)		
NIG - IG		-5.47			30.92*	
		(0.78)			(0.06)	
Small - Big (IG)			51.05**			-15.33
			(0.02)			(0.50)
Small - Big (NIG)			18.39			-6.89
			(0.61)			(0.82)
NIG - IG (Big)			-6.21			31.76
			(0.81)			(0.14)
NIG - IG (Small)			-38.87			40.20
			(0.23)			(0.19)
Small (IG) - Large (NIG)			57.26*			-47.09
			(0.07)			(0.11)