Is cost of equity a mere function of leverage? The case of the bond IPO

Abstract:

In this paper, we investigate how undertaking a bond IPO influences a firm's cost of equity. The information and monitoring environment, agency relationships, governance and the leverage of a firm are transformed significantly as a result of a firm going through a bond IPO, and these changes can have a significant impact on the firm's cost of equity. As per Modigliani and Miller (1958), the cost of equity of a firm should increase as the leverage of the firm increases when it undertakes a bond IPO. However, we show that the change in cost of equity is not just a simple function of leverage in this case. Using a sample of nearly 400 non-financial U.S firms over the 1982-2013 period, we find that firms that have relatively high information asymmetry before they undertake the bond IPO experience less of a rise in their cost of equity than firms which have relatively low information asymmetry before they undertake the bond IPO. We also show that firms with high pre bond IPO free cash flow see less of an increase in their cost of equity than firms with low pre bond IPO free cash flow. In addition, we find that firms with poor corporate governance experience more of an increase in their cost of equity after the bond IPO than firms with better corporate governance. These findings are robust to firm characteristics, and do not appear to be driven by sample selection. The evidence suggests that the dynamics of the change in the riskiness of equity after a firm goes through a bond IPO is much more complex than what is predicted by the M&M propositions. On one hand, the cost of equity of a firm is impacted by the significant transformation that results due to a bond IPO, and on the other, the change in the direction and magnitude of the cost of equity is highly influenced by the pre bond IPO characteristics of the firm.

1. Introduction

Cost of capital is frequently a deciding factor in major corporate and investment decisions. Since investors face many financial market opportunities, there has to be a tool for benchmarking corporate uses of capital against these capital market alternatives, and this benchmark is provided by the cost of capital. Cost of equity is an integral part of the over-all cost of capital as equity capital is a major source of funding for firms.

In this paper, we investigate the interaction between the sources of funds a firm uses and its implications for its equity holders. In particular, we examine how a firm's Bond IPO affects its cost of equity. The M&M proposition states that when the leverage of a firm increases, its cost of equity should increase as well (Modigliani and Miller 1958 & 1963). It is because that the equity holders have a residual claim on the cash flows of the firm. As a result, the more debt a firm carries, the higher the risk borne by the equity holders, hence the higher is its cost of equity. Extant literature (e.g., Faulkender and Petersen, 2006; Datta, Datta and Patel, 2000) documents that a bond IPO increases the leverage of the firm significantly. Figure 1 examines debt to asset ratios of the firms that have gone through a bond IPO between 1982 and 2013. It confirms the findings of previous research as it shows that on average the debt to asset ratio of firms after they issue public debt for the first time increases substantially. Therefore, as par as the M&M conclusion is concerned, the cost of equity of a firm should increase on average after it issues public debt for the first time.

However, the question remains if the change in the cost of equity after these firms go through the bond IPO follow a universal pattern, or the change is influenced by some other factors specific to a bond IPO as well. A bond IPO is a unique and significant event in a firm's life. Extant literature points out that only a small fraction of public firms go through a bond IPO,

that these firms possess specific characteristics, and the bond IPO considerably changes the agency relationships, information and monitoring environment along with capital structure of the firms (e.g., Hale and Santos, 2009; Datta, Datta and Patel., 2000; Booth, Cleary and Purda 2013). Just like the equity IPO transforms a firm, so does the bond IPO. As a firm taps into the public debt market, its funding sources alter, and the firm restructures its debt ownership by bringing in a new stakeholder ---- the public debt holders. Hence, the agency relationships in the firm go through a profound transformation besides an increase in over-all leverage. Further, when a firm issues for the first time in the public debt market, new information about its credit worthiness is made public, and apart from private lenders, it becomes subject to additional scrutiny coming from bond holders, bond analysts and credit rating agencies.

In addition, as the firm has a new type of debt holder (public debt holders) apart from private debt holders now, the governance mechanism of the firms also goes through a significant change. These transformations can have an impact on the cost of equity. For example, equity holders demand a premium for the level of information asymmetry. If a firm's information environment changes after it issues debt in the public market for the first time, that premium can be revised, and it can have an impact on the cost of equity. Similarly, a change in the monitoring environment or the governance of the firm can influence the cost of equity. Also, even if the firms that go through the bond IPO possess similar characteristics in general, there can be subtle differences in them, and to the degree to which these transformations impact the cost of equity can also depend on specific pre bond IPO characteristics that the firms possess when they go through the bond IPO.

This is exactly what our focus is in this paper. We ask if the cost of equity of firms with similar pre-bond IPO characteristics responds in a particular way to the changes that are brought through the bond IPO, and if the differences in pre bond IPO characteristics among the different homogeneous groups of firms can explain any non-universal pattern of the changes in the cost of equity that we observe after the firms go through the bond IPO.

Table 3 shows what happens to the cost of equity of the firms that have gone through a bond IPO. Among the 397 firms in the sample, the change in the cost of equity of the firms that go through the bond IPO is not universal at all. The direction and magnitude of the changes in the cost of equity after the firms issue debt in the public market for the first time vary considerably. In this paper, we argue that the primary reason for this non-universal pattern of change in the cost of equity is that the cost of equity of a firm after it goes through the bond IPO is not merely a function of the increase in leverage as the simple world of M&M would suggest; rather, the cost of equity of a firm responds to the profound transformation such as in terms of information asymmetry, monitoring, and governance that result due to the bond IPO. Also, the magnitude of change and the direction of change in the cost of equity after firms go through the bond IPO depends on the pre bond IPO characteristics of the firms.

For example, firms with relatively lower pre bond IPO information asymmetry are likely to see a relatively higher increase in their cost of equity after the bond IPO, as there is relatively little uncertainty about the firm's true state left to resolve, and therefore little potential for eliminating the portion of the firm's risk premium attributed to incomplete information about the firm. On the other hand, firms with relatively high pre bond IPO information asymmetry should see a relatively smaller increase in the cost of equity, or perhaps a decrease in their cost of equity around the bond IPO, as much new information will be revealed about the firm, which will

reduce or remove a major source of risk to investors. On the other hand, firms with relatively high pre bond IPO free cash flow may see a relatively lower rise in the cost of equity after they issue public debt for the first time. Additional debt might force the managers to be more disciplined in terms of their decision making, and stockholder might view this positively. Hence, the pre bond IPO characteristics of a firm can significantly influence the direction and magnitude of the change in cost of equity because of the profound transformation that a firm undergoes after it issues debt in the public market for the first time.

The key contribution of this paper is that while the classic Modigliani-Miller result does hold, and increased leverage does on average lead to a higher cost of equity, these changes in capital structure are not the only factors affecting how a firm's cost of equity responds to a bond IPO. The other effects of the IPO, such as the change in the information, monitoring and governance environment, and pre bond IPO characteristics like pre bond IPO information asymmetry and free cash flow also have a significant effect on the cost of equity. This enhances our understanding regarding how shareholders view a bond IPO, and may aid firms in predicting how a bond IPO will affect their weighted average cost of capital. A firm that fails to account for these secondary effects of the bond IPO may decide not to undergo a bond IPO due to concerns about how it will affect their ability to raise equity capital when issuing their first bond may have a negligible or even beneficial effect on their cost of equity. To best of our knowledge, no paper has examined how a bond IPO affects the cost of equity of a firm; we aim to address this significant void in the literature.

Our dataset covers the period between 1982 and 2013. The bond IPO data is collected from the FISD Mergent bond issue database. A bond issue is considered a bond IPO if the issue is a first-time issue in the database. The dataset contains 398 firms. For each firm, cost of equity

is estimated in the year before and after the bond IPO, using analyst forecasts from IBES and the cost of equity estimation methodology formulated by Ohlsen and Juettner (2004). This gives us a total of 12,497 data points. The governance environment is captured using the Entrenchment Index that has been developed by Bebchuk et al (2008). This index is a simplification of the more commonly used Gompers (2003) measure. It captures most of the variance in the Gompers measure, and has the advantage of not requiring data that is no longer being collected. We conduct both univariate and multivariate analyses to examine whether the change in the cost of equity of a firm after it goes through a bond IPO is influenced by the change in the operating environment of the firm and by its pre bond IPO characteristics..

The important results of the empirical investigation are summarized as follows. First, we find that the cost of equity of firms that have high pre bond IPO information asymmetry increases relatively less after the bond IPO compared to that of the firms that have low pre bond IPO information asymmetry. Second, the results show that firms with high pre bond IPO free cash flow, on average, see relatively less of an increase in their cost of equity after they go through the bond IPO than firms with low pre bond IPO free cash flow. In addition, we find that the cost of equity of firms with poor pre bond IPO corporate governance relatively goes up more than that of firms with better corporate governance even after other effects of a bond IPO are controlled for. While firms with poor corporate governance see more of a rise in their cost of equity after a bond IPO, poor corporate governance appears to increase the effect of information asymmetry and free cash flow. This suggests that the information asymmetry and free cash flow reduction effects of a bond IPO may be more valuable to poorly governed firms, whose shareholders are presumably more concerned about these issues.

The organization of this paper is as follows: Section 2 discusses the motivation and develops a set of hypotheses. Section 3 focuses on the data sources and estimation of key variables, while section 4 elaborates on the empirical methodologies used to test the hypotheses. Section 5 presents the results, and Section 6 concludes.

2. Motivation and Hypothesis Development

In general, the cost of equity should increase after a firm issues public bond for the first time as leverage of the firm increases (Modigliani and Miller, 1958). Also, as a result of the bond IPO, the agency relationship within a firm becomes more complicated as the firm brings in a new type of stakeholder, the public debt holders. Hence, the conflict between the stockholders and debt holders might intensify, and that can increase the agency cost of equity further.

Therefore, we develop our first hypothesis as follows:

Hypothesis 1: The cost of equity of a firm will increase after the firm goes through a bond IPO.

However, the relationship between a firm's bond IPO and its cost of equity may not be as simple as it seems. A bond IPO brings in a fundamental transformation in the over-all environment of the firm apart from simply increasing the leverage. Besides a change in the its agency relationship and leverage, the firm's information, monitoring and governance environment change significantly.

Most firms never go through a bond IPO in their life time. The ones that do, possess unique characteristics in general although there exists fine differences among different homogeneous groups within the firms that go through the bond IPO. It might be the case that the pre bond IPO characteristics of the firms that go through the bond IPO and the significant

changes that happen to the firms due to the bond IPO impact the riskiness of equity in a much more profound way than that of the simple prediction of the theory.

Several studies have examined the unique characteristics of the firms that go through a bond IPO. For example, Datta et. al (2000) find that the firms that go through a bond IPO are significantly larger than the ones that do not. They also point out that these firms grow significantly in the year prior to a bond IPO. They argue that this growth suggests a greater need for capital for the public debt issuing firms than that of those that do not go through a bond IPO.

Hale and Santos (2008) show that firms that possess higher growth opportunities undertake bond IPOs relatively earlier. They argue that firms that have a relatively lower demand for external funds enter the public debt market later either because they have fewer investment opportunities, or because they have substantial internal funds. By using leverage, profitability and Z scores as proxies of credit worthiness, they show that firms that are more credit worthy are likely to enter the public debt market earlier relative to the ones that are less credit worthy. In addition, Hale and Santos (2008) find that firms which have issued private bond and syndicated loan funding tend to enter the public bond market earlier. In line with the finding of Datta et. al (2000) in terms of the size of the firm that go through a bond IPO, Hale and Santos (2008) also point out that relatively larger firms are likely to go through a bond IPO earlier than relatively smaller firms. Their results regarding the size and creditworthiness of firms are consistent with the findings of previous research as well (e.g., Houston and James; 1996).

While conforming to some of the previous results, Booth et al. (2013) argue that a firm's decision to enter the public debt market depends on which stage of life cycle it is in. They argue that when a firm enters a mature stage, it can take additional debt because by that time it has

generated substantial cash flow. "At this stage, not only are they able to handle more debt and successfully issue public debt, but they may want to in order to constrain management's ability to over-invest using the firm's free cash flows. At the same time, they will want to raise debt as cheaply as possible in order to maintain profit margins which are likely to be squeezed due to increased competition. This suggests that at some point during the middle-to-later stages of maturity, firms will want to access public debt markets through a debt IPO." (p. 1577-1578).

Booth et al. (2013) also point out that a firm considers timing when it decides to go through a bond IPO. They provide evidence that stock prices for the firms that initiate public debt for the first time rise in the period prior to the bond IPO, and fall subsequently. They also examine the operating performance measures, and find that a firm usually goes through a bond IPO following periods of strong operating performance which further strengthens their timing argument. In this regard, it should be noted that Hale and Santos (2008) find that firms avoid bond IPOs during recessionary periods, and Barry et al. (2008) find that firms issue relatively more debt when interest rates are historically low.

In a nutshell, extant literature points out that firms that go through a bond IPO possesses unique operating and life cycle characteristics. However, there are subtle differences among the firms that go through a bond IPO in terms of degree of information asymmetry, free cash flow, governance and other aspects of operating characteristics. Table 8 shows these differences among the firms that enter the public debt market. The change in the direction and magnitude of cost of equity of firms that go through the bond IPO may be a function of two distinct variables. First, the cost of equity is affected due to the transformation that a bond IPO brings into the firm, and second, it is influenced by the pre bond IPO characteristics of the firms. It might be the case that the cost of equity of firms of a particular homogeneous group in terms of pre bond IPO

characteristics respond in a particular way to the bond IPO, and the cost of equity of firms that belong to another homogeneous group responds to the bond IPO significantly differently in terms of direction and magnitude.

The information environment and the degree of monitoring change substantially after a firm goes through a bond IPO. These changes can profoundly impact the cost of equity in addition to the impact caused by increased leverage. As a result of the bond IPO, new information about the credit worthiness of the firm is revealed. The firm is now followed by bond holders, bond analysts and credit rating agencies. Therefore, the information asymmetry declines.

Hale and Santos (2009) investigate bank loan spreads for firms after they issue in the public debt market for the first time. They find that the spreads decline. Their result is particularly significant for firms with higher credit quality. Hale and Santos (2009) argue that their findings are a reflection of Rajan's (1992) theoretical insight that incumbent banks have an informational advantage over outside banks, and earn rents as a result. In the event of a bond IPO, new information about a firm is made public, thereby reducing the informational advantage of incumbent banks. Hence, the loan spread declines. Datta et al. (2000) examine how the stock market reacts when a firm issues public debt for the first time. While they find that the stock market reacts negatively in general after a firm goes through a bond IPO, they show that stock market response is relatively less adverse when bond IPOs are undertaken by older firms, with relatively less information asymmetry and more reputational capital.

In addition to the information environment, the monitoring environment of the firm changes as a result of a firm going through a bond IPO. Both private and public debt holders have to monitor the activities of the firm in order to reduce the agency costs and moral hazard

associated with debt. When a firm issues public debt for the first time, it receives additional monitoring coming from bond holders and credit rating agencies. The additional monitoring, in turn also reduces information asymmetry.

Overall, as a firm goes through a bond IPO, the change in its information as well as the monitoring environment should reduce information asymmetry between investors and the firm. Investors tend to demand a premium for bearing uncertainty, and this premium will be reduced by anything that reduces information asymmetry. This suggests that firms with high information asymmetry before the bond IPO will not see as negative an effect on their cost of equity relative to the firms with low information asymmetry. Hence, we develop the following hypothesis.

Hypothesis 2: Firms with high information asymmetry at the time of the bond IPO will see less of a rise in their cost of equity after the bond IPO than that of firms with low information asymmetry at the time of the bond IPO

Literature points out that most firms, when they issue the bond IPO are in the middle to latter stages of their life cycle with substantial cash flow. Issuing the bond IPO might force the managers to be more disciplined. Jensen (1986) points out that increased leverage is beneficial to a firm, because it forces the managers to act more responsibly as they have less free cash flow to waste. Jensen posits that the threat caused by failure to make debt payments serves as an effective motivating force to make managers more disciplined and organizations more efficient. Other research has also argued in line with Jensen's theory and elaborated on the benefit of the discipline mechanism imposed by debt (e.g., Jensen and Meckling,1976; and Williamson, 1988).

If shareholders are concerned about management wasting free cash flow, the interest payments associated a bond IPO can be a valuable way of reducing management's ability to

overinvest or misappropriate funds. If management is less able to spend the firm's resources in a way that does not provide value to the shareholders, the shareholders will be inclined to see the firm as less risky. In addition to firms with high free cash flow, firms with few good investments available to them, or no history of paying dividends should also be benefit from the disciplining effects of debt the bond IPO brings, as they likely lack a "sink" for excess cash and are therefore more likely to spend it in ways that do not benefit shareholders.

In addition, the extra monitoring that results from the bond IPO may also contribute to disciplining managers. Not only does a firm experience additional monitoring from public debt holders, bond analysts and credit rating agencies, literature points out that after a firm goes through a bond IPO, private debt holders increase the intensity of monitoring of private loans granted to the firm by increasing both the number and severity of covenants attached to private loans that they grant to the firm (Hussain, 2014). He (Hussain, 2014) argues that private lenders get concerned about the potential increase of agency problems and leverage as a result of a firm accessing the public debt market, and consequently, find it valuable to increase the degree of monitoring of loans that they extend to the firm.

Schramade and Roosenboom (2011) show that the stock market reacts positively to the bond IPOs of those firms that have a relatively high level of free cash flow and low levels of concentrated ownership. They argue that stock market reactions to bond IPOs are more favorable for firms that seem to be in need of additional disciplining, and the market appreciates management's commitment to additional disciplining by taking on public debt. Considering all these, investors may perceive the bond IPO positively particularly for those firms who possess healthy free cash flow at the time of the bond IPO. Hence, we develop the following hypothesis.

Hypothesis 3: Firms with higher free cash flow at the time of the bond IPO will see less of a rise in their cost of equity after the bond IPO than that of firms with relatively lower free cash flow at the time of the bond IPO

Along with the transformation that a firm experiences after going through a bond IPO due to the change in the information and monitoring environment, the agency relationships also go through an intense modification. Most firms have private debt before they access public debt. As public debt holders enter into the picture, the agency relationships between the stock holders and debt holders become more complicated. The stock holders go down further in the claim on firm's cash flows as along with private debt holders, public debt holders have priority over the equity holders.

This transformation in the agency relationship can have an impact on the cost of equity based on how well the firm is governed. If the firm is well governed, the equity holders will have less to worry about as governance problems should not intensify because of the shareholders' moving to a lower priority in claim. However, if the firm is poorly governed, it is possible that the bond IPO further harms the shareholders because the governance problems will further intensify as the shareholders move further down the claim. For example, If a poorly governed firm is more likely to default on its obligations or make arrangements with creditors that are good for management but bad for shareholders, this lower priority in bankruptcy will be more damaging to poorly governed firms than well governed firms. This brings us to the first part of hypothesis 4.

Hypothesis 4a: Firms with relatively poor corporate governance at the time of the bond IPO will see more of a rise in their cost of equity after the bond IPO than that of firms with relatively strong corporate governance at the time of the bond IPO.

If a firm is well governed, it is less likely to misuse free cash flow or act against the interests of the shareholders, and shareholders should therefore have less to gain from making more information about the firm's inner workings available, or reducing the amount of free cash flow available to the managers. If a firm's cost of equity response to a bond IPO is determined by these factors, well governed firms with a given level of information asymmetry or free cash flow will gain less of a benefit from a bond IPO than a poorly governed firm with similar information asymmetry or free cash flow. The effects of the IPO should have relatively little effect on the risk premium investors in these well-governed firms demand. If the managers are already behaving responsibly, the effects of a bond IPO that compel them to behave responsibly will be of relatively little use, but for firms where shareholders are concerned that management might be acting against them, additional constraints on or information about management might be seen as highly valuable.

Hypothesis 4b. Firms with poor corporate governance will see more benefit from the reduction in information asymmetry and free cash flow that a bond IPO brings.

3. Data Sources, Estimation Techniques of Key Variables and Controls

In this section, we discuss our data set, how we estimate the key variables, and the controls that we use in our regressions.

3.1. Dataset

For the purposes of this research, bond IPOs are located using the Mergent FISD database. A firm's bond IPO is defined as the first instance of a bond issuance in Mergent FISD. In identifying bond IPOs, we exclude Preferred securities, foreign currency bonds, Yankee

bonds, private placement bonds, Rule 144A bonds, unit deals, convertible debt, perpetual debt, and exchangeable bonds.

The analyst forecasts used to estimate cost of equity and information on analyst following are obtained from IBES. Because the dependent variable in the multivariate tests is the cost of equity, which is estimated from analyst forecasts, each data-point corresponds to an analyst forecast for a single firm on a particular day. In cases where multiple analysts released forecasts for the same firm on the same day, the mean of their forecasts was used to estimate the cost of equity.

Information on corporate charter provisions hostile to shareholders used to construct the corporate governance measure is obtained from the Investor Responsibility Resource Center. Interest rate information for estimating the cost of equity is obtained from the St. Louis Federal Reserve website, and all other data are obtained from Compustat and CRSP. All non-US and financial firms are dropped from the sample.

The resulting dataset contains 398 firms and 12,497 data-points, and spans the period from 1982 to 2013. All data-points that are more than a year before or after the relevant firm's bond IPO are dropped, as firms naturally undergo changes that will systematically affect their cost of equity as they mature. Including data-points from significantly before or after the bond IPO would make it likely that changes in the cost of equity resulting simply from the firm aging and growing could be attributed to the bond IPO. Removing data-points far in time from the IPO means that more of the changes in the cost of equity we observe is due to the changes brought on by the IPO, allowing us to better isolate its effects. Details of the construction of all variables can be found in Appendix 1.

3.2. Cost of Equity Estimation

Academics and practitioners do not face any difficulty in estimating the cost of debt. However, the precise estimation of cost of equity has posed significant challenges. Although the established asset pricing models can be used to calculate the cost of equity, the estimations derived from the average realized returns are imprecise due to difficulties in identifying the right asset pricing model, imprecision in the estimates of factor loadings (such as beta), and imprecision in the estimates of factor risk premia (Fama & French 1997).

Given these limitations of the traditional asset pricing models in estimating cost of equity with precision, several alternative models have been developed. For the purpose of this research, the cost of equity capital is estimated using the method developed by Ohlson and Juettner (2004). This method utilizes expected future earnings per share and dividend payments to imply a cost of equity. Theoretically, it is derived from the dividend discount model, though it makes no attempt to forecast future dividends. Instead, this model relies on Modigliani and Miller's result that the timing of dividends is unimportant, and instead focuses on growth in the firm's ability to pay future dividends, as measured by its expected future earnings per share. Mathematically, this method is equivalent to pricing the firm as a perpetuity of dividends growing at the risk free rate plus a growing perpetuity of perpetuities– each year, the firm's earnings increase at the rate implied by analyst forecasts, and the firm gains another perpetuity with a coupon equal to the growth in earnings over the risk free rate.

Solving this equation for the discount rate in the perpetuity yields the following expression for a firm's current cost of equity in terms of expected future earnings per share, current dividends, current stock price, and the risk free rate:

Equation 1.

$$r_e = A + \sqrt{A^2 + \frac{eps_1}{P_0} \times \frac{eps_2 - eps_1}{eps_1} - (\gamma - 1)}$$

$$A = {}^1\!/_2 \times \left((\gamma - 1) \frac{dps_0}{P_0} \right)$$

The risk free rate is γ-1, the current stock price is P_0, the one year forecasted earnings per share is eps_1, the two year forecasted earnings per share is eps_2, and the current dividend payment is dps_0.

The cost of equity implied by this model has been shown to be highly correlated with conventional measures of how risky a firm's equity is, such as earnings variability, both systematic and unsystematic components of return volatility, and leverage, and is negatively associated with analyst following (Gode and Mohanram, 2001). This is a popular method for estimating cost of equity that has been used in many recent papers such as Huang et al. (2009) and El Ghoul et al. (2013).

3.3. Measures of Information Asymmetry

We use two variables to measure the pre bond IPO degree of information asymmetry of a firm. First, we use the natural log of firm age. Second, we use an indicator variable identifying if a firm has an S&P debt rating prior to the bond IPO. Older firms in general suffer less from information asymmetry between management and investors, simply because they have been around for relatively longer period of time, and there has been more time for information about them to come out. There is less private information left to reveal about an older firm, and so old

firms should experience less of a benefit from a bond IPO. This is a common measure of information asymmetry, as seen in Lu, Chen and Liao (2010). We measure firm age as the number of years since the firm first appears in Compustat.

One of the major ways in which a bond IPO typically reduces information asymmetry is by assigning the borrowing firm a debt rating. If a firm already has a rating before the bond IPO takes place, the reduction in information asymmetry associated with a rating will have already taken place and their cost of equity should already reflect this smaller asymmetry. These pre-rated firms should therefore see less of a reduction in their information asymmetry when they undergo a bond IPO. As these pre-rated firms have already reaped the cost of equity benefits of reduced information asymmetry, they have less to gain from a bond IPO and should see relatively more of an increase in their cost of equity than firms that will be gaining a debt rating as part of the process.

3.4 Measuring Free Cash Flow

We estimate a firm's free cash flow as their operating cash flow less their investment cash flows. As a firm that is undergoing a bond IPO is likely to be making substantial investments, many of the firms in our sample have a negative free cash flow by this measure.

3.5 Measuring Corporate Governance

We measure corporate governance using the Entrenchment Index (henceforth referred to as the E-Index), which was proposed in Bebchuk, Cohen and Ferrell (2008). The E-Index is a simplification of Gompers et al's 2003 corporate governance measure. Both of these measures are constructed by summing how many of a set of provisions hostile to shareholders that a firm has in its corporate charter, using data gathered by the Investor Responsibility Research Center

(IRRC) on a yearly basis. The Gompers index had 26 possible provisions, for some of which the data is longer available. The E-Index has only 6 possible provisions, which capture most of the variance in the Gompers index, and data for all of the needed variables are still being collected by IRRC. The E-Index ranges from 0 to 6, with 0 meaning that the firm has no anti-shareholder provisions, and 6 meaning that the firm has all of the anti-shareholder provisions considered in this measure. The six anti-shareholder provisions that the E- Index keeps track of are as follows: staggered boards, limits to shareholder by-law amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendment.

3.6 Controls

To make sure that the effects we are capturing are due to the bond IPO itself, not other changes the firm might go through in tandem with the bond IPO, we control for a number of factors. These factors are: total assets, sales, and debt to assets ratio. A firm typically emerges from the bond IPO in a larger, more highly levered form. Adding assets, sales and long term debt to assets to our regressions allows us to control for these secondary effects of the bond IPO, and examine only the changes in cost of equity resulting from the IPO itself. These variables are commonly used to control for changes in the cost of equity due to changes in the firm's asset base and capital structure (e.g., Gebhardt et al. (2001); Gode & Mohanram (2003)).

4. Empirical Specification

The methodology that we use in this research has several parts. They are discussed below.

4.1 Univariate Tests

The first tests of the hypotheses are provided by univariate tests comparing the mean cost of equity for the year before and after the bond IPO for firms in the top and bottom quintile of measures of information asymmetry, monitoring, corporate governance, and free cash flow. For example, if age is the measure, we find the mean cost of equity for four subsets of the whole sample: Young firms in the year before the IPO, young firms in the year after the IPO, old firms in the year before the IPO, and old firms in the year after the IPO. Note that this means that once a firm is categorized as young (or old) in the pre bond IPO period, it retains this classification into the post-IPO period. This allows us to examine differences in the response to the IPO by young and old firms. If a given factor does influence how a firm's cost of equity changes in response to its bond IPO, we would expect that the change in cost of equity would be significantly different for firms that are in the top quintile than for firms that are in the bottom quintile. For the purposes of these tests, the quintile that a firm is in is determined by the mean level of the factor in question over the year before the IPO ------ the firms in the top pre-IPO quintile are the same as the firms in the top post-IPO quintile.

Additionally, the sample is split into firms with an above and below median cost of equity in the year before their IPO, and the test described above is performed separately for each of these subsets. Cost of equity is highly positively correlated with a firm's risk profile, and it is possible that more and less risky firms will respond differently to the changes in monitoring, information asymmetry and free cash flow that a bond IPO brings.

4.2 Multivariate Tests

We conduct the multivariate tests to examine the incremental impact the bond IPO has on cost of equity after controlling for other influential factors. As a bond IPO has multiple effects on a firm, some of which will tend to increase cost of equity (such as increased leverage), and

some of which will tend to reduce cost of equity (such as a reduction in managerial agency conflicts due to lower free cash flow), it is necessary to control for these factors to get a clean hypothesis test.

In the multivariate tests, we regress the firm's cost of equity on control variables, an indicator variable for whether a data point is from the pre-IPO period or post-IPO period, the variable of interest, and the variable of interest interacted with the post-IPO indicator variable, and in some cases, the variable of interest interacted with the post-IPO indicator and a measure of corporate governance. As firms naturally undergo changes that will systematically affect their cost of equity as they mature (such as increased leverage, better access to credit markets, larger size, and lower informational asymmetry), these regressions only include data points that are within 1 year of the firm's bond IPO.

4.2.1 Multivariate Tests for Hypothesis 1

Hypothesis 1 proposes that a firm's cost of equity will rise in the aftermath of a bond IPO. This hypothesis simply asserts that Modigliani-Miller Proposition 2 holds, and the increased leverage due to the bond IPO will lead to a higher cost of equity. The test of this hypothesis is to regress cost of equity on control variables and an indicator for a data point being in the post-IPO period.

Equation 2.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times is.post.ipo_{i,t} + \varepsilon_{i,t}$$

If Hypothesis 1 holds, β2 will be significantly higher than zero, indicating that the cost of equity rises after the bond IPO, as classical finance theory suggests it should.

4.2.2 Multivariate Tests for Hypothesis 2

Hypothesis 2 proposes that firms with high information asymmetry will see less of a rise in their cost of equity after a bond IPO, as they will gain more from the reduction in asymmetry that the IPO brings about. The test of this hypothesis is to regress the cost of equity on control variables, a measure of information asymmetry, and the measure of information asymmetry interacted with an indicator variable for a data-point being in the post-IPO period. The information asymmetry variables are constructed so that a high value of "*info.symmetry"* indicates a low information asymmetry.

Equation 3.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times info.symmetry_{i,t} + \beta_3 \times info.symmetry_{i,t} \times is.post.ipo_{i,t} + \varepsilon_{i,t}$$

If Hypothesis 2 holds, the coefficient on β3 will be positive, implying that the cost of equity increases more as a result of the bond IPO for low pre bond IPO information asymmetry firms relative to high pre bond IPO information asymmetry firms. In other words, a positive β3 indicates that firms with relatively high pre bond IPO information asymmetry see less of an increase in their cost of equity as a result of the bond IPO than that of firms with relatively low pre bond IPO information asymmetry.

4.2.3 Multivariate Tests for Hypothesis 3

Hypothesis 3 states that firms with high free cash flow, or few useful ways to employ excess cash, should see less of a rise in their cost of equity after the bond IPO due to the disciplining mechanism of debt. The test of this hypothesis is to regress the cost of equity on

control variables, the firm's free cash flow in the year before the bond IPO, and the mean pre-IPO cash flow with an indicator variable for a data point being in the post-IPO period.

Equation 4.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times mean\ pre\ IPO\ FCF_i + \beta_3 \times mean\ pre\ IPO\ FCF_i \times is.post.ipo_{i,t} + \varepsilon_{i,t}$$

If Hypothesis 3 holds, the coefficient on β3 will be negative and statistically significant, implying that the cost of equity increases less as a result of the bond IPO for firms with high free cash flow.

4.2.4 Multivariate Tests of Hypothesis 4

Hypothesis 4 has two parts. The first part states that firms with poor corporate governance should see more or a rise in their cost of equity around their bond IPO, as being moved back in absolute priority is more damaging for the shareholders in a poorly governed firm than for those in a well run firm. The second part states that poor corporate governance will increase the effect of information asymmetry and free cash flow on the cost of equity. If a firm is generally well run, shareholders will be more inclined to trust management. If shareholders are less concerned that management is going to act against their interests, they will see less value in taking action to prevent management from doing so. If they trust management to only invest in projects that will increase their wealth, and do not suspect that management is trying to conceal important information from them, they will not see reducing free cash flow or gaining more information about the inner workings of the firm as substantially reducing the risk they take by investing in the firm. This means that for well governed firms, the reductions in free

cash flow and information asymmetry around the bond IPO will not have as large an impact on the cost of equity.

The first part of Hypothesis 4 can be tested in much the same way as the previous three hypotheses, by regressing the cost of equity on control variables, the firm's E-Index score, and the E-Index score interacted with an indicator variable for a data point being in the post-IPO period.

Equation 6.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times E.index_{i,t} + \beta_3 \times E.index_{i,t} \times is.post.ipo_{i,t} + \varepsilon_{i,t}$$

If firms with poor governance (high E-Index) see more of an increase in their cost of equity after a bond IPO than well governed firms, the coefficient on β3 should be significantly positive.

Well governed firms should gain less from a reduction in information asymmetry, and so should see less benefit from the informational effects of a bond IPO. To capture this effect, the sample is split into firms with poor corporate governance in the pre-IPO period (mean E-Index of 4 or above), and firms with good corporate governance (mean E-Index of 2 or below), and the following regression was estimated separately for each of these subsets, leaving out firms with an E-Index of 3.

Equation 7.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times info.symmetry_{i,t} + \beta_3 \times info.symmetry_{i,t} \times is.post.ipo_{i,t} + +\varepsilon_{i,t}$$

A poorly governed firm should benefit from the reduction in information asymmetry associated with the bond IPO, even if they already have low information asymmetry. Hypothesis 4 suggests that the coefficient on β3 should be more negative for the poorly governed firms than for the well governed firms.

Free cash flow is seen as a problem by stockholders because it is easily misappropriated by managers. Free cash flow will be seen in a less negative light for firms that have adequate controls in place to ensure that this does not take place. This suggests that firms with good corporate governance will gain less of a benefit from the free cash flow management effects of a bond IPO. In the same way as for information asymmetry, firms were sorted into high and low E-Index groups, and the following regression was estimated separately for each of these subsets.

Equation 8.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times mean\ pre\ IPO\ FCF_i + \beta_3 \times mean\ pre\ IPO\ FCF_i \times is.post.ipo_{i,t} + \varepsilon_{i,t}$$

If Hypothesis 4 holds for free cash flow, we would expect that the coefficient on β3 should be more negative for the poorly governed firms than for the well governed firms.

5. Results

5.1 Summary Statistics (Full Sample)

Table 1 presents the summary statistics for the full sample. As expected, both the mean and the median debt to assets increase from the pre bond IPO period to the post bond IPO period, and the increase is highly significant. After the bond IPO, mean debt to assets went from 60.2%

to 64.5%, and median debt to assets went from 58.3% to 61.2%. Total assets of the firms increase as well, although the increase is not statistically significant. Mean free cash flow as a fraction of assets went from -6.72% to -4.3%. Median scaled free cash flow also increased, from -1.75% to -.1% Intangible assets scaled by total assets decrease after the bond IPO. Capital expenditure as a fraction of assets increased, though the increase was not statistically significant. Natural log of sales also increases significantly, with the mean rising from 5.99 to 6.08, and the median rising from 5.99 to 6.03. Institutional ownership decreased after the bond IPO, with the mean dropping from 65.5% to 63.6%, and median institutional ownership decreasing from 69.1% to 66.8%. Analyst following does not appear to change meaningfully after the bond IPO, with the mean number of analysts per firm dropping from 4.16 to 3.94 analysts, and the median remaining unchanged at 4. Mean dividend payments dropped from 0.33% of assets to 0.26% of assets. Free cash flow increased for both types firms.

5.2 Summary Statistics (Increased COE vs. Decreased COE)

Summary statistics were also computed separately for firms that saw a rise in their cost of equity and firms that saw a fall in their cost of equity. These results can be found in Table 2. These two subsets do not appear to have significantly different capital structures – both types of firms are about 60% debt before the IPO and 63% debt after the IPO. Firms that saw a rise in their cost of equity started larger and grew significantly from the year before their IPO to the year after, with a mean asset value of 7075 before their bond IPO and 8254 afterwards. The median size of these firms increases in a similar fashion from 3014 to 4042. Firms for whom the cost of equity decreased started smaller and do not appear to have grown significantly. These firms went from mean total pre-IPO assets of 2428 to mean post IPO assets of 2305, though the

drop is of marginal statistical significance. The median total asset value of firms that saw a reduction in cost of equity increases slightly from 1200 to 1233.

Mean free cash flow increased for both types of firms, with firms with an increased cost of equity increasing their free cash flow from -5% of assets to -2% of assets. Firms with a decreased cost of equity saw their free cash flow increase from about -0.8% of assets to about -0.1% of assets. Capital expenditure as a fraction of assets decreased for firms with an increased cost of equity, and decreased for firms with an increased cost of equity. Both subsets saw increased sales – mean log sales went from 6.4 to 6.6 for firms with an increased cost of equity and 5.7 to 5.8 for firms with a decreased cost of equity. This is to be expected – investors are likely to look more favorably on a bond issue when the proceeds are invested in a project that increases the firm's operational cash flows.

Mean analyst following does not appear to be meaningfully affected by the bond IPO for either subset – firms that saw a rise in their cost of equity have about 4.1 analysts following them both before and after the bond IPO, and firms whose cost of equity fell have about 4.3 analysts following them in both time periods.

5.3 Univariate Results

5.3.1 Univariate Results for Hypothesis 1

The univariate results show that among all the firms in the sample, the cost of equity went up for 49% of firms after the bond IPO, and it went down for 51% of firms. Contrary to the predictions of Modigliani and Miller's second proposition, the mean cost of equity decreased from 27.5% to 26.9% from the pre bond IPO period to the post bond IPO period. This change is marginally statistically significant. However, the median cost of equity rose slightly, from

18.5% to 18.7%. For the typical firm, a bond IPO leads to a slight increase in cost of equity, which is to be expected if a bond IPO increases leverage, but there are a significant number of firms that see a large drop in their cost of equity, which implies that for some firms, a bond IPO actually results in decrease in cost of equity. The Modigliani-Miller model of capital structure suggests that all else being equal, a firm's cost of equity should rise after a bond IPO, as its leverage will rise. These univariate results imply that there are a significant number of firms that deviate from this Modigilani-Miller result. This suggests that there may be important factors influencing the cost of equity effect of a bond IPO that are not accounted for in the M&M propositions. In the remainder of the results, we hope to provide evidence that it is the cross sectional variation in monitoring, information asymmetry, corporate governance, and the ability to cope with free cash flow that are the missing factors accounting for this puzzling result.

5.3.2 Univariate Results for Hypothesis 2 (Information Asymmetry)

Hypothesis 2 proposes that relatively high pre bond IPO information asymmetry firms should see less of an increase in their cost of equity, as their shareholders will place the most value on the information revealed about the firm during the bond IPO process.

The univariate results concerning Hypothesis 2 is presented in Table 3. The results show that firms that lacked a credit rating before their bond IPO experience a large drop in their cost of equity (Table 3). Before the IPO, their mean cost of equity is 35%, and after the IPO, it falls to 24.2%. Firms that had already obtained a bond rating start with a lower mean cost of equity (26.7%), but post IPO, their cost of equity actually rises to 27.7%. All of these changes are highly statistically significant.

Firms that did not previously have a bond rating, but receive a speculative rating see their mean cost of equity fall a significant amount from 25.3% to 23.4%, while firms with an investment grade rating have a 35.1% mean cost of equity before the IPO, and a 35.6% mean cost of equity after the IPO, a change that is not statistically significant. It is possible that investors already had an idea that the speculative grade firms were more prone to default, and so were more interested in gaining additional information about them than they were in reducing the uncertainty about the firms that received an investment grade rating, which presumably appeared less prone to financial distress even before their rating was assigned. Firms in the bottom quintile of age (the youngest firms) before the IPO see a drop in mean cost of equity from 25.4% to 22.9%, where as for the oldest firms, the mean cost of equity goes up from 39.9% to 40.9%.

The results for both credit rating and firm age suggest that firms starting with high information asymmetry see a drop in their cost of equity after the bond IPO, and that firms with low information asymmetry see an increase in their cost of equity. These results suggest that firms with low pre bond IPO information asymmetry do not gain the same benefits from a bond IPO as firms with high pre bond information asymmetry, and that Hypothesis 2 holds.

5.3.3 Univariate Results for Hypothesis 3 (Free Cash Flow)

Hypothesis 3 proposes that firms with high free cash flow should see less of an increase in their cost of equity. The results of the univariate tests show that firms in the top quintile of pre bond IPO free cash flow as a percentage of assets experience a significantly larger drop in cost of equity than firms in the bottom quintile of pre bond IPO free cash flow (Table 3). Specifically, for firms with high pre bond IPO free cash flow, the cost of equity went from 25.2% to 19.5%, and the change was highly statistically significant. on the other hand, firms with low pre bond

IPO free cash flow had a mean cost of equity of 22.6% pre-IPO, and 21.5% post-IPO, and this change is not statistically significant.

Firms that were in the top quintile for capital expenditure in the year before their bond IPO saw virtually no change in their mean cost of equity ----- it is 24.2% both before and after the bond IPO. However, firms in the bottom quintile of capital expenditure saw their cost of equity rise from 22% to 26.7% (Table 3). All of these results point to firms with a free cash flow problem gaining more of a benefit in terms of cost of equity from a bond IPO, and provide evidence for Hypothesis 3.

Firms in the bottom quintile of asset-scaled dividend payments in the year before the IPO saw their average cost of equity increase from 16.8% to 18.6%. Firms in the top quintile saw their average cost of equity drop from 53.0% to 50.3%

These results provide some support for Hypothesis 3. Firms with high free cash flow, or no established way of usefully employing free cash flow, saw significantly smaller increases in their cost of equity.

5.3.4 Univariate Results for Hypothesis 4

The first part of Hypothesis 4 posits that all else being equal, firms with poor corporate governance should see more of a rise (or less of a drop) in their cost of equity in the wake of a bond IPO. The second part, that poor corporate governance will also increase the value shareholders place on the reductions in information asymmetry and free cash flow associated with the bond IPO is not easy to test in a univariate manner; therefore, we only examine the first part of Hypothesis 4 in the univariate tests.

Surprisingly, firms in the top quintile of E-Index scores (the most poorly governed firms) have a significantly lower cost of equity than those in the bottom quintile (well governed firms), both before and after the bond IPO (Table 3). Firms with a high E-Index (poorly governed firms) see a drop in their cost of equity, with the most poorly governed firms going from a mean 18.2% to 16.9% cost of equity. Firms with a low E-Index (well governed firms) see an increase in their cost of equity, with a mean pre-IPO cost of equity of 22.9% and a mean post-IPO cost of equity of 26.5%.

5.4 Multivariate Results

5.4.1 Multivariate Results for Hypothesis 1

Hypothesis 1 simply states that firms will see a rise in their cost of equity after their bond IPO. The multivariate test of this hypothesis is to regress the cost of equity against an indicator variable for the post IPO period. Table 4 reports the results of this regression. In Model 1, the only independent variable is an indicator variable for a data point being in the post bond IPO period. Under this specification, the coefficient on the post bond IPO indicator variable is -0.006, and is statistically significant at a 10% level, suggesting that on average, firms will see a slight decrease in their cost of equity after undergoing a bond IPO. In Model 2, we add the firm's debt to asset ratio as a control. Under this specification, the coefficient on the indicator variable increases to -0.004, and it is no longer statistically significant. In Model 3, we add a full suite of control variables. Under this specification, the coefficient on the time period indicator variable is 0.007, and is statistically significant at a 10% level, suggesting that once we control for the other changes a firm undergoes around the bond IPO, the effect is to increase their cost of equity.

These results indicate that unconditionally, a bond IPO causes a firm's cost of equity to decrease slightly if one does not control for the other changes a firm undergoes as part of the process, but once other factors are controlled for, the bond IPO does cause a substantial increase in the firm's cost of equity. This suggests that while the increased leverage associated with a bond IPO does tend to increase the cost of equity, and the classic Modigilani-Miller result does hold, the other changes the firm undergoes around this event can counteract this effect.

5.4.2 Multivariate Results for Hypothesis 2 (Information Asymmetry)

Hypothesis 2 posits that firms with high information asymmetry should see less of an increase in their cost of equity after their bond IPO. The multivariate test of Hypothesis 2 is to interact a measure of information asymmetry with an indicator variable for the post-IPO period, and regress this, along with control variables, on the firm's cost of equity. Table 5 reports the results of these tests.

In Model 1, the measure of information asymmetry used is the natural log of firm age. In this specification, the coefficient on the interaction term is 0.009, and is statistically significant at the 1% level. The coefficient on the un-interacted log of firm age is 0.036, and is also significant at the 1% level. This suggests that the older a firm is, the more its cost of equity tends to rise after its bond IPO.

In Model 2, logged firm age is replaced by an indicator variable that is 1 for firms that had an S&P long term credit rating previous to their bond IPO, and 0 for firms that did not have an S&P long term credit rating before their bond IPO. As with Model 1, the coefficient on the interaction term is 0.087, and is significant at a 1% level. Interestingly, the coefficient on the unconditional pre-rated indicator variable for Model 2 is -0.080. The fact that the two

coefficients are very close in magnitude, and opposite in sign suggests that having a credit rating before the IPO has little lasting impact, and the differences between a firm that already had a rating and a firm that got one during the IPO largely disappear once both firms have a rating. The results from Models 1 and 2 both confirm the findings of the univariate tests: The bond IPO has a less adverse effect on the cost of equity of firms with relatively high information asymmetry.

5.4.3 Multivariate Results for Hypothesis 3 (Free Cash Flow)

Hypothesis 3 states that firms with high free cash flow, or few methods for dealing with free cash flow will see less of an increase in their cost of equity after the bond IPO. The multivariate test of Hypothesis 3 is to interact the firm's pre-IPO free cash flow as a proportion of assets, or a measure of the firm's ability to absorb free cash flow, with an indicator variable for the post-IPO period, and regress this, along with control variables, on the firm's cost of equity. Table 6 reports the results of these regressions.

In Model 1, the variable of interest is mean pre-IPO free cash flow as a fraction of assets. The coefficient on free cash flow interacted with an indicator variable for a data point being in the post-IPO period is -0.054, and is statistically significant at the 5% level. The unconditional coefficient on mean pre-IPO free cash flow is 0.188, and is significant at a 1% level. This suggests that while firms with high free cash flow do have a higher cost of equity overall, they will typically see less of an increase (or a fall) in their cost of equity when they undergo a bond IPO.

Firms with many intangible assets tend to have good investment prospects, and will, in general, have less to fear from free cash flow. This suggests that they, like firms with low free cash flow, will have less to gain from a bond IPO. In Model 2, free cash flow is replaced with the

proportion of the firm's assets that are intangible. We find that the unconditional coefficient on asset intangibility is -0.138, and is significant at a 1% level. This is as expected – firms that have positive NPV projects available to them should be seen as a better investment. The coefficient on asset intangibility interacted with a post-IPO time period indicator is 0.077, and is significant at a 1% level. This implies that firms with many good investment opportunities will see less of a reduction (or an increase) in their cost of equity around a bond IPO, as they have little to gain from the reduction in free cash flow it brings.

Firms that pay dividends have a pre-established method of dealing with free cash flow, and would likely benefit less from the reduction in free cash flow brought about by the bond IPO. Model 3 provides a test of this by regressing a firm's mean pre-IPO dividends, and pre IPO dividends interacted with the post-IPO indicator variable on the firm's cost of equity. The coefficient on the unconditional dividend variable is 19.393, and is significant at a 1% level. The coefficient on the dividend variable interacted with the time period indicator variable is 9.182. This suggests that firms that already pay dividends see an increase (or less of a decrease) in their cost of equity around a bond IPO.

Together the results presented in Table 6 suggest that firms with low free cash flow, or a pre established method of dealing with free cash flow problems will see more of a rise (or less of a drop) in their cost of equity after the bond IPO than firms with high free cash flow, or no established method to deal with it.

5.4.4 Multivariate Results for Hypothesis 4 (Corporate Governance)

Hypothesis 4 has two parts. The first states that firms with poor corporate governance should see less cost of equity benefit from a bond IPO, as shareholders will be more concerned about their lower priority in bankruptcy if they see management as prone to taking advantage of them.

This hypothesis is tested by regressing estimated cost of equity on control variables and an indicator variable for a data point being in the post IPO period. This regression is done separately for firms with high (4 and above) and low (2 and below) pre bond IPO E-index. The results for this regression can be found in Table 7, Model 1. We find that the coefficient on the post-IPO indicator is significantly higher for the high E-Index subset than the low E-Index subset, indicating that poorly governed firms see more of an increase in their cost of equity after a bond IPO. As we would expect, shareholders see firms that are poorly governed as more risky, and demand a premium for investing in them. This premium is higher after the bond IPO, which provides evidence that the first part of Hypothesis 4 does hold.

The second part of Hypothesis 4 states that poor corporate governance will increase the importance of information asymmetry and free cash flow, and that the reduction in information asymmetry and free cash flow from the bond IPO will be seen as more valuable to shareholders when the firm is poorly governed. This hypothesis is tested by interacting a measure of information asymmetry or free cash flow with post-IPO indicator variable. This regression is estimated separately for firms with high and low pre bond IPO E-Index. If poor corporate governance does increase the importance of the reduction in information asymmetry and free cash flow that the IPO brings, the coefficient on the interaction term should be significantly smaller (more negative) for the poor corporate governance subset. Results for these regressions can be found in Tables 7 and 8.

When we examine the results for firm age, we find that poorly governed firms (high E-Index) have a significantly lower coefficient on the interaction between the log age of the firm and the indicator for post-IPO period (Table 7, Model 1). Older firms tend to have lower information asymmetry than young firms, so this result suggests that for a given level of information asymmetry, a poorly governed firm will see more of a cost of equity benefit from a bond IPO than a well governed firm. When the proportion of the firm's common equity held by institutional investors is used in place of firm age, we find a similar result. The coefficient on the interaction term is statistically insignificant for well governed firms, and negative and highly significant for poorly governed firms. These results also suggest that the reduction in information asymmetry is more beneficial to poorly governed firms that well governed firms.

Performing this test with the firm's pre-IPO free cash flow as a fraction of assets as the variable of interest likewise provides support for Hypothesis 4. While the coefficient on the interaction term is negative and significant for both well and poorly governed firms, it is significantly more negative for poorly governed firms. For a given level of free cash flow, a poorly governed firm will see more cost of equity benefit from a bond IPO than a well governed firm.

5.4.5 Sample Selection Issues

One strong argument against our results is the possibility that our results are not driven by changes these firms are undergoing due to an IPO, but are changes that the sort of firms in our sample would undergo whether or not they underwent an IPO. Was this the case, we would expect similar firms that do not undergo an IPO to undergo a similar transformation in their cost of equity at the same stage in their lifecycle. To control for this possibility, we repeated many of the multivariate tests performed above on a sample that included firms picked to resemble the

IPO firms in our sample on the basis of age, leverage, and industry, with the addition of an indicator variable for whether or not the firm in question ever underwent an IPO.

Equation 9.

$$COE_{i,t} = \alpha + \beta_1 \times controls_{i,t} + \beta_2 \times variable\ of\ interest_{i,t} + \beta_3 \times variable\ of\ interest_{i,t} \times is.post.ipo_{i,t} + \beta_4 \times is.ipo.firm_i + \varepsilon_{i,t}$$

If the results are driven by the fact that our original sample contains only firms that did actually undergo an IPO, we would expect the coefficient on β4 to be statistically significant, and the post-IPO indicator to lose its significance.

For each IPO firm in our sample, we found a non-IPO firm with the same age in years as the IPO firm at the time of the IPO and in the same industry (as defined by 2 digit SIC codes) with the most similar debt to assets ratio. We were able to find 207 firms that met these criteria that we were able to estimate the cost of equity for, and added data points for these firms for the year before and after they would have undergone their IPO, had they done so at the same age as their comparable firm.

We preformed this test for the presence of a bond rating before the IPO (for non-IPO firms, this was defined as having a bond rating in the first year of their sample period), free cash flow, intangible assets, dividends, and firm age. In all cases, the coefficient on the IPO firm indicator was statistically insignificant.

We found that for age, the presence of a bond rating, and dividends, our results were substantially unaltered. The coefficient on the IPO firm indicator variable was not significant, and the coefficients on the post-IPO interaction variable were statistically significant at a 5%

level and of the same sign as in the tests performed with only IPO firms. For free cash flow and dividends, the coefficients were of the correct sign, but not statistically significant.

These results suggest that our results are not entirely driven by the choice of firms in our sample, and that these firms would not have seen the same changes in their cost of equity had they not undergone a bond IPO.

6. Conclusion

In this paper, we examine the effect of the bond IPO on a firm's cost of equity. We find that while the classic Modigliani-Miller result does hold for bond IPOs, and the increased leverage that accompanies a bond IPO does tend to increase the firm's cost of equity, this is not the only aspect of the bond IPO that affects cost of equity, and in many cases, it is not the dominant effect. The bond IPO also reduces information asymmetry and free cash flow. For firms for whom these are significant risk factors for shareholders, the reduction in risk from lower free cash flow and information asymmetry can offset the increase in risk from the lower priority in bankruptcy. Additionally, we find that poorly governed firms, whose shareholders have good reason to worry that management will misuse firm resources, are more likely to benefit from the free cash flow reducing effects of the bond IPO.

This avenue of research may allow managers and shareholders to better decide whether or not a bond IPO will benefit the firm and its shareholders. By examining the impact of factors not accounted for in Modigliani and Miller's seminal work on debt and cost of capital, we show that for certain kinds of firms, a bond IPO can actually reduce the riskiness of their equity.

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Figure 1. Mean Debt to Assets plotted in event time

Mean debt to assets for all firms, plotted against days since (or to) the firm's bond IPO. Each data point represents the mean debt to assets ratio for all data points in a given 30 day period – the first point in this figure represents the mean of all debt to assets values in the sample that are between 365 and 336 days before the relevant firm's IPO, the second is the mean of all datapoints on the interval [-335, -306), et cetera. Using a 10 or 15 day period instead of a 30 day period does not meaningfully change the results.

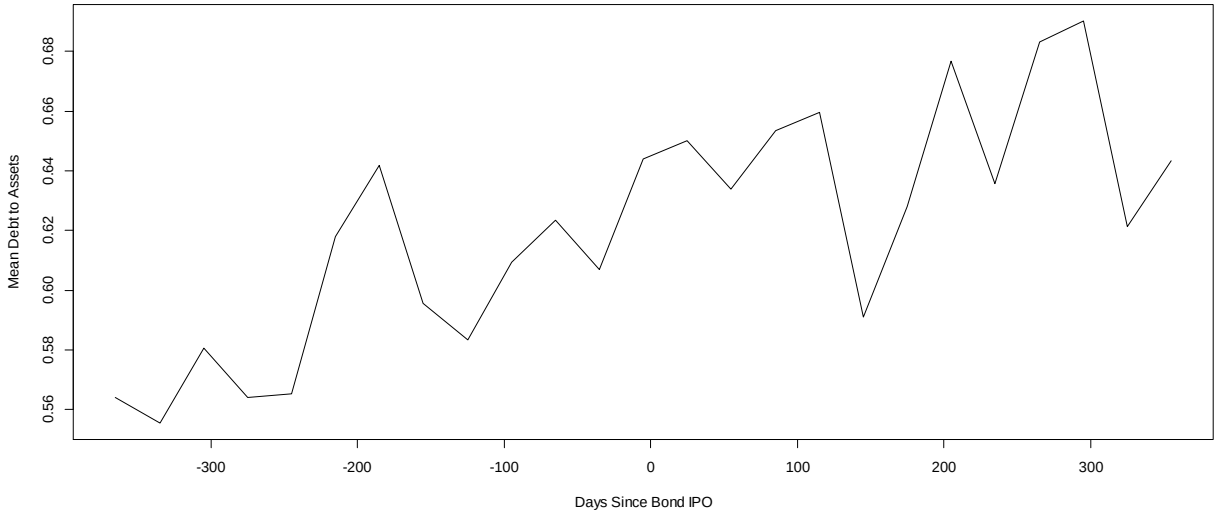

Table 1. Summary statistics, before and after bond IPO. This table gives the mean, median and variance for the estimated cost of equity and important independent variables in both the pre and post IPO periods. A data point is in the pre-IPO period if the relevant firm has not yet undergone a bond IPO, and post-IPO otherwise. For each of the variables, the mean and median were calculated separately for pre-IPO and post-IPO data points. The T Test entry provides the pval for a 2 sided unequal variance T test comparing the mean value of the relevant variable for all data points in the pre-IPO period to the mean value of the relevant variable for all data points in the post-IPO period.

Cost Of Equity	Mean	Median	Variance
Pre-IPO	0.275243	0.185155	0.045492
Post-IPO	0.268770	0.187101	0.044362
T test	0.088730		
Total Assets	Mean	Median	Variance
Pre-IPO	4628.362952	1874.071	74533410
Post-IPO	4856.237676	1772.361	72025436
T test	0.138178		
Asset-Scaled Free Cash Flow	Mean	Median	Variance
Pre-IPO	-0.067153	-0.01751	0.050543
Post-IPO	-0.042969	-0.001	2.89E-02
T test	0.000000		
Debt To Assets	Mean	Median	Variance
Pre-IPO	0.601501	0.582634	0.03409
Post-IPO	0.644885	0.611573	0.036154
T test	0.000000		
Asset-Scaled Intangible Assets	Mean	Median	Variance
Pre-IPO	0.229722	0.15769	0.055609
Post-IPO	0.207293	0.131279	0.044843
T test	0.000026		
Asset-Scaled CAPX	Mean	Median	Variance
Pre-IPO	0.029254	0.013139	0.001788
Post-IPO	0.029421	0.014762	0.002327
T test	0.839021		
Percent Institutional Ownership	Mean	Median	Variance
Pre-IPO	0.655430	0.691395	0.05825
Post-IPO	0.635544	0.668343	0.063078
T test	0.000008		
Number of Analysts	Mean	Median	Variance
Pre-IPO	4.161202	2	19.35571
Post-IPO	3.939299	2	16.50134
T test	0.003567		
Log Sales	Mean	Median	Variance
Pre-IPO	5.988167	5.988513	2.057678
Post-IPO	6.083360	6.03427	2.022779
T test	0.000204		
Asset-Scaled Dividends	Mean	Median	Variance
Pre-IPO	0.003252488	0	5.429702e-05
Post-IPO	0.002569141	0	2.611695e-05
T test	3.022e-09		

Table 2. Summary statistics, firms whose COE increased vs. firms whose COE decreased. This table gives mean and median values of cost of equity and important independent variables separately for firms whose cost of equity increased and decreased, in both the pre bond IPO period and the post bond IPO period. Firms were divided into those whose cost of equity increased after the IPO and those whose cost of equity decreased after the IPO. Mean and median levels for firm characteristics were calculated for these firms in both the pre IPO and post IPO period, and the mean of each characteristic for each subset (pre-IPO and decreased COE, post IPO and increased cost of equity, post-IPO and decreased cost of equity, post-IPO and increased cost of equity) was compared to that of other subsets with a 2 sided unequal variance T-test.

	Increased COE firms		Decreased COE firms		Pval for T-test		Pval for T-test	
	(195 of 397 firms)		(203 of 397 firms)		Inc vs. Dec. COE		Pre vs. post IPO	
	Pre IPO mean	Post IPO mean	Pre IPO mean	Post IPO mean	Pre IPO	Post IPO	Increased COE firms	Decreased COE firms
Cost of equity (mean)	0.259	0.328	0.296	0.234	0.000	0.000	0.000	0.000
Cost of equity (median)	0.184	0.219	0.192	0.171	NA	NA	NA	NA
Total assets (mean)	7074.958	8254.155	2428.132	2305.621	0.000	0.000	0.000	0.100
Total assets (median)	3014.350	4041.993	1200.217	1232.761	NA	NA	NA	NA
Asset-scaled free cash flow (mean)	-0.051	-0.020	-0.083	-0.059	0.000	0.000	0.000	0.004
Asset-scaled free cash flow (median)	-0.018	-0.002	-0.008	-0.001	NA	NA	NA	NA
Debt to assets (mean)	0.601	0.639	0.606	0.630	0.368	0.067	0.000	0.000
Debt to assets (median)	0.588	0.607	0.554	0.604	NA	NA	NA	NA
Intangible ratio (mean)	0.248	0.239	0.193	0.158	0.000	0.000	0.266	0.000
Intangible ratio (median)	0.158	0.168	0.144	0.063	NA	NA	NA	NA
Asset-scaled CAPX (mean)	0.029	0.025	0.028	0.037	0.331	0.000	0.000	0.000
Asset-scaled CAPX (median)	0.013	0.014	0.015	0.017	NA	NA	NA	NA
Percent institutional ownership (mean)	0.644	0.614	0.690	0.706	0.000	0.000	0.000	0.029
Percent institutional ownership (median)	0.676	0.641	0.781	0.823	NA	NA	NA	NA
Number of analysts (mean)	4.125	4.149	4.385	4.342	0.050	0.099	0.815	0.762
Number of analysts (median)	2.000	3.000	2.000	2.000	NA	NA	NA	NA
Log sales (mean)	6.399	6.611	5.676	5.753	0.000	0.000	0.000	0.027
Log sales (median)	6.172	6.557	5.779	5.876	NA	NA	NA	NA
Asset-scaled dividends (mean)	0.003	0.003	0.004	0.003	0.000	0.951	0.283	0.000
Asset-scaled dividends (median)	0.000	0.000	0.000	0.000	NA	NA	NA	NA

Table 3. Cost of equity, high and low quintiles of firm characteristics. This table compares pre IPO and post IPO cost of equity for firms in the top and bottom quintiles of important independent variables in the pre-IPO period. For each firm characteristic (such as analyst following), a firm is classified as "low" or "high", based on which quintile their pre IPO mean for this variable is in. For example, a firm whose pre-IPO mean analyst following was in the top quintile for all firms in the pre IPO period would be high analyst following, and a firm whose pre-IPO mean analyst following was in the bottom quintile for all firms in the pre IPO period would be low analyst following. Data points for firms that are neither low nor high for a particular attribute are omitted from this analysis for that attribute. Pvals are for 2 sided, unequal variance T tests.

	Pre IPO		Post IPO		Pre vs. Post IPO Pval		High vs. low COE Pval	
	Low quintile mean COE	High quintile mean COE	Low quintile mean COE	High quintile mean COE	Low quintile mean COE	High quintile mean COE	Pre IPO	Post IPO
Analyst following	0.242	0.290	0.241	0.194	0.968	0.000	0.001	0.000
Institutional Ownership	0.293	0.289	0.313	0.271	0.023	0.066	0.642	0.066
Had previous credit rating (Previously rated is high quintile, previously unrated is low quintile)	0.350	0.267	0.242	0.277	0.000	0.015	0.000	0.000
Investment vs. speculative rating (investment is high quintile, spec is low quintile)	0.253	0.352	0.235	0.356	0.000	0.693	0.000	0.000
Firm age	0.254	0.399	0.229	0.409	0.001	0.347	0.000	0.374
E-Index	0.229	0.182	0.265	0.169	0.012	0.042	0.000	0.042
Asset-scaled free cash flow	0.226	0.252	0.215	0.195	0.160	0.000	0.003	0.000
Asset-scaled CAPX	0.220	0.242	0.267	0.242	0.295	0.965	0.002	0.965
Asset-scaled dividends	0.168	0.530	0.186	0.503	0.000	0.002	0.000	0.002
Total assets	0.192	0.233	0.172	0.325	0.000	0.000	0.000	0.000
Debt to assets	0.249	0.274	0.241	0.267	0.284	0.430	0.002	0.430
Market to book	0.331	0.281	0.292	0.273	0.000	0.484	0.000	0.484

Table 4. Unconditional impact of bond IPO on estimated cost of equity. Dependent variable is estimated cost of equity. Each observation is the estimated cost of equity and independent variables for a single firm on a single date. Dataset only includes data points within one year on either side of a firm's bond IPO and covers the interval from 1982 to 2003. Model 1 includes only an intercept and an indicator variable for the data point being in the post-IPO period. Model 2 includes debt to assets to control for changes in the capital structure due to the bond IPO. Model 3 includes a full suite of control variables.

	1		2		3	
	Coefficient	Pval	Coefficient	Pval	Coefficient	Pval
Intercept	0.275	0.000	0.306	0.000	0.750	0.000
Post-IPO indicator	-0.006	0.089	-0.004	0.262	0.007	0.078
Natural log of total assets	NA	NA	NA	NA	0.097	0.000
Natural log of sales	NA	NA	NA	NA	-0.030	0.000
Percent institutional ownership	NA	NA	NA	NA	0.158	0.000
Natural log of market value of equity	NA	NA	NA	NA	-0.054	0.000
Natural log of firm age	NA	NA	NA	NA	-0.016	0.000
Debt to assets	NA	NA	-0.051	0.000	-0.008	0.399
Proportion of intangible assets	NA	NA	NA	NA	-0.100	0.000

Table 5. Impact of information asymmetry on changes in estimated cost of equity around bond IPO. Dependent variable is estimated cost of equity. Each observation is the estimated cost of equity and independent variables for a single firm on a single date. Dataset only includes data points within one year on either side of a firm's bond IPO and covers the interval from 1982 to 2003. Cost of equity estimates are regressed against control variables, an indicator variable for post-IPO period, variables proxying for information asymmetry, and the information asymmetry proxy interacted with the post-IPO indicator. Model 1 uses natural log of firm age in years as a proxy for information asymmetry. Model 2 uses whether a firm had a S&P long term credit rating prior to the bond IPO as a proxy for information asymmetry.

	Age (1)		Pre rated (2)	
	Coefficient	Pval	Coefficient	Pval
Intercept	0.401	0.000	0.431	0.000
Post-IPO indicator	-0.019	0.008	-0.080	0.000
Natural log of total assets	0.051	0.000	0.054	0.000
Natural log of sales	-0.020	0.000	-0.022	0.000
Percent institutional ownership	-0.088	0.000	-0.078	0.000
Natural log of market value of equity	-0.017	0.000	-0.017	0.000
Natural log of firm age	0.036	0.000	0.039	0.000
Debt to assets	-0.074	0.000	-0.059	0.000
Rated before IPO	NA	NA	-0.079	0.000
Post-IPO indicator x Natural log of firm age	0.009	0.006	NA	NA
Post-IPO indicator x Rated before IPO	NA	NA	0.087	0.000

Table 6. Impact of free cash flow and, dividends and investment opportunities on changes in estimated cost of equity around bond IPO. Dependent variable is estimated cost of equity. Each observation is the estimated cost of equity and independent variables for a single firm on a single date. Dataset only includes data points within one year on either side of a firm's bond IPO and covers the interval from 1982 to 2003. Cost of equity estimates are regressed against control variables, an indicator variable for post-IPO period, the variable of interest, and the variable of interest interacted with the post-IPO indicator. Model 1 measures the effect of pre-IPO free cash flow as a fraction of assets on changes in the cost of equity. Model 2 measures the effect of investment opportunity, with intangible assets proxying for investment opportunity. Model 3 measures the effect of pre bond IPO dividends as a fraction of assets on the changes in estimated cost of equity around the bond IPO

	Free Cash Flow (1)		Intangible assets (2)		Scaled dividends (3)	
	Coefficient	Pval	Coefficient	Pval	Coefficient	Pval
Intercept	0.253	0.000	0.742	0.000	0.279	0.000
Post-IPO indicator	0.001	0.825	-0.011	0.042	-0.019	0.000
Natural log of total assets	0.081	0.000	0.095	0.000	0.111	0.000
Natural log of sales	-0.054	0.000	-0.030	0.000	-0.046	0.000
Percent institutional ownership	-0.041	0.000	0.157	0.000	0.021	0.001
Natural log of market value of equity	-0.014	0.000	-0.053	0.000	-0.033	0.000
Natural log of firm age	0.028	0.000	-0.016	0.000	0.008	0.000
Debt to assets	-0.010	0.399	-0.007	0.509	0.058	0.000
Proportion of intangible assets	NA	NA	-0.138	0.000	NA	NA
Mean Pre IPO FCF as fraction of assets	0.188	0.000	NA	NA	NA	NA
CAPX as a fraction of assets	NA	NA	NA	NA	NA	NA
Post-IPO indicator x Mean Pre IPO FCF as fraction of assets	-0.054	0.012	NA	NA	NA	NA
Post-IPO indicator x CAPX as a fraction of assets	NA	NA	NA	NA	NA	NA
Post-IPO indicator x Proportion of intangible assets	NA	NA	0.077	0.000	NA	NA
Dividends as a fraction of assets	NA	NA	NA	NA	19.393	0.000
Post-IPO indicator x Dividends as a fraction of assets	NA	NA	NA	NA	9.182	0.000

Table 7. Impact of corporate governance on changes in estimated cost of equity around bond IPO, part 1. Dependent variable is estimated cost of equity. Each observation is the estimated cost of equity and independent variables for a single firm on a single date. Dataset only includes data points within one year on either side of a firm's bond IPO and covers the interval from 1982 to 2003. Low E Index regressions only include data points from firms with a mean E-Index of 2 or less in the pre-IPO period, High E Index regressions only include data points from firms with a mean E-Index of 4 or more in the pre-IPO period. Cost of equity estimates for one year before and after bond IPO are regressed against control variables, an indicator variable for post-IPO period, a variable of interest, and the variable of interest interacted with the time period indicator variable. Model 1 measures the effect of corporate governance alone. Model 2 measures how corporate governance changes the impact of firm age on changes in the cost of equity around a bond IPO. Model 3 measures how corporate governance changes the impact of institutional ownership on changes in the cost of equity around a bond IPO.

	No interaction (1)				Firm age (2)				Institutional ownership (3)			
	Low E Index firms		High E Index firms		Low E Index firms		High E Index firms		Low E Index firms		High E Index firms	
	Estimate	Pval	Estimate	Pval	Estimate	Pval	Estimate	Pval	Estimate	Pval	Estimate	Pval
Intercept	0.440	0.000	-0.519	0.000	0.441	0.000	-0.577	0.000	0.439	0.000	-0.608	0.000
Post-IPO indicator	0.020	0.007	0.118	0.000	-0.009	0.726	0.297	0.000	0.022	0.466	0.358	0.000
Natural log of total assets	0.077	0.000	0.180	0.000	0.076	0.000	0.160	0.000	0.077	0.000	0.198	0.000
Natural log of sales	-0.050	0.000	-0.277	0.000	-0.050	0.000	-0.281	0.000	-0.050	0.000	-0.279	0.000
Percent institutional ownership	0.093	0.000	-0.526	0.000	0.096	0.000	-0.564	0.000	0.094	0.001	-0.349	0.000
Natural log of market value of equity	-0.022	0.000	0.077	0.000	-0.021	0.000	0.085	0.000	-0.022	0.000	0.069	0.000
Natural log of firm age	-0.006	0.151	-0.003	0.681	-0.015	0.069	0.028	0.002	-0.006	0.152	-0.005	0.466
Debt to assets	-0.152	0.000	-0.259	0.000	-0.148	0.000	-0.239	0.000	-0.151	0.000	-0.242	0.000
Log age x Post-IPO indicator	NA	NA	NA	NA	0.012	0.215	-0.064	0.000	NA	NA	NA	NA
Insitutional ownership x Post-IPO indicator	NA	NA	NA	NA	NA	NA	NA	NA	-0.002	0.948	-0.333	0.000

Table 8. Impact of corporate governance on changes in estimated cost of equity around bond IPO, part 1. Dependent variable is estimated cost of equity. Each observation is the estimated cost of equity and independent variables for a single firm on a single date. Dataset only includes data points within one year on either side of a firm's bond IPO and covers the interval from 1982 to 2003. Low E Index regressions only include data points from firms with a mean E-Index of 2 or less in the pre-IPO period, High E Index regressions only include data points from firms with a mean E-Index of 4 or more in the pre-IPO period. Cost of equity estimates for one year before and after bond IPO are regressed against control variables, an indicator variable for post-IPO period, a variable of interest, and the variable of interest interacted with the time period indicator variable. Model 1 measures how corporate governance changes the impact of analyst following on changes in the cost of equity around a bond IPO. Model 2 measures how corporate governance changes the impact of free cash flow on changes in the cost of equity around a bond IPO.

	Analyst following (1)				Scaled free cash flow (2)			
	Low E Index firms		High E Index firms		Low E Index firms		High E Index firms	
	Estimate	Pval	Estimate	Pval	Estimate	Pval	Estimate	Pval
Intercept	0.453	0.000	-0.561	0.000	0.648	0.000	-1.334	0.000
Post-IPO indicator	-0.010	0.357	0.105	0.000	0.018	0.012	0.149	0.000
Natural log of total assets	0.078	0.000	0.186	0.000	0.080	0.000	0.099	0.000
Natural log of sales	-0.052	0.000	-0.278	0.000	-0.052	0.000	-0.156	0.000
Percent institutional ownership	0.094	0.000	-0.494	0.000	0.062	0.003	-0.412	0.000
Natural log of market value of equity	-0.022	0.000	0.076	0.000	-0.033	0.000	0.100	0.000
Natural log of firm age	-0.006	0.194	0.003	0.623	0.004	0.309	0.001	0.861
Debt to assets	-0.152	0.000	-0.252	0.000	-0.149	0.000	-0.107	0.001
Number of analysts	-0.002	0.147	-0.006	0.000	NA	NA	NA	NA
Number of analysts x Post-IPO indicator	0.006	0.000	0.002	0.383	NA	NA	NA	NA
Asset-scaled FCF	NA	NA	NA	NA	-0.124	0.029	-0.825	0.000
Asset-scaled FCF x Post-IPO indicator	NA	NA	NA	NA	0.714	0.000	-0.299	0.001

Table 9. Variation in proposed predictors of cost of equity change in pre bond IPO period. This table gives the mean, median, minimum, maximum, and variance for variables theory suggests should influence how a firm's cost of equity responds to a bond IPO. Tested variables are the firm's E-Index (high E index means the firm has many anti-shareholder provisions in its charter), proportion of a firm's assets that are intangible, the firm's age in years, the firm's free cash flow, and the firm's dividend payments as a fraction of assets.

	Mean	Median	Minimum	Maximum	Variance
E Index	2.561	3.000	0.000	5.000	1.733
Proportion of intangible assets	0.230	0.158	0.000	0.826	0.056
Firm age in years	12.867	11.000	1.000	43.000	113.150
Free cash flow as a fraction of assets	-0.067	-0.018	-3.735	0.543	0.051
Dividends as a fraction of assets	0.003	0.000	0.000	0.104	0.000

Appendix 1. Variable construction

Variable	Formula	Source
Post-IPO indicator	Date is later than date of first bond issue in Mergent FISD	Mergent FISD
Natural log of total assets	Natural log of quarterly total assets	Compustat
Natural log of sales	Natural log of quarterly sales	Compustat
Percent institutional ownership	Shares held by institutional investors / total shares outstanding	IBES
Natural log of market value of equity	Natural log of market value of equity	Compustat
Natural log of firm age	Years since first appearance in Compustat	Compustat
Debt to assets	Total liabilities / total assets	Compustat
Proportion of intangible assets	Intangible assets / total assets	Compustat
fcf.scaled	(Operating cashflow -Investing Cashflow)/total assets	Compustat
Mean Pre IPO FCF as fraction of assets	Mean of fcf.scaled in the year before the bond IPO	NA
Rated before IPO	Had a S&P Longterm credit rating before bond IPO date	Compustat
CAPX as a fraction of assets	Quarterly CAPX / total assets	Compustat
num.analysts	Number of analysts following the stock	IBES
div.scaled	Dividend payment/total assets	
delta.leverage	Mean post-IPO debt to assets – mean pre-IPO debt to assets	