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Information asymmetry, monitoring, and the placement structure of corporate debt[1]

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Abstract

We empirically examine the impact of flotation costs, agency conflicts, regulation, and information asymmetries on a firm's mix between public and private debt. Results indicate that firms with larger issue sizes exploit the scale economies in flotation costs of public debt. Firms with higher contracting costs due to moral hazard have higher proportions of private debt. There is only limited support for the adverse selection hypothesis. We find little evidence that firms with favorable private information about future profitability choose more private debt. However, those firms with favorable information about future profitability that also operate under greater information asymmetry rely more on private debt.

JEL classification: G30; G32

Keywords: Debt financing; Monitoring; Moral hazard; Adverse selection; Capital structure

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1. Introduction

Several prior studies in corporate finance have analyzed the cross-sectional variation in financing choices. While the first studies in this area limited their attention to the choice between issuing debt and equity, more recently researchers have examined the cross-sectional variation in other important aspects of financing choice such as maturity structure, priority structure, and placement choice. For instance, Barclay and Smith (1995a), Guedes and Opler (1996), and Hoven-Stohs and Mauer (1996) empirically study the determinants of the maturity structure of corporate debt, and Barclay and Smith (1995b) study the factors that affect the priority structure of different corporate claims. We extend this line of research by focusing on the determinants of a firm's debt placement structure. While many theoretical studies yield hypotheses about what factors drive firms' debt placement structure, these hypotheses have not been tested empirically.[2] Our research fills this gap.

Privately placed debt is one of the largest sources of long-term funds for U.S. corporations.[3] Most lenders in the private placement market are institutions such as commercial banks and life insurance companies that specialize in performing comprehensive credit evaluations before a debt issue and in monitoring firm performance after a debt issue. Privately placed debt is perhaps the most important source of funds for small firms whose access to public markets is limited by the high flotation and other transaction costs associated with public debt issues. It is therefore not surprising that small, less well-known companies that are subject to severe information problems gravitate to private lenders. Blackwell and Kidwell (1988) and Carey et al. (1993) find that private debt is also an important financing source for large, well-known firms that have widely held and publicly traded securities. This suggests that in comparison to public debt, private debt may offer benefits other than just lower issuance costs.

Using data on privately placed and publicly issued debt for a sample of 297 publicly traded firms over the time period 1987–1993, we empirically examine why many firms borrow in both debt markets and what determines the placement mix they select. Since our aim is to examine why firms with access to public debt markets choose to finance through private sources, our sample includes only firms that are likely to have access to both private and public debt markets,

[2] Some examples of theoretical studies on debt placement include Diamond (1991), Rajan (1992), Besanko and Kanatas (1993), Chemmanur and Fulghieri (1994), and Carey and Rosen (1997).

[3] Carey et al. (1993) estimate that at the end of 1992 total privately placed debt was $819 billion, which is more than 50 percent of all long-term U.S. corporate debt outstanding. This classification of private debt includes bank loans and other debt that was privately placed with or without the help of intermediate agents.

and excludes very small firms that are likely to have no access to the public debt markets. Our measure of placement structure is the fraction of a firm's total long-term debt that is privately placed. Our objective is to study the impact of flotation costs, agency conflicts, regulation, and information asymmetries on a firm's debt placement structure.[4]

We find that the flotation cost of public debt issues explains a sizable part of the cross-sectional variation in placement structure. Larger firms and firms with larger average issue sizes exploit the scale economies in issuance costs of public debt, and so have lower proportions of private debt. Conditioned on firm size, we find that firms with greater debt-related moral hazard problems use higher proportions of private debt. This is consistent with the view that the greater monitoring and the more restrictive covenants in privately placed debt mitigate the agency costs of debt. In particular, consistent with an implication in Myers (1977), we find that firms with more growth options benefit more from the monitoring associated with privately placed debt. These results are further affirmed by the finding that regulated firms, that is firms with alternative monitoring mechanisms that control their discretion over operating and investment decisions, have lower proportions of private debt.

Our evidence provides only limited support for the view that private debt mitigates the contracting costs due to adverse selection. In the context of adverse selection, the contracting costs hypothesis argues that if private lenders are better informed than public lenders, then younger firms and firms with greater potential information asymmetries will issue more private debt. Our evidence supports this hypothesis.[5] The adverse selection hypothesis also argues that if private lenders are better informed than public lenders, then firms that bear the cost of adverse selection, such as firms with favorable private information about their value and future earnings, will have more private debt. Our empirical evidence is not consistent with this prediction. However, evidence does suggest that those firms with favorable information about their value and future earnings that are *also* subject to a high degree of information asymmetry use more private debt.

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[4] Easterwood and Kadapakkam (1991) also examine a firm's choice between public and private debt. However, they focus on transaction costs and leverage related costs, and do not examine the impact of monitoring, regulation, or information asymmetry on a firm's debt placement decision. Houston and James (1996) analyze the mix between bank debt and public debt to examine the importance of information monopoly of banks on the borrowing decisions of firms. They focus on the hold-up problem that arises when a firm is reliant on a single bank for its financing needs (Rajan, 1992) and the impact of this problem on the firm's borrowing choice.

[5] Consistent with Blackwell and Kidwell (1988), we also find that firms with only private debt are significantly younger and have higher levels of information asymmetry than firms with some public debt in their capital structure.

The remainder of the paper is organized as follows. In Section 2, we discuss the theories and hypotheses on the determinants of firms' borrowing structure. In Section 3, we describe our data, and the variables used to proxy the theoretical constructs. In Section 4 we present the empirical results. Section 5 contains concluding comments.

2. The theory of debt placement structure

Although most theoretical studies on the choice between privately placed and publicly issued debt have primarily sought to explain the stylized facts about the stock market's differential reaction to private and public debt issues, they also contain implications about the mix of borrowing that firms undertake.[6] We classify these theories into four categories: (i) flotation costs, (ii) moral hazard, (iii) regulation, and (iv) adverse selection. In this section, we summarize the hypotheses that emerge from these theories.

2.1. Flotation costs

Public issues of debt securities are typically associated with flotation costs that include investment banker fees, filing and legal fees, and other transaction costs. Bhagat and Frost (1986), Smith (1986), and Blackwell and Kidwell (1988) provide evidence that issuance costs contain a *fixed* component, which is larger for public issues than for private placements of debt. For instance, as Blackwell and Kidwell (1988) argue, legal fees, accountants' fees, and trustees' fees are higher in public issues because SEC registration, certified financial statements, and bond counsel's opinion are required in public issues but not in private placements. Public issues are therefore associated with greater economies of scale. Carey et al. (1993) document that public issues are cost-effective only above the $100 million mark, while bank debt and non-bank private placements are cost-effective even for smaller issues. This suggests that small firms and other firms that on average have smaller issues will find the public debt markets to be cost ineffective and will choose private financing options. Therefore, we expect smaller firms and firms with smaller average debt issue sizes to have higher proportions of privately placed debt.

[6] James (1987) documents the stock price reaction to debt placement choice. He reports a negative reaction to the announcement of public debt issues, but a positive reaction to the announcement of bank loans. Preece and Mullineaux (1994) and Billet et al. (1995) document a positive stock price reaction even to *non-bank private* debt placement announcements. In fact, they find no statistical difference between the reactions to bank and non-bank private debt placements.

2.2. Contracting costs due to moral hazard

The two moral hazard problems that affect a firm's debt placement structure are asset substitution and underinvestment. The asset substitution problem arises due to the adverse incentives of limited liability. Jensen and Meckling (1976) argue that shareholders have an incentive to undertake riskier projects, because they have unbounded upside potential for future cash flows but face only bounded downside potential due to limited liability. This problem is also illustrated in Galai and Masulis (1976) who view a levered firm's equity as a call option on the firm's underlying assets. By substituting riskier assets for assets of lower risk, shareholders can increase the volatility of the firm's assets thereby increasing the value of their shares. Hence, debtholders who are unable to monitor the firm's activities will demand a higher yield as compensation for this risk. The second moral hazard problem, the problem of underinvestment, is outlined in Myers (1977). In firms with debt outstanding, since shareholders receive only cash flows that remain after paying off debt, they will accept only projects whose NPV exceeds the face value of debt. As a result managers will forego some positive NPV projects. Because this is rationally anticipated by the lenders at the time of the loan issue, it results ex ante in a higher cost of debt.

Barclay and Smith (1995a) suggest that a firm's future investment opportunities may be viewed as options whose value depends on the likelihood that the firm will exercise the options optimally. Therefore, the contracting costs due to underinvestment and asset substitution are higher for firms with more growth options because the conflict between shareholders and bondholders over the exercise of the options is greater. Shareholders of high growth firms can more easily substitute riskier projects for less risky ones and are also more susceptible to foregoing positive NPV projects if the gains accrue predominantly to the bondholders. Myers (1977) argues that short-term debt that comes up for renegotiation before completion of the project and monitoring of the firm's operating and investment decisions mitigate the moral hazard problems. Such monitoring is typically achieved in privately placed debt by incorporating restrictive covenants that are non-standard in public issues (Smith and Warner, 1979).

Private bondholders have a comparative advantage in writing and enforcing bond covenants. As Smith and Warner (1979) observe, when there are covenant violations, it is often optimal to renegotiate the debt contract rather than force bankruptcy. However, renegotiation is more difficult and costly in public debt agreements than in private debt agreements. For instance, changes to covenants must be approved by bondholders that represent two-thirds of the total principal, and changes to the principal amount or maturity must be approved by all bondholders of a given debt issue. This is especially difficult in diffusely held public debt because the Trust Indenture Act of 1939 provides the trustees in public debt issues with only limited discretion during renegotiation outside of

bankruptcy. Finally, Nakamura (1993) argues that since the total number of lenders in private debt issues is small, the average default risk to private lenders is higher and there exist stronger incentives for monitoring. Therefore, private bondholders have greater incentives to write and enforce restrictive bond covenants. Hence, firms with more growth options in their investment opportunity set will benefit from lower contracting costs by selecting private debt financing.[7]

2.3. Regulation

Smith (1986) argues that regulated firms raise funds more frequently in the capital markets to generate evidence on the firm's cost of capital, which is useful to the firm in the rate setting process. This frequent use of the capital markets disciplines management and limits their discretion in investment and operating decisions. Smith and Watts (1992) also argue that compared to unregulated firms, regulated firms are less likely to engage in asset substitution and underinvestment because state utility commissions and other regulatory authorities supervise management's decisions. Thus, regulated firms will only find a limited need for the monitoring role of private debt, and would therefore have higher proportions of publicly issued debt.

2.4. Contracting costs due to adverse selection

Leland and Pyle (1977) argue that when there is information asymmetry between borrowers and lenders, adverse selection problems affect borrowing decisions. Ramakrishnan and Thakor (1984), Boyd and Prescott (1986), and Hadlock and James (1997) contend that private lenders have an informational advantage over lenders in the public debt markets. While public lenders have only public information to assess the risks of a firm, private lenders typically have access to non-public information, perhaps regarding the future potential of the firm. Also, Bhattacharya and Chiesa (1995) and Yosha (1995) argue that

[7] Rajan (1992) proposes a counter argument. He addresses a moral hazard problem that arises when high growth firms use bank debt (or other private debt). In a multi-period model, he argues that if a firm is reliant on just one bank for financing, and if the firm's projects are revealed to be profitable (in the second period), the bank has the incentive to threaten to withhold credit from the firm in exchange for a share of the NPV. Therefore, it may be costly for high growth firms to rely on bank debt. Of course, the bank's ability to hold-up the firm is dependent on the extent of the firm's reliance on the bank. Houston and James (1996) test Rajan's model. They find that among firms with public debt or with multiple banking relations, i.e., firms that have the least concern about being held-up by any one bank, there is a positive relation between growth options of a firm and its reliance on bank debt. The relation is negative only among firms with a single bank relationship, i.e., only among firms that are most vulnerable to the hold-up problem.

firms may reveal proprietary, firm-specific information more readily to a small group of private lenders than to a diffuse group of public lenders. This suggests that private lenders have a comparative advantage in producing pre-contract, firm-specific information.[8] If lenders in the private debt markets are indeed better informed than lenders in the public debt markets, then we would expect younger firms, and firms with larger potential information asymmetries to have more private debt.

There is also another implication of the adverse selection hypothesis. If private lenders have an informational advantage over public lenders, then under information asymmetry, firms that bear the cost due to adverse selection (such as firms with favorable private information about future profitability) should rely more on private debt. Hadlock and James (1997) show that if banks are better informed than lenders in the public debt markets, then firms with positive private information about their value would use bank debt to avoid the adverse selection costs of public debt. Hence, under information asymmetry, bank loans and other private debt signal positive information about firm value. Further, since adverse selection is more severe among firms with larger informational asymmetries, the signaling effects of private debt are more pronounced for these firms. Therefore, firms with favorable information about their value and future earnings, but subject to high levels of information asymmetry should have higher proportions of private debt. On the other hand, firms with favorable information about their value and future earnings, but subject to low levels of information asymmetry, are less likely to be concerned about the signaling effects of their debt placement decision, and should therefore have relatively lower proportions of private debt.

3. Data and variable definitions

To test the hypotheses on debt placement structure we analyze data for odd-numbered years from 1987 through 1993 for a cross-section of firms trading on the NYSE, AMEX, and NASDAQ.[9] Our initial sample is the set of all firms

[8] The fact that private lenders may have superior firm-specific information is supported by evidence in Best and Zhang (1993). They analyze the information content in private loan arrangements in the presence of stock market analysts who are involved in producing information and evaluating firms. They find that there is a positive share price reaction to the announcements of private loan arrangements primarily when these 'outside' indicators of value are noisy (i.e., high forecast errors and/or several revisions of earnings forecasts).

[9] Since data on debt placement details for each firm-year are hand-collected from the Moody's industrial manuals, we use data from alternate years instead of from each year to minimize data collection costs. This should however, not be a problem because the fraction of private debt and some of our explanatory variables do not exhibit much time-series variation (see Tables 2 and 3).

for which data are available on the Compustat expanded annual industrial and full coverage files and the Center for Research in Security Prices (CRSP) tapes for the year ending 1993. Following Barclay and Smith (1995a,b) and Guedes and Opler (1996), we restrict our attention to non-financial firms (SIC codes 2000 to 5999). Because our aim is to analyze why even firms with access to public debt choose to finance through private sources, we exclude from our sample very small firms that may not have access to public debt markets. We consider only firms with firm size exceeding $100 million as of year-end 1986.[10] Finally, firms must have data on debt issues available in Moody's Industrial, Transportation, or Utility Manuals for the years ending in 1987, 1989, 1991, and 1993. These criteria resulted in a total of 297 firms, which represents 1188 firm-year observations. A discussion of the variables used in the study follows.

3.1. Private versus public debt classification

We use the ratio of privately placed long-term debt to total long-term debt to measure the debt placement structure of firms. Most firms have a combination of bank loans, other private debt, and public debt contributing to their total debt. Data on the amount of public debt outstanding are obtained from the Moody's industrial manuals. Public debt is defined as any publicly traded debt with original maturity greater than one year. This debt includes floating rate notes, convertible bonds, zero coupon bonds, eurobonds, and debt of those subsidiaries for which the firm files consolidated financial statements. It also includes publicly traded debt that is not rated and debt for which price ranges are not reported. The total long-term debt of the firm is obtained from Compustat (item #9) and is defined as the sum of all debt with original maturity greater than one year. This includes bonds, notes, mortgages, other loans, and capitalized lease obligations. From this total long-term debt we exclude capitalized leases (item #84) since they represent non-debt fixed claims.[11]

The ratio of privately placed debt to total long-term debt equals one minus the fraction of total long-term debt that was publicly issued. Privately placed debt includes all long-term debt that is not publicly traded, i.e., bank loans, finance company loans, mezzanine financing, venture capital, and other debt that is placed privately, with or without intermediate agents.

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[10] Firm size is measured as the book value of long-term debt and capitalized lease obligations plus the market value of preferred and common stock. The cut-off of $100 million in firm size is admittedly arbitrary, and may not exclude all firms that have no access to public debt. However, even when we re-estimate our regressions using two other cut-offs, $250 million and $500 million, we find the results are similar. Hence, we retain the $100 million cut-off.

[11] Our regression results were not materially affected when we interpreted capitalized lease obligations as private debt and included it in both the total private debt and the total long-term debt.

3.2. Exogenous variables

We analyze both pooled and cross-sectional regressions to test the hypotheses regarding debt placement structure. The pooled regressions use data from the four years for the 297 firms in our sample, yielding a total of 1188 firm-year observations for each regression. The cross-sectional regressions use the time-series mean across the four years for the dependent variable and for each of the independent variables. The dependent variable is the ratio of privately placed debt to total long-term debt. The independent variables capture the importance of flotation costs, growth options, regulation, and information asymmetry.

3.2.1. Flotation costs

The natural logarithm of firm size, and average debt issue size proxy for economies of scale in flotation costs. *Log size* refers to the natural logarithm of the sum of the market values of the firm's common and preferred stock, the book values of its long-term and short-term debt, and capitalized lease obligations. Based on the flotation costs hypothesis, we expect a negative relation between *log size* and the fraction of debt that is private. Average issue size is the ratio of the firm's total long-term debt to the total number of debt issues in the firm. The total number of debt issues in the firm is obtained from Moody's industrial manuals. As with firm size, we expect to see a negative relation between the *natural logarithm of average issue size* and the proportion of debt that is privately placed.

3.2.2. Contracting costs due to moral hazard

As in Smith and Watts (1992) and Barclay and Smith (1995a,b), the *market-to-book ratio* proxies for the growth options in a firm's investment opportunity set. The market-to-book ratio equals the ratio of market value of assets to book value of assets. Growth options increase a firm's market value relative to its book value since intangible assets like growth options are not included in the book value of assets. We estimate the market value of assets as the book value of assets minus book value of equity plus market value of equity. The market-to-book ratio is our primary variable to measure the future investment opportunities and the potential contracting costs of moral hazard faced by the firm. This includes contracting costs due to the underinvestment and asset substitution problems. We expect a positive relation between the *market-to-book ratio* and the proportion of debt that is privately placed.

Following Barclay and Smith (1995a) we use the *depreciation ratio* as another proxy for the growth options in a firm. The depreciation ratio equals the ratio of the firm's depreciation expense to the market value of the firm. Firms with higher depreciation ratios have relatively more tangible assets and relatively fewer growth options in their investment opportunity sets. We therefore expect

an inverse relation between the *depreciation ratio* and the proportion of debt that is privately placed.

3.2.3. Regulation

The *regulation dummy* is an indicator variable that equals one if the firm is from a regulated industry and zero otherwise. Regulated industries include only gas and electric utilities (SIC codes 4900 to 4939). Other industries that used to be regulated such as the airlines, trucking, and telecommunications were deregulated prior to the beginning of our sample period. We expect to see lower proportions of private debt in regulated firms.

3.2.4. Contracting costs due to adverse selection

To analyze the importance of adverse selection problems in explaining debt placement structure, we first construct a proxy for the degree of information asymmetry about each firm. Following Bhagat et al. (1985), Blackwell et al. (1990), and Dierkens (1991), we consider the information asymmetry about a firm to be high when the managers have a relatively large amount of value-relevant, firm-specific information that is not shared by the market. Until this information is revealed to the market, the investors bear some firm-specific uncertainty. Therefore, if the investors in the market and the firm's managers are equally well-informed about the *market-wide* (systematic) factors influencing firm value, then residual volatility in a firm's stock returns may be used as a proxy for information asymmetry about firm-specific information. The residual standard deviation variable captures the firm-specific uncertainty that remains after removing from total uncertainty the uncertainty that is common to the firm's insiders and the market. As in Bhagat et al. (1985) and Blackwell et al. (1990), for each firm and for each year in our sample, the *residual standard deviation* is defined as the standard deviation of the residuals of the market model regression using daily returns from the previous year. We expect firms with higher information asymmetry about their value to have higher residual volatility in their returns.[12] The adverse selection hypothesis suggests a positive relation between *residual standard deviation* and the proportion of total long-term debt that is privately placed.[13]

[12] Dierkens (1991) uses the standard deviation of the *market-adjusted* daily stock returns instead of the standard deviation of the market model residuals. Results are virtually unchanged when we use this variable.

[13] Following James and Wier (1990) and Berger and Udell (1995), we also use *firm age* to capture potential information asymmetries faced by the firm. We expect younger firms with their limited financial histories to have a greater degree of information asymmetry. Firm age is defined as the time in years since the firm first started publicly trading. The adverse selection hypothesis suggests a negative relation between firm age and the proportion of debt that is privately placed. Though the results are not reported in our tables, we find that our inferences are unchanged when we replace *residual standard deviation* with *firm age* in the regressions.

The adverse selection hypothesis also predicts that if private lenders are better informed than public lenders, then firms with favorable private information about future profitability will rely more on private debt. Since this prediction arises in a model in which there is information asymmetry between borrowers and lenders, the proxy for favorable private information should be unobservable to the market at the time of the debt issue. Following Barclay and Smith (1995a,b) and Hoven-Stohs and Mauer (1996), we measure favorable private information by the *future abnormal earnings* of the firm. Based on the evidence in Watts and Zimmerman (1986) that annual earnings follow a random walk, we measure future abnormal earnings in year t as the earnings per share in year $t + 1$ minus earnings per share in year t divided by the stock price in year t. We expect firms with favorable information about future profitability to have high future abnormal earnings. The adverse selection hypothesis suggests a positive relation between *future abnormal earnings* and the proportion of debt that is privately placed.

The future abnormal earnings measure described above may include both an earnings surprise component and a growth in earnings (if any) component. To measure unanticipated positive information about firm value, we must eliminate the expected growth component from this future abnormal earnings measure (Hoven-Stohs and Mauer, 1996). *Unexpected future earnings* is another proxy of earnings surprise, and hence of favorable information about future profitability. For each firm, the unexpected earnings in year t is defined as the earnings per share in year $t + 1$ minus the forecasted earnings per share for year $t + 1$ divided by the year t share price. We forecast future earnings by regressing current earnings on lagged earnings.[14] As with the future abnormal earnings variable, we expect a positive relation between the *unexpected future earnings* of a firm and the fraction of total long-term debt that is privately placed.

4. The empirical results

As shown in Table 1, the sample of 297 firms exhibits considerable variation in both firm size and long-term debt. Firm size in 1987 ranges from a minimum of \$100 million to a maximum of \$73 billion. The maximum value for firm size ranges from \$73 to \$280 billion across the sample years. The use of long-term debt increased from an average of \$831.6 million in 1987 to \$1.3 billion in 1993, while the maximum value for long-term debt ranges from \$18 billion in 1987 to \$34.5 billion in 1993.

[14] For each firm, we regress the time series of earnings on lagged earnings (one period lag) using all available annual earnings data up to year t for that firm from Compustat. The estimated coefficients of this model are then used to forecast the earnings in year $t + 1$ using year t earnings.

Table 1
Descriptive statistics on firm size and long-term debt

Descriptive statistics for the variables firm size and long-term debt for a cross-section of 297 industrial firms in the years 1987, 1989, 1991, and 1993. Firm size is measured as the book value of long-term debt and capitalized lease obligations plus the market value of preferred and common stock and is denominated in millions of dollars. Long-term debt is measured as the book value of total long-term debt excluding capitalized lease obligations and is denominated in millions of dollars.

Variable	Year	Mean	25%	Median	75%	Max
Firm size	1987	3916	423	1189	4133	73,503
	1989	5351	481	1612	5371	149,885
	1991	6337	624	1844	6182	195,527
	1993	7006	673	2187	6058	280,766
	1987–93 Pooled	5656	541	1716	5393	280,766
Long-term debt	1987	831.6	50.2	211.4	775.8	17,930
	1989	1186.3	76.7	271.0	922.5	36,708
	1991	1344.1	80.6	330.4	1050.3	40,682
	1993	1340.7	82.0	335.2	1164.0	34,465
	1987–93 Pooled	1175.7	71.5	271.2	958.9	40,682

Table 2 shows, however, that the proportion of private debt remains relatively stable across the period 1987–1993. The average fraction of debt that is privately placed is 60.7% in the pooled sample, and it ranges from 59.8% to 62.5% across the years.[15] Descriptive statistics on average issue size and other financial characteristics appear in Table 3. There appears to be little difference in the mean issue sizes of privately placed debt and publicly issued debt. For privately placed debt the mean issue size ranges between \$92 million and \$108 million across the years, while for publicly issued debt the mean is only slightly larger ranging between \$99 million and \$151 million. However, the *median* average debt issue size is significantly larger for public than for private debt issues. The median average issue size of privately placed debt ranges between \$21 million and \$38 million, while it is between \$56 million and \$108 million for

[15] Table 2 also provides some insight on the role of liquidity in a firm's debt placement choice. Rule 144A, which governs the resale of privately placed debt, was relaxed in 1990 to allow resale of privately placed debt among qualified institutional buyers without any registration or stringent disclosure requirements. This creates an improved secondary market for private debt, thus encouraging more underwriters, large institutional investors, and foreign institutions to transact in these debt securities. However, in our sample, this regulatory change does not appear to have increased the use of private debt after 1990.

Table 2
Descriptive statistics on the percentage of long-term debt that is privately placed

Descriptive statistics on the percentage of long-term debt that is privately placed for a cross-section of 297 industrial firms in the years 1987, 1989, 1991, and 1993. Private debt equals one minus the fraction of total long-term debt that was publicly issued. Public debt is defined as any publicly traded debt with original maturity greater than one year. This debt includes floating rate notes, convertible bonds, zero coupon bonds, eurobonds, and debt of those subsidiaries for which the firm files consolidated financial statements. It also includes publicly traded debt that is not rated, and debt for which price ranges are not reported. The total long-term debt of the firm is defined as the sum of all debt with original maturity greater than one year. This includes bonds, mortgages, and all other long-term fixed claims payable, but excludes capitalized lease obligations. Thus *private debt* includes all long-term debt that is not publicly traded, and includes bank loans, finance company loans, mezzanine financing, venture capital, and other debt that was placed privately with or without intermediate agents.

Year	Mean	Std. deviation	25%	Median	75%
1987	59.8	37.4	23.6	61.1	100
1989	62.5	34.7	33.2	64.2	100
1991	60.4	36.9	24.5	64.4	100
1993	59.8	37.4	25.4	59.5	100
1987–1993 Pooled	60.7	36.5	26.4	62.6	100

publicly issued debt. Thus, consistent with the economies of scale in flotation costs hypothesis, the issue size for most privately placed debt is smaller than the issue size of the typical publicly issued debt. Table 3 also presents summary statistics on market-to-book ratio, depreciation ratio, and residual standard deviation in daily returns for the firms in our sample. Finally, observe that the median future abnormal earnings ranges between 0.005 and 0.036 across the years. However, once we adjust this variable to reflect the expectations about earnings' growth, we find that the median unexpected earnings is slightly negative but close to zero in all years.

To examine the differences between firms that rely more on private debt and those that rely more on public debt, we first focus on the differences between firms that use only private debt and those that also use public debt. This is similar to the analysis in Blackwell and Kidwell (1988) who document the differences between non-switch hitters (utilities with only private debt issues) and switch hitters (utilities with both public and private debt issues). Table 4 presents the differences in size, growth opportunities, age, degree of information asymmetry, and other characteristics between the two sub-samples. Firms relying only on private debt are typically smaller, have smaller issue sizes, have greater contracting costs due to moral hazard, are younger, and have a higher degree of information asymmetry than firms that access the public debt market. For firms that use only private debt, the mean debt issue size is below \$90 million while for firms that also issue public debt the mean is a significantly

Table 3
Descriptive statistics on financial characteristics

Descriptive statistics on the financial characteristics of a sample of 297 industrial firms for the years 1987, 1989, 1991, and 1993. Average issue size (All debt) is the ratio of the firm's total long-term debt to the total number of debt issues. Average issue size (Public debt) is the ratio of the firm's publicly issued debt to the total number of public debt issues. Average issue size (Private debt) is the ratio of the firm's privately placed debt to the total number of private debt issues. Market-to-book ratio is the ratio of (book value of assets − book value of equity + market value of equity) to the book value of assets. Depreciation ratio is the ratio of the firm's depreciation expense to the market value of the firm. Market value of the firm is (book value of assets − book value of equity + market value of equity). Residual standard deviation in year t is measured as the standard deviation of the residuals of the market model regression using daily returns from year $t-1$. Unexpected earnings in year t is defined as the EPS in year $t+1$ minus the forecasted EPS for year $t+1$ divided by the year t share price. The forecast EPS is computed using a lagged earnings regression model. Future abnormal earnings in year t is defined as the EPS in year $t+1$ minus the EPS in year t divided by the year t share price.

Variable	1987		1989		1991		1993	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Avg. issue size All debt ($ mil.)	94.14	34.95	96.40	45.99	120.16	47.39	121.58	59.20
Avg. issue size Public Debt ($ mil.)	99.19	56.42	107.17	73.63	140.33	87.50	151.40	108.56
Avg. issue size Private debt ($ mil.)	92.01	21.80	93.08	38.16	108.15	29.71	104.01	35.09
Market-to-book ratio	1.34	1.16	1.50	1.24	1.56	1.25	1.67	1.40
Depreciation ratio	0.0358	0.0327	0.0332	0.0312	0.0353	0.0327	0.0318	0.0300
Residual standard deviation	0.0187	0.0170	0.0169	0.0156	0.0189	0.0165	0.0179	0.0158
Unexpected earnings	− 0.013	− 0.003	− 0.015	0.001	− 0.053	− 0.013	− 0.019	− 0.006
Future abnormal earnings	0.009	0.005	0.052	0.036	0.014	0.008	− 0.004	0.007

Table 4
Difference in characteristics between firms with some public debt and those with no public debt outstanding

The sample includes 826 firm-year observations with some public debt and 362 firm-year observations with no public debt during the years 1987, 1989, 1991, and 1993. Average issue size is the ratio of the firm's total long-term debt to the number of debt issues. Firm size is measured as the market value of preferred and common stock plus the book value of long-term debt and capitalized lease obligations, and is denominated in billions of dollars. Market-to-book ratio is the ratio of (book value of assets − book value of equity + market value of equity) to the book value of assets. Depreciation ratio is the ratio of the firm's depreciation expense to the market value of the firm. Market value of the firm is (book value of assets − book value of equity + market value of equity). Residual standard deviation in year t is measured as the standard deviation of the residuals of the market model regression using daily returns from year $t-1$. Firm age is the time in years since the firm first started publicly trading. Unexpected earnings in year t is defined as the EPS in year $t+1$ minus the forecasted EPS for year $t+1$ divided by the year t share price. The forecast EPS is computed using a lagged earnings regression model. Future abnormal earnings in year t is defined as the EPS in year $t+1$ minus the EPS in year t divided by the year t share price. Percent regulated is the fraction of regulated firms in each category. Regulated firms are firms with SIC codes between 4900 and 4939 (gas and electric utilities). The significance of the difference in means is determined using the non-parametric Wilcoxon rank-sum test, and the significance of the difference in medians is determined using the Median scores test.

Variable	Firms with some public debt		Firms with no public debt		Difference	
	Mean	Median	Mean	Median	Mean	Median
Avg. issue size ($ mil.)	136.56	67.29	89.74	17.14	46.82[a]	50.15[a]
Firm size ($ bil.)	7.279	2.555	1.985	0.660	5.294[a]	1.895[a]
Market-to-book	1.45	1.24	1.63	1.35	− 0.18[a]	− 0.11[a]
Depreciation ratio	0.0363	0.0338	0.0289	0.0263	0.0074[b]	0.0075[b]
Residual standard deviation	0.017	0.015	0.020	0.018	− 0.003[a]	− 0.003[a]
Firm age (years)	35.60	34.83	20.96	19.25	14.64[a]	15.58[a]
Unexpected earnings	− 0.029	− 0.006	− 0.017	− 0.004	− 0.012[c]	− 0.002
Future abnormal earnings	0.047	0.016	0.042	0.020	0.005	− 0.004
Percent regulated	25.50		11.30		14.20[a]	

[a]Significant at the 1% level.
[b]Significant at the 5% level.
[c]Significant at the 10% level.

higher \$136 million. Also, firms that use public debt are nearly four times larger than firms using only private debt.

Consistent with the contracting costs hypotheses, firms that rely exclusively on private debt have more growth options in their investment opportunity set. Their mean market-to-book ratio is larger than that of firms who access the public debt market. The difference is significant at the 1% level. There also are more unregulated firms in the subsample of firms using only private debt. Further, firms using only private debt are significantly younger and have a greater degree of information asymmetry than firms using public debt. These differences are significant at the 1% level. There is no significant difference in future abnormal earnings between firms that use only private debt and those that also use public debt. This evidence is not consistent with the view that firms with favorable private information about their future profitability, as proxied by their future abnormal earnings, will rely more on private debt.

Table 5 presents the results from pooled regressions that analyze the impact of flotation costs, moral hazard problems, regulation, and adverse selection on corporate debt placement structure. Since pooled time-series, cross-section data are likely to preserve correlation over time, regressions using these data may violate the standard OLS assumption of independent errors. To correct for this problem, we re-estimate the coefficients using cross-sectional regressions that use the time-series mean across the four years for each variable. These regressions, shown in Table 6, mask any time-series variation in our observations, while preserving the cross-sectional variation in our data.

4.1. Flotation costs

In the pooled regressions, shown in Table 5, the coefficient of *log of firm size* is significantly negative at the 1% level. The *t*-statistic for this variable ranges from -13.49 to -12.10 across the alternative regression specifications. The coefficient of the *log of average debt issue size* is also significantly negative (regression 2 of Table 5), with a *t*-statistic of -8.72. Thus, consistent with the flotation costs hypothesis, smaller firms and firms with smaller debt issue sizes rely more on privately placed debt than on publicly issued debt.

To obtain a better understanding of the significance of the regression results in Table 5, we also compute the economic impact of each independent variable on the debt placement decision. Following Barclay and Smith (1995a,b), we measure the economic impact as the change in the private debt variable as a percentage of its mean, when moving an independent variable from the middle of its bottom quintile (10th percentile) to the middle of its top quintile (90th percentile). The coefficient of the log of firm size in regression 1 of Table 5 implies that a move from a firm size of \$257 million (10th percentile) to \$12.24 billion (90th percentile) decreases the fraction of debt that is privately placed by about 40.6 percentage points. This reduction of 40.6 points represents a large

fraction (66.8%) of the average percentage of debt that is privately placed. The economic impact of the average debt issue size variable is equally dramatic. From regression 2 of Table 5, a move from the 10th to the 90th percentile of the average debt issue size variable results in a drop of over 23 percentage points in the use of private debt, which represents an economic impact of 38%.

The cross-sectional regressions in Table 6 re-affirm these results. The coefficients of both flotation cost variables are significantly negative at the 1% level. The *t*-statistics, though, are slightly smaller than in the corresponding pooled regressions. These results are consistent with the hypothesis that economies of scale in issuance costs have a significant statistical and economic impact on a firm's debt placement structure.

4.2. Contracting costs due to moral hazard

The regressions in Table 5 indicate that, consistent with the contracting costs hypothesis, the market-to-book ratio is significantly positively related to the proportion of a firm's debt that is privately placed. The coefficient of the market-to-book ratio in the pooled regressions ranges from 0.059 to 0.068, with *t*-statistics ranging from 3.22 to 4.55, all of which are significant at the 1% level. In regression 3 of Table 5, we replace the market-to-book ratio with the depreciation ratio, as a specification check. Consistent with the market-to-book results, the depreciation ratio is significantly negatively related (t-statistic $= -2.75$, p-value < 0.01) to the proportion of debt that is privately placed.

The economic impact of the market-to-book variable is also high. Using the coefficient of the market-to-book variable in regression 1 of Table 5, we infer that a move from 0.892 (10th percentile) to 2.866 (90th percentile) in the market-to-book ratio is associated with a 13.5 percentage point increase in the use of private debt. This represents an economic impact of over 22%. Similarly, from regression 3 of Table 5, the economic impact of the depreciation ratio variable is about 12%. As reported in Table 6, results from the cross-sectional regressions are similar. The coefficient of the market-to-book ratio is significant at the 1% level, and that of the depreciation ratio is significant at the 5% level. These results are consistent with the hypothesis that firms with more growth options in their investment opportunity set, i.e., firms with higher contracting costs due to underinvestment and risk-shifting, use higher proportions of privately placed debt to mitigate the agency costs.[16]

[16] Although the results are not reported here, following Barclay and Smith (1995a) and Hoven-Stohs and Mauer (1996), we also use the ratio of R&D expense to firm value as an alternate proxy for the growth options in the investment opportunity set. Since we expect high growth firms to use more private debt, the predicted sign of the R&D variable is positive. In the regressions, the coefficient has the expected sign but is not significant. However, the variable coefficient becomes significant at the 5% level when four influential firm-year observations (i.e., outliers) are eliminated. We use Cook's (1977) distance measure D to identify influential observations.

Table 5
Pooled OLS regressions estimating the determinants of debt placement structure

The sample includes 1188 firm-year observations from 1987, 1989, 1991, and 1993. The dependent variable equals the ratio of privately placed long-term debt to total long-term debt. Log of firm size and average debt-issue size proxy for scale economies in issuance costs. Firm size is measured as the market value of preferred and common stock plus the book value of long-term debt and capitalized lease obligations. Average issue size is the ratio of the firm's total long-term debt to the number of debt issues. Market-to-book ratio and depreciation ratio measure contracting costs due to moral hazard. Market-to-book ratio is the ratio of (book value of assets − book value of equity + market value of equity) to the book value of assets. Depreciation ratio is the ratio of the firm's depreciation expense to the market value of the firm. Residual standard deviation, unexpected earnings, and future abnormal earnings measure the degree of information asymmetry and the contracting costs associated with adverse selection. Residual standard deviation in year t is defined as the standard deviation of the residuals of the market model regression using daily returns from year $t-1$. Unexpected earnings in year t is defined as the EPS in year $t+1$ minus the forecasted EPS for year $t+1$ divided by the year t share price. The forecast EPS is computed using a lagged earnings regression model. Future abnormal earnings in year t is defined as the EPS in year $t+1$ minus the EPS in year t divided by the year t share price. The regulation dummy equals one if the firm belongs to a regulated industry and zero otherwise. White-adjusted t-statistics are in parentheses.

Independent variable	Expected sign	Regression (1)	Regression (2)	Regression (3)	Regression (4)	Regression (5)
Intercept		1.386	1.732	1.492	1.247	1.221
		(16.77)	(11.49)	(17.61)	(22.48)	(22.06)
Log size	−	− 0.105[a]		− 0.101[a]	− 0.096[a]	− 0.092[a]
		(− 12.65)		(− 12.10)	(− 13.49)	(− 12.82)
Log average debt-issue size	−		− 0.067[a]			
			(− 8.72)			
Market-to-book ratio	+	0.062[a]	0.059[a]		0.068[a]	0.064[a]
		(4.09)	(3.22)		(4.55)	(4.18)
Depreciation ratio	−			− 1.682[a]		
				(− 2.75)		

Regulation dummy	−	− 0.099[a] (− 3.43)	− 0.072[b] (− 2.36)	− 0.129[a] (− 4.58)	− 0.073[a] (− 2.81)	− 0.083[a] (− 3.11)
Residual standard deviation	+	3.217[b] (2.06)	2.571[b] (2.02)	3.313[b] (2.10)		
Unexpected earnings	+				0.161[c] (1.81)	
Future abnormal earnings	+					0.072 (1.11)
Adjusted R^2		0.17	0.13	0.17	0.17	0.16
F-Statistic		51.17[a]	32.68[a]	47.03[a]	53.66[a]	48.92[a]

[a]Significant at the 1% level.
[b]Significant at the 5% level.
[c]Significant at the 10% level.

Table 6
Cross-sectional OLS regressions estimating the determinants of debt placement structure

The sample consists of 297 industrial firms. Each variable represents the time series mean for each firm across 1987, 1989, 1991, and 1993. The dependent variable equals the ratio of privately placed long-term debt to total long-term debt. Log of firm size and average debt-issue size proxy for scale economies in issuance costs. Firm size is measured as the market value of preferred and common stock plus the book value of long-term debt and capitalized lease obligations. Average issue size is the ratio of the firm's total long-term debt to the number of debt issues. Market-to-book ratio and depreciation ratio measure contracting costs due to moral hazard. Market-to-book ratio is the ratio of (book value of assets − book value of equity + market value of equity) to the book value of assets. Depreciation ratio is the ratio of the firm's depreciation expense to the market value of the firm. Residual standard deviation, unexpected earnings, and future abnormal earnings measure the degree of information asymmetry and the contracting costs associated with adverse selection. Residual standard deviation in year t is defined as the standard deviation of the residuals of the market model regression using daily returns from year $t-1$. Unexpected earnings in year t is defined as the EPS in year $t+1$ minus the forecasted EPS for year $t+1$ divided by the year t share price. The forecast EPS is computed using a lagged earnings regression model. Future abnormal earnings in year t is defined as the EPS in year $t+1$ minus the EPS in year t divided by the year t share price. The regulation dummy equals one if the firm belongs to a regulated industry and zero otherwise. White-adjusted t-statistics are in parentheses.

Independent variable	Expected sign	Regression (1)	Regression (2)	Regression (3)	Regression (4)	Regression (5)
Intercept		1.397	1.992	1.547	1.192	1.163
		(9.40)	(7.22)	(10.33)	(13.55)	(13.42)
Log size	−	−0.108[a]		−0.104[a]	−0.092[a]	−0.089[a]
		(−7.83)		(−7.44)	(−8.34)	(−8.11)
Log average debt-issue size	−		−0.083[a]			
			(−6.10)			
Market-to-book ratio	+	0.080[a]	0.062[a]		0.086[a]	0.090[a]
		(3.31)	(2.95)		(3.53)	(3.68)

Depreciation ratio	−			− 1.320[b] (− 2.25)		
Regulation dummy	−	− 0.075[a] (− 2.83)	− 0.074[a] (− 2.95)	− 0.117[a] (− 3.57)	− 0.061[a] (− 2.80)	− 0.093[a] (− 2.88)
Residual standard deviation	+	4.099[b] (2.37)	3.326[b] (2.20)	4.329[b] (2.42)		
Unexpected earnings	+				0.157 (1.13)	
Future abnormal earnings	+					0.094 (0.57)
Adjusted R^2		0.25	0.19	0.23	0.23	0.22
F-Statistic		22.07[a]	14.94[a]	19.07[a]	21.77[a]	20.74[a]

[a]Significant at the 1% level.
[b]Significant at the 5% level.
[c]Significant at the 10% level.

4.3. Regulation

The indicator variable for regulation is negatively related to the private debt variable in all the pooled regressions. As shown in Table 5, the coefficient is significantly negative with t-statistics ranging from -4.58 to -2.36. The coefficient is similarly negative in the cross-sectional regressions reported in Table 6 (t-statistics range from -3.57 to -2.80). These results suggest that regulated firms find less need for the monitoring benefits associated with private debt, presumably because they have an overseeing authority in the form of regulatory agents who reduce management's discretion over investment and operating decisions. In particular, the coefficient of the regulation dummy variable in regression 1 of Table 5 suggests that holding other factors fixed, regulation decreases the use of private debt by about 10 percentage points, which represents an economic impact of over 16%.

4.4. Contracting costs due to adverse selection

The coefficient of the residual standard deviation variable, the proxy for information asymmetry, is significantly positive at the 5% level in both the pooled and cross-sectional regressions (regressions 1, 2, and 3 in Tables 5 and 6). The economic impact of this variable, inferred from the pooled regression, is about 9%. This evidence suggests that firms with greater potential information asymmetries rely more on private debt than do other firms.

We also examine whether under information asymmetry, firms with favorable information about their value and future earnings rely more on private debt. Unexpected earnings is the primary variable that measures favorable private information. In regression 4 of Table 5, the coefficient of the unexpected earnings variable is significantly positive at the 10% level, consistent with the adverse selection hypothesis. However, even though the variable is statistically significant, the economic impact is very low. From regression 4 of Table 5, moving from the 10th to the 90th percentiles in the unexpected earnings variable increases the use of private debt by a mere 2.2 percentage points, an economic impact of about 3.6%. Further, in the cross-sectional regressions in Table 6, the coefficient of this variable is statistically indistinguishable from zero.

The coefficient of the other proxy for favorable private information, future abnormal earnings, is indistinguishable from zero in both the pooled and the cross-sectional regressions (regression 5 in Tables 5 and 6). Furthermore, the economic impact of this variable inferred from the pooled regression is only 2.9%. Thus, there is little evidence to support the hypothesis that firms with favorable private information about their value and future earnings obtain better terms with private than with public debt, and so rely more on privately placed debt.

The finding that unexpected earnings or future abnormal earnings do not explain debt placement structure contrasts with our earlier result that the degree of information asymmetry plays an important role in explaining placement structure. A plausible explanation is that unexpected earnings and future abnormal earnings are incomplete proxies for favorable firm-specific information that is not known to the market. In particular, not all firms with favorable information are subject to the same degree of information asymmetry. Firms with favorable information about their value but with low information asymmetry may be indifferent between public and private debt because adverse selection is not a concern for these firms. On the other hand, those firms with favorable information about their value that either have a limited financial history or are otherwise subject to a high degree of information asymmetry would face a higher cost due to adverse selection and, therefore, may rely more on privately placed debt. Hence, to test the adverse selection hypothesis more directly, we must simultaneously incorporate favorable information about future profitability *and* the degree of information asymmetry.

In Table 7, we re-estimate the pooled regressions using two interaction variables *Unexpected earnings* $*$ *High information asymmetry dummy* and *Unexpected earnings* $*$ *Low information asymmetry dummy* to measure the differential impact of unexpected earnings on the debt placement choice between high and low information asymmetry firms. In a given year, a firm is classified in the high information asymmetry category if its residual standard deviation of returns is above the median residual standard deviation of returns of all firms in the sample, and is classified in the low information asymmetry category otherwise. Consistent with the adverse selection hypothesis, in the subsample of high information asymmetry firms, firms with higher unexpected earnings rely more on private debt than do other firms. The coefficient of the *Unexpected earnings* $*$ *High information asymmetry dummy* variable is significant at the 10% level in all the regressions in Table 7. The t-statistics range from 1.70 to 1.76. The coefficient of the *Unexpected earnings* $*$ *Low information asymmetry dummy* variable is not significant in any of the four regressions in Table 7. Thus, adverse selection is not an important driver of debt placement structure for firms with favorable information about future earnings but without a high degree of information asymmetry.

5. Conclusion

We examine the factors that affect a firm's choice between publicly issued and privately placed debt by analyzing the costs and benefits of the two types of debt. Data on debt placement structure is obtained from Moody's manuals for a sample of 297 firms over the period 1987–1993. We measure placement structure as the fraction of a firm's total long-term debt that is privately placed.

Table 7
Pooled OLS regressions measuring the impact of information asymmetry on debt placement structure

The sample includes 1188 firm-year observations from 1987, 1989, 1991, and 1993. The dependent variable equals the ratio of privately placed long-term debt to total long-term debt. Log of firm size and average debt-issue size proxy for scale economies in issuance costs. Firm size is measured as the market value of preferred and common stock plus the book value of long-term debt and capitalized lease obligations. Average issue size is the ratio of the firm's total long-term debt to the number of debt issues. Market-to-book ratio and depreciation ratio measure contracting costs due to moral hazard. Market-to-book ratio is the ratio of (book value of assets − book value of equity + market value of equity) to the book value of assets. Depreciation ratio is the ratio of the firm's depreciation expense to the market value of the firm. Residual standard deviation and unexpected earnings measure the degree of information asymmetry and the contracting costs associated with adverse selection. Residual standard deviation in year t is defined as the standard deviation of the residuals of the market model regression using daily returns from year $t-1$. Unexpected earnings in year t is defined as the EPS in year $t+1$ minus the forecasted EPS for year $t+1$ divided by the year t share price. For each firm and in each year, the high information asymmetry dummy equals one if the residual standard deviation of the firm is higher than the median residual standard deviation of all firm-years, and zero otherwise. Low information asymmetry dummy is defined as 1 minus the high information asymmetry dummy. The regulation dummy equals one if the firm belongs to a regulated industry and zero otherwise. White-adjusted t-statistics are in parentheses.

Independent variable	Expected sign	Regression (1)	Regression (2)	Regression (3)	Regression (4)
Intercept		1.384	1.792	1.510	1.907
		(16.53)	(11.83)	(17.53)	(13.19)
Log size	−	− 0.108[a]		− 0.103[a]	
		(− 12.79)		(− 12.27)	
Log average debt-issue size	−		− 0.072[a]		− 0.074[a]
			(− 9.26)		(− 9.62)
Market-to-book ratio	+	0.066[a]	0.041[b]		
		(4.36)	(2.49)		
Depreciation ratio	−			− 1.546[b]	− 1.345[b]
				(− 2.43)	(− 2.17)

Regulation dummy	−	− 0.087[a] (− 3.03)	− 0.058[c] (− 1.90)	− 0.121[a] (− 4.28)	− 0.072[b] (− 2.37)
Residual standard deviation	+	3.522[b] (2.05)	3.492[b] (2.02)	3.450[b] (2.04)	2.600[c] (1.78)
High Info. Asymm. dummy * Unexpected earnings	+	0.164[c] (1.74)	0.178[c] (1.76)	0.167[c] (1.76)	0.171[c] (1.70)
Low Info. Asymm. dummy * Unexpected earnings		0.194 (1.02)	0.239 (1.20)	0.190 (0.98)	0.234 (1.12)
Adjusted R^2		0.19	0.13	0.18	0.13
F-Statistic		36.24[a]	21.99[a]	33.55[a]	21.36[a]

[a]Significant at the 1% level.
[b]Significant at the 5% level.
[c]Significant at the 10% level.

Private debt includes bank loans, finance company loans, mezzanine financing, and other debt that is privately placed with or without intermediate agents. For a typical firm in our sample, over 60% of all its long-term debt is privately placed, and this fraction remains relatively stable over the sample period. We test the theories on debt placement structure that are motivated by issuance costs, regulation, and contracting costs associated with moral hazard and adverse selection in the debt markets.

Flotation costs in public debt issues explain a significant part of the cross-sectional variation in placement structure. Larger firms and firms with larger average issue sizes exploit the scale economies in issuance costs of public debt, and so have lower proportions of private debt. Conditioned on firm size, firms with higher contracting costs due to the moral hazard problems of underinvestment and risk-shifting have higher proportions of private debt. Consistent with Myers (1977), firms with more growth options in their investment opportunity set benefit more from the monitoring associated with privately placed debt. This suggests that the greater monitoring and the more restrictive covenants in privately placed debt helps mitigate costs that arise due to conflict between bondholders and shareholders. These results are reaffirmed by the evidence that regulated firms have lower proportions of privately placed debt.

Evidence provides only limited support for the view that private debt mitigates the contracting costs associated with adverse selection. Although firms operating under a greater degree of information asymmetry rely more on private debt, we do not find any evidence that firms with favorable private information about their value, i.e., firms that bear the cost of adverse selection, choose more private debt. However, those firms with favorable information about their value that are *also* subject to a high degree of information asymmetry rely more on private debt.

Our study on the determinants of placement structure of corporate debt extends prior research on the determinants of maturity and priority structure of debt. One limitation of this analysis arises from our definition of placement structure. Boot and Thakor (1997) suggest that corporate debt may be classified into 'relationship' loans and 'transaction' loans. Relationship loans are characterized by repeated borrower–lender interactions, in which the lender has the ability to monitor the firm's operations and thus improve firm value. Repeated interactions may also mitigate information asymmetry about the borrower. Transaction loans, on the other hand, are loans in which there are few monitoring or informational benefits. Boot and Thakor (1997) demonstrate that although private lenders offer both types of loans, these lenders (especially banks) have a comparative advantage over lenders in the public debt markets in offering relationship loans. Therefore, the power of our tests of the moral hazard and adverse selection theories may be improved by disaggregating private debt into relationship loans and transaction loans using issue-by-issue data, and focusing on the fraction of debt that is raised through relationship loans.

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