Prior Debt and the Cost of Going Public

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Previous studies find that firms with prior debt, particularly publicly rated, have lower information asymmetry and experience a lower opportunity cost of going public, as measured by underpricing. Subsequent research suggests that underpricing may be an inaccurate measure of indirect issuance costs. Thus, we replicate and extend existing studies to examine whether previously issued debt reduces the true opportunity cost of issuance. We find that private debt issues have little effect; however, firms with public debt (particularly rated) have both significantly lower levels of underpricing and lower issuance opportunity costs, as well as narrower filing ranges and smaller price revisions, all of which are consistent with reduced asymmetry. We find, however, that matching issues by firm size eliminates the significant relations. Thus, we conclude that although prior public debt appears to reduce information asymmetries, it is more likely a reflection of the underlying characteristics of firms with these existing securities.

Introduction

When firms go public, they generally face indirect issuance costs that stem from various risk factors, a prime example of which is information asymmetry between issuers (i.e., sellers) and investors (i.e., buyers). The presence of asymmetry necessitates selling shares at a discount in order to induce potential investors to participate in the offering. Therefore, all else equal, firms that have a greater level of publicly available information (i.e., lower asymmetry) should experience reduced issuance costs.

Firms that take on debt, whether private or public, submit themselves to the scrutiny of external parties, which may increase the amount of information available to potential investors and, therefore, also may reduce the cost of going public. Previ-

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ous studies (e.g., Cai, Ramchand, and Warga, 2004) examine this relation by evaluating the effect of prior debt on underpricing, which is the variable commonly used to measure the indirect cost of equity issuance. The results of these studies suggest that the existence of prior debt issues, particularly those that are rated, reduces information asymmetry and underpricing.

Subsequent research (e.g., Dolvin and Jordan 2005), however, suggests that underpricing may be flawed as a measure of the indirect cost of issuance because it does not account for the share retention decision of preexisting owners, which is referred to as *share overhang*. Further, existing studies generally ignore underlying firm characteristics (e.g., firm size) that may be correlated with prior debt issuance. Therefore, the results of existing studies may or may not reflect the true relation of prior debt issues to the cost of going public. Our primary contribution is to address these shortcomings by examining the relation of prior debt issues to the level of information asymmetry and true opportunity cost of issuance, as well as by implementing controls for potential relations between debt issuance and firm characteristics.

Across the entire sample, we find no significant relation between prior private debt issuance and underpricing. Further, we also find that prior private debt has little influence on reducing information asymmetry, as measured by the width of initial filing ranges and the extent of offer price revisions. Conversely, we find that firms with prior public debt issues have marginally lower underpricing and significantly lower opportunity costs of issuance. Consistent with these results, prior public debt appears to reduce information asymmetry, as filing ranges are narrower and price revisions are smaller. Further, we find that most of these relations are confined to those issuers with rated public debt, all of which is in line with previous studies.

To control for potential relations between prior debt issuance and underlying firm characteristics, we also examine various matched samples within our data set, first matching by date and issuing firm size. We find that the significant relation between prior debt issues and the opportunity cost of going public disappears using the matching approach, which suggests that the presence of prior debt may not reduce information asymmetry, but is serving as a proxy for underlying firm characteristics, primarily company size. We conclude that although our initial results are consistent with previous work, they appear to be driven by underlying relations that prior studies generally fail to consider.

Information Asymmetry and the Cost of Going Public

Firms undertaking an initial public offering (IPO) face direct issuance costs in the form of a gross underwriting spread; however, the indirect costs of issuance are typically the largest component of the cost of going public. For example, Loughran and Ritter (2002) find that firms, on average, leave approximately $9.1 million on the table, which is roughly twice the amount of direct fees paid. Many potential

explanations exist for this large opportunity cost; however, one that forms the basis for multiple theoretical models is asymmetric information between buyers and sellers (e.g., Rock, 1986; Benveniste and Spindt, 1989). The existence of asymmetric information forces issuers to offer shares at a discount, which implies a positive relation between asymmetric information and the cost of going public (i.e., money left on the table). Previous studies generally address this relation by examining underpricing, or initial return, which is defined as money left on the table (MLOT) divided by the proceeds of the offering.[1] The implication is that characteristics that reduce (increase) information asymmetry should be associated with lower (higher) underpricing.

All else equal, studying the influence of information asymmetry on underpricing would be equivalent to studying the effect of asymmetry on MLOT. Underpricing, however, fails to control for the number of shares retained by preexisting owners, which is a decision that would affect underpricing but not MLOT. Underpricing implicitly assumes that all preexisting shares are sold in the offering, but this is rarely the case. As an extreme example, consider a firm that goes public by issuing a single share. Any level of underpricing is essentially irrelevant because its dilutive effect on the value of the firm would be minimal, and the money left on the table would be minor in comparison to the overall stake of preexisting owners.

Put differently, the wealth effect on preexisting owners (i.e., MLOT) is determined by the risk of the offering, including the amount of asymmetric information, not by the share issuance decision. Thus, studies that focus on underpricing may or may not reach accurate conclusions regarding the underlying relations between characteristics of the offer and the cost of going public. Specific to this study, reduced information asymmetry should result in a smaller opportunity cost of issuance; however, if fewer shares are issued, underpricing may be higher relative to a comparable firm that issues more shares.

Dolvin and Jordan (2005), following Barry (1989), formally address the relation between underpricing and the true wealth effect of an IPO, finding that underpricing is the product of two underlying components: the wealth effect and the share retention (i.e., overhang) decision. In addition, Dolvin and Jordan define the wealth effect in percentage terms, which they refer to as the opportunity cost of issuance (OCI):

$$OCI = \frac{MLOT}{E} = \frac{N_o(P_1 - OP)}{P_1 N_A - N_{o,p} OP} \quad (1)$$

where E represents the preexisting equity value and is equal to the market value of the firm after the offering less any new proceeds raised from newly created (i.e., primary) shares. (Any secondary shares sold create proceeds for selling shareholders,

[1] The traditional definition of underpricing is the percentage change from the offer price to the closing market price on the first day of trading; however, these are equivalent definitions.

not for the firm itself.) In addition, N_o is the number of shares offered in the IPO; P_1 is the market price at the end of the first trading day; OP is the offer price; N_A is the total number of shares after the offering; and $N_{o,p}$ is the number of primary (i.e., newly created) shares offered. Their derivation and results suggest that failing to control for the share retention decision introduces potential bias; therefore, in examining the relation between information asymmetry and the cost of going public, we study both underpricing and OCI.

As an example, consider two firms (A and B) that face the same level of underpricing. Assume each firm has 100 preexisting shares and, for simplicity, no primary shares are being issued (i.e., a pure secondary offering). Further assume that preexisting owners of Firm A choose to issue 25 shares, while Firm B owners choose to issue 50 shares. Thus, Firm A has greater share overhang. Also assume each firm offers shares at a price of $10 and that the aftermarket price for each is $12, thereby implying an initial return of 20 percent for both firms.

Using equation (1), this example illustrates that preexisting owners in these two firms, even with the same level of underpricing, experience different indirect (i.e., opportunity) costs of issuance. Specifically, owners of Firm A issue half as many shares at a discount (less money left on the table), and the shares they retain are worth the market value after the offer. Thus, the cost of going public for Firm A is lower than for Firm B. Specifically, calculating OCI for Firm A gives a value of 4.17 percent (50/1200), whereas the OCI for Firm B is 8.33 percent (100/1200).[2]

To further illustrate what OCI is measuring, consider the following equivalent formula for calculating OCI:

$$OCI = \frac{N_{o,s}}{N_B}(\text{Cost of Secondary Shares Sold}) + \frac{N_{B,r}}{N_B}(\text{Cost of Secondary Shares Retained}) \quad (2)$$

where $N_{o,s}$ is the number of preexisting (i.e., secondary) shares sold in the offering; N_B is the number of preexisting shares prior to the offering; and $N_{B,r}$ is the number of preexisting shares retained. This equation illustrates that OCI is essentially a weighted average of costs, where the weights capture the percentage of secondary shares that are sold (i.e., $N_{o,s}/N_B$) and the percentage of secondary shares that are retained (i.e., $N_{B,r}/N_B$). The cost of sold shares primarily captures money left on the table, whereas the value of retained shares is affected by dilution associated with selling new shares at a price below market value. Underpricing fails to control for the

[2] Note that the preexisting equity value is equal to the market value after the offering because no primary shares are being created and issued. This example is readily extended to include primary shares. Moreover, with primary shares it is simple to illustrate that firms with the same amount of money left on the table could have a different OCI.

share issuance decision, thereby failing to measure the true cost to preexisting owners. As an example, consider using equation (2) to calculate OCI for the two firms in our example:

$$\text{Firm A: } OCI = \frac{25}{100}\left(\frac{12-10}{12}\right)+\frac{75}{100}(0) = 4.17\%$$

$$\text{Firm B: } OCI = \frac{50}{100}\left(\frac{12-10}{12}\right)+\frac{50}{100}(0) = 8.33\%$$

both of which match the OCI values reported above. Because no primary shares are sold, there is no dilution in firm value as a result of the offering. [See Barry (1989) and Dolvin and Jordan (2005) for a more complete illustration and discussion of this alternative formula.]

Specific to this study, previous results suggest that prior debt issues reduce underpricing and conclude that this implies a reduction in the cost of going public. If firms that have previously issued debt also retain fewer shares, however, then the lower level of underpricing may not translate into a lower cost of going public for the preexisting owners of the firm.

Prior Debt Issues and Information Asymmetry

The majority of firms that go public in the equity market are small and not well-known, which exacerbates the amount of information asymmetry investors face. Exceptions may exist, however, particularly when you consider firms that have previously raised capital in markets other than equity. For example, a firm that assumes private debt subjects itself to the monitoring of the lender, which may reduce information asymmetry between the borrower and lender (e.g., Peterson and Rajan 1994), as well as between the borrower and other firm claimants (e.g., Fama, 1985). Additionally, those firms that have previously issued public debt already provide publicly available information that is readily accessible by potential equity investors. Thus, it is possible that preexisting debt issues, private and/or public, may moderate information asymmetry and, therefore, reduce the cost of going public.

Previous studies have investigated the possible influence of individual types of preexisting debt on the equity issuance process. For example, James and Wier (1990) find that firms with prior private debt outstanding exhibit lower underpricing, which they attribute to a signaling effect. The ability to take on private debt is considered a signal that the firm is of high value. Schenone (2004) concentrates on the period following the effective repeal of the Glass-Steagel Act (i.e., 1998 and after), which previously prevented commercial banks from underwriting security issues. Schenone finds that firms that borrow from commercial banks that have the ability to take the firm public exhibit lower underpricing than those firms that borrow from commercial banks that are not able to take the firm public.

Moreover, because commercial banks could not take firms public in earlier periods, Schenone's (2004) discussion suggests that private debt issues should have no effect on reducing information asymmetry or the cost of going public for IPOs taking place prior to the repeal of the Glass-Steagel Act, in contrast to the theoretical prediction of Fama (1985) and the empirical results of James and Wier (1990). Schenone does not compare firms with prior private debt to other IPOs, however, and both of the aforementioned empirical studies focus on underpricing, although OCI is most likely of greater importance, particularly to the issuing firm.

Cai, Ramchand, and Warga (2004) compare equity IPOs that have previously issued public debt to those that have not, finding that public debt, particularly rated debt, appears to reduce information asymmetry and lower the cost of going public. Similar to other studies, however, the focus is again placed on underpricing, not the underlying opportunity cost of issuance. Cai, Ramchand, and Warga do extend their analysis, on a univariate basis only, by examining the effect of prior public debt on initial filing ranges and offer price revisions and find that firms with prior public debt generally have narrower ranges and smaller revisions, which they attribute to reduced information asymmetry. In addition, their study does not address prior private debt. Thus, we consolidate and extend these existing studies by addressing the relation between the opportunity cost of going public (and information asymmetry) and both prior private debt and prior public debt (rated versus unrated) for firms going public in the 1986 to 2000 period.

Moreover, none of the above studies consider the possible relation between prior debt issuance and underlying firm characteristics. For example, it would be easier for larger and/or more profitable firms to assume debt, and these same firms typically also would represent those with a relatively smaller level of information asymmetry. Ignoring these characteristics may bias existing results by attributing a reduction in information asymmetry to the issuance of debt rather than to the underlying firm characteristics that initially enabled the firms to assume debt. Thus, we also extend our analysis to control for these potentially important firm characteristics.

Data Description

Our main data source is Thomson Financial's SDC New Issues database. SDC captures prospectus information on firm commitment initial public offerings (IPOs), including the existence and rating of prior public debt issues. In addition to company and issue information provided by SDC, we rely on the University of Chicago's Center for Research in Security Prices (CRSP) database to provide closing market prices and shares outstanding information on the date of issuance. We also collect information on firms with prior private debt issues from the Loan Pricing Corporation's (LPC's) Dealscan database. SDC began reporting data on several important items in 1986; after the bubble period of 1999-2000, there were relatively few IPOs. Therefore, the primary period we study is January 1, 1986, to December 31, 2000.

LPC only provides data beginning in 1987; thus, as a robustness check we repeat all analyses starting in 1987, as well as in 1990. We find that our general results are unchanged.

We make numerous corrections to SDC data using information from Jay R. Ritter (http://bear.cba.ufl.edu/ritter/) on a variety of items such as incorrect file ranges and offer type classifications. We also use Loughran and Ritter's (2004) updated underwriter reputation variables [i.e., updates to those originally provided by Carter and Manaster (1990)], firm founding dates, and Internet classification data.

As is commonly done, we eliminate various types of issues, including closed-end funds, unit issues, American depositary shares, mutual-to-stock conversions, reverse leveraged buyouts, real estate investment trusts, and spin-offs. Unlike many studies, we also eliminate firms with multiple share classes. The reason is that determination of overhang, and therefore OCI, can be problematic in such cases, particularly in circumstances where, for example, one Class A share can be converted into multiple Class B shares. After elimination of these issues, we are left with a final sample of 4,510 IPOs, represented by 91 issues with prior public debt, 599 issues with prior private debt, and 3,818 issues with no prior debt.[3]

Summary Statistics

We begin by examining variables related to information asymmetry and the cost of going public. Specifically, we calculate mean values for three types of issues (i.e., those with prior public debt, those with prior private debt, and those with no prior debt), as well as t-statistics from difference of means tests, assuming unequal variances, between each of these types of issues. We report the results in Panel A of Table 1.

Underpricing (i.e., Initial) is lowest for those issues with prior public debt and highest for those issues with prior private debt. This finding suggests that the existence of prior public debt issues reduces the cost of going public, but prior private debt issues increase the cost, which contrasts with the results of previous studies (e.g., Fama, 1985; James and Wier, 1990). Recall that underpricing does not measure the true wealth effect of the offering because it fails to control for the share retention decision. OCI, which does account for the level of share retention, appears to be lowest for those issues with prior public debt and highest for those without any debt, suggesting that both types of prior debt reduce issuance costs, but the reduction is more pronounced for public debt issues.

[3] There are 23 issues with both prior private and public debt. We code these as having public debt. For robustness we examine specifications where we code these issues as private debt and also where we create a variable identifying the issues as having both types of prior debt; however, we find that the results are consistent with those reported (i.e., there is no incremental effect associated with multiple types of previous debt issues).

Table 1—Summary Statistics

Panel A: Information Asymmetry and Issue Costs

	Public	Private	None	t-statistics		
	(1)	(2)	(3)	(1) v (2)	(2) v (3)	(1) v (3)
N	91	599	3818			
Initial	16.02	26.99	22.51	-2.60	1.92	-1.77
OCI	1.82	4.51	5.57	-1.64	-3.54	-2.28
Range	.14	.16	.15	-2.09	2.17	-1.26
Revision	.34	.67	.62	-2.00	.79	-1.79

Panel B: Firm and Issue Characteristics

	Public	Private	None	t-statistics		
	(1)	(2)	(3)	(1) v (2)	(2) v (3)	(1) v (3)
n	91	599	3818			
Sales	396.57	110.70	106.66	4.23	.34	4.28
Assets	511.44	82.39	217.25	5.72	-2.49	3.19
Proceeds	130.35	41.39	39.70	5.04	.85	5.14
VC	.36	.52	.41	-3.02	5.19	-.99
Age	17.16	11.60	11.85	2.14	-.40	2.08
Integer	.82	.80	.75	.43	2.37	1.49
HT	.40	.40	.36	-.03	1.91	.76
Internet	.09	.09	.10	-.05	-.85	-.41
Rank	8.36	7.42	6.79	5.97	7.18	11.00
Primary	.68	.56	.66	2.38	-4.54	.55
NasLag	1.52	.84	1.18	1.07	-1.63	.55
PartialU	8.03	9.67	8.26	-.80	1.83	-.12
PartialD	-9.34	-6.98	-6.64	-1.66	-.70	-2.32
Nineties	.90	.91	.79	-.38	9.57	3.57
Bubble	.33	.18	.16	2.83	1.03	3.30

Note: This table reports descriptive statistics for IPOs for the 1986 to 2000 period, segmented by issuers with prior public and prior private debt issues. Columns 1 through 3 report means and the final three columns report t-statistics from difference of means tests assuming unequal variances. Panel A reports variables related to information asymmetry and the cost of going public. Panel B reports firm and offer characteristics

The next two variables we report measure the width of the initial filing range and the level of offer price revision, respectively. Following Cai, Ramchand, and Warga (2004), these variables proxy for information asymmetry, as reduced asymmetry should result in less uncertainty surrounding the offer price. We calculate Range as the original high filing price less the original low filing price, divided by the middle of the filing range. We follow Ljungvist and Wilhelm (2002) and define Revision as the offer price less the initial low filing price, divided by the difference between the initial high and low filing prices.[4] Issues with prior public debt appear to

[4] For robustness, we also define the revision as the partial adjustment, which is the percentage change from the initial midfile price to the offer price, but we find the results to be qualitatively similar to those reported. Following Cai, Ramchand, and Warga (2004) we also define the filing range as the difference between the initial high and low filing prices, divided by the low filing price; however, we find the general results to be unchanged.

have marginally narrower ranges and smaller revisions, suggesting a reduction in information asymmetry; however, it does not appear that prior private debt has a similar effect.

The results to this point fail to account for underlying issue characteristics that also may be influencing the relations. Thus, to begin to explore potential causes of the above differences, we report descriptive statistics on some selected firm and offer characteristics in Panel B of Table 1. The variables in the panel are representative of the types commonly examined in IPO research, but the list is not intended to be exhaustive. Specifically, we report means and t-statistics from difference tests for the following:

Sales = Gross sales, in millions of dollars, of the issuing firm in the year prior to issuance;
Assets = Total asset value, in millions of dollars, of the issuing firm immediately prior to issuance;
Proceeds = Gross proceeds of the issue in millions of dollars;
VC = Dummy variable equal to one if the firm is venture capital backed;
Age = Firm age, measured in years;
Integer = Dummy variable equal to one if the IPO offer price is an integer;
HT = Dummy variable equal to one if the firm is in a "high-tech," but non-internet-related, industry;
Internet = Dummy variable equal to one if the firm is internet-related;
Rank = Carter-Manaster (1990) rank of the lead underwriter, as updated by Loughran and Ritter (2004);
Primary = Dummy variable equal to one if the offering has 100 percent primary shares;
NasLag = Return on the Nasdaq composite index for the 15 trading days prior to the issue;
PartialU = The percentage change (from the original midfile) in the final offer price if the change is positive (and zero otherwise);
PartialD = The percentage change (from the original midfile) in the final offer price if the change is negative (and zero otherwise);
Nineties = Dummy variable equal to one if the issue takes place in the 1990 to 1998 period; and
Bubble = Dummy variable equal to one if the issue takes place in the 1999 to 2000 period.

Compared to issues with prior private debt and those with no prior debt, issues with prior public debt appear to be larger, older, and associated with higher quality underwriters, all of which could reduce asymmetry and, therefore, the cost of going

public.[5] It also appears that a larger percentage of the IPOs with prior public debt occurred in the internet bubble period of 1999 to 2000, which typically would result in higher average underpricing. Thus, the lower levels observed may be more significant than the univariate results indicate. Comparing IPOs with prior private debt to those with no prior debt, they appear to be similar in size and age, although those with prior private debt do appear to be more likely to be backed by a venture capitalist, have a higher quality underwriter, and be less likely to be a pure primary offering.

Thus far, it appears that prior public debt issues have a more significant effect in reducing asymmetry and issue costs than prior private debt. Within the public debt sector, issues that are rated typically would have a greater amount of information available, thereby reducing asymmetry even further. Thus, we split the IPOs with prior public debt into rated and unrated issues, and we report the results of this comparison in Table 2.

Economically, we find that issuers with rated debt experience lower issue costs and smaller offer price revisions. In contrast to our expectations, we find only marginal statistical significance, which may be related to the small sample size and high variability among issuers. Thus, on the surface it appears that whether the debt issue is rated or not is of little importance; however, the true relation may be influenced by other underlying effects. For example, firms with rated debt appear to be larger, as well as less likely to be high-technology or internet firms, all of which are characteristics that are consistent with lower levels of asymmetry and cost relations.[6]

[5] Unfortunately, data on pre-issue firm size (i.e., assets and sales) are not available for all firms in our sample. Therefore, the averages reported for those variables are derived from a smaller sample. Specifically, we have firm size data for 65 of the issues with prior public debt, 516 of those with prior private debt, and 2,515 of those with no prior debt. It is with these observations that we complete our multivariate analyses throughout the paper. This is a necessary action, as our results indicate that firm size is an important contributor to understanding the overall relationship we examine. As a crude check, we examine the characteristics of those issues dropped versus those retained (primarily for the public debt sample) and conclude there are no significant differences between the groups.

[6] As a further analysis, we separate our rated debt into investment grade (BBB- or better) and speculative grade (BB+ or worse) issues as identified by Standard & Poor's ratings. The rationale for this analysis is that firms with an investment grade rating are perceived as being of higher financial quality, which is a signal (i.e., a type of certification) to investors that effectively may reduce asymmetry and lower issue costs. Of the 63 rated issues, there are only five that are investment grade. We find no significant relations in any of the primary variables of interest. Regardless, for robustness we consider alternative specifications of the models that include variables to control for the level of the rating. We find no significant relations in any specification.

Table 2—Summary Statistics by Public Debt Segment

Panel A: Information Asymmetry and Issue Costs

	Rated (1)	Non-Rated (2)	t-statistic (3)
N	63	28	
Initial	11.38	26.64	-1.49
OCI	.57	4.69	-1.60
Range	.14	.15	-.89
Revision	.21	.61	-1.35

Panel B: Firm and Issue Characteristics

	Rated (1)	Non-Rated (2)	t-statistic (3)
Sales	447.62	206.93	1.76
Assets	569.80	294.70	2.50
Proceeds	136.69	115.86	.71
VC	.31	.46	-1.35
Age	19.38	12.18	1.42
Integer	.83	.79	.46
HT	.31	.61	-2.66
Internet	.05	.18	-1.68
Rank	8.24	8.64	-1.87
Primary	.63	.82	-2.05
NasLag	.78	3.23	-1.92
PartialU	8.41	7.16	.39
PartialD	-10.33	-7.12	-1.21
Nineties	.89	.93	-.60
Bubble	.30	.39	-.87

Note: This table presents descriptive statistics for the sample of IPOs that had a public debt issue prior to the offering, segmented by those with rated debt and those with unrated debt. Columns 1 and 2 provide means for the identified segments, and Column 3 reports the t-statistics from difference tests assuming unequal variances. Panel A reports variables related to information asymmetry and the cost of going public, and Panel B reports firm and offer characteristics

The Effect of Prior Debt on Equity Issuance

The variation in the univariate results for the firm and offering characteristics above suggests that the differences in issue costs and information asymmetry may be driven by factors (e.g., size and/or age) other than the existence of prior public or private debt. Therefore, we control for these underlying characteristics by estimating the parameters of the following model:

$$\begin{aligned} Dep_i &= \alpha + \beta_1 Private + \beta_2 Public + \beta_3 LnAssets \\ &\quad + \beta_4 LnProceeds + \beta_5 VC + \beta_6 LnAge + \beta_7 Integer \\ &\quad + \beta_8 HT + \beta_9 Internet + \beta_{10} Rank + \beta_{11} Primary \\ &\quad + \beta_{12} NasLag + \beta_{13} PartialU + \beta_{14} PartialD \\ &\quad + \beta_{15} Nineties + \beta_{16} Bubble + \varepsilon_i \end{aligned} \quad (3)$$

where Dep is the dependent variable and is either Initial, OCI, Range, or Revision. Private is a dummy variable equal to one if the issuer has prior private debt, zero

otherwise, and Public is a dummy variable equal to one if the issuer has prior public debt outstanding, zero otherwise. The remaining independent variables serve as controls and are as previously defined.[7]

The natural logarithm of total assets at issuance is included as a proxy measure for information asymmetry, as larger firms are likely to be more well-known in the market and, therefore, have lower asymmetry.[8] The natural logarithm of the size of the deal is a common conditioning variable. Earlier research (e.g., Megginson and Weiss, 1991) finds that venture capitalists perform a certification role; however, more recent evidence (e.g., Loughran and Ritter 2004) suggests that VC backing has no significant effect over the period we study. To control for this relation, we include the VC dummy variable. The age of the firm may affect the amount of information available, thus we also include LnAge.

Bradley, Cooney, Jordan, and Singh (2004) find that IPOs priced on an integer exhibit greater underpricing, which they attribute to pricing uncertainty and the lack of time available to negotiate an offer price. Thus, we include the Integer dummy variable. High technology issues, particularly those that are internet related, have received increased focus during the period we study, as they typically are associated with higher levels of underpricing (and asymmetry). Thus, we include the dummy variables HT and Internet. We also include the underwriter quality variable (Rank), as Dolvin (2005) finds that underwriter certification has a significant effect, particularly once we control for the level of overhang.

The lag variable (NasLag) proxies for investor sentiment and the existence of a hot IPO market. PartialU and PartialD control for the well-known partial adjustment phenomenon. Following Bradley and Jordan (2002), we include separate variables for upward and downward adjustments because recent studies find evidence of an asymmetric effect (i.e., upward adjustments have a greater impact). We also include the time period dummies (Nineties and Bubble), as Loughran and Ritter (2004) find differing results over these periods. We report the results of this analysis in Table 3.[9] In regressions (2), (4), (6), and (8), we further split Public into dummy variables that identify if prior public debt is rated (PublicRated) or nonrated (PublicNonRated).

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[7] Rather than the absolute size of the offer, we use LnProceeds, which is the natural logarithm of the proceeds amount in millions of dollars, inflation adjusted to 1986 values. Rather than the absolute age of the firm, we use LnAge, which is the natural logarithm of one plus the age of the issuing firm in years. Also, rather than the absolute size of the issue firm, we use LnAssets, which is the natural logarithm of the asset value in millions of dollars.

[8] In unreported results, we replace LnAssets with LnSales, as both may proxy for the size of the issuing firm prior to issuance. The results are qualitatively unchanged.

[9] Note that in regressions (5) through (8) we do not include the partial adjustment variables, as Revision is a measure of this movement and Range proxies for a similar notion. For robustness, we include PartialU and PartialD in the regression with Range as the dependent variable and find our results to be consistent with those reported.

Table 3—Regression Results

	Initial				OCI			
	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	6.84	2.86	6.83	2.86	3.72	4.32	3.72	4.33
Private	1.50	1.20	1.50	1.20	-.65	-1.44	-.65	-1.44
Public	-5.47	-1.68			-2.55	-2.17		
PublicRated			-4.87	-1.34			-2.94	-2.24
PublicNonRated			-7.67	-1.13			-1.12	-.46
LnAssets	-.54	-1.02	-.54	-1.02	-.23	-1.22	-.23	-1.22
LnProceeds	-1.52	-1.62	-1.53	-1.62	.56	1.65	.56	1.65
VC	.09	.08	.09	.09	-.03	-.06	-.03	-.07
LnAge	-.23	-.44	-.23	-.44	.14	.76	.14	.77
Integer	3.51	3.21	3.51	3.21	1.14	2.88	1.14	2.89
HT	3.40	3.16	3.41	3.17	-.21	-.55	-.22	-.56
Internet	18.63	7.01	18.63	7.01	-.86	-.90	-.86	-.90
Rank	.18	.57	.18	.58	-.35	-3.07	-.35	-3.09
Primary	1.89	1.87	1.89	1.87	.66	1.81	.66	1.80
NasLag	.71	6.54	.71	6.55	.08	1.97	.08	1.95
PartialU	1.01	27.22	1.01	27.20	.09	6.51	.09	6.52
PartialD	.33	7.02	.33	7.03	.15	8.98	.15	8.97
Nineties	3.96	2.88	3.98	2.88	1.82	3.67	1.82	3.66
Bubble	16.79	8.98	16.79	8.98	-.68	-1.01	-.68	-1.01
N	2,976	2,976	2,976	2,976				
Adj. R. Sq.	.4103	.4101	.0857	.0855				

	Range				Revisions			
	(5)		(6)		(7)		(8)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	.09	13.78	.09	13.78	-.66	-5.73	-.66	-5.73
Private	.00	.56	.00	.56	.02	.31	.02	.31
Public	-.02	-1.73			-.49	-3.45		
PublicRated			-.02	-1.51			-.45	-2.84
PublicNonRated			-.02	-.90			-.62	-2.15
LnAssets	-.00	-1.95	-.00	-1.95	-.19	-8.15	-.19	-8.16
LnProceeds	.00	.13	.00	.13	.64	15.66	.64	15.65
VC	.00	1.17	.00	1.17	.11	2.36	.11	2.37
LnAge	.00	2.51	.00	2.51	-.02	-.84	-.02	-.84
Integer	.01	.91	-.01	-3.09	.03	.65	.03	.65
HT	.01	4.13	.01	4.13	.14	2.97	.14	2.98
Internet	.01	.91	.01	.91	1.05	9.62	1.05	9.62
Rank	.01	9.04	.01	9.04	-.03	-1.84	-.03	-1.84
Primary	-.01	-2.53	-.01	-2.53	-.12	-2.69	-.12	-2.69
NasLag	.00	1.29	.00	1.29	.04	9.24	.04	9.25
PartialU								
PartialD								
Nineties	.01	2.25	.01	2.25	-.17	-2.76	-.17	-2.75
Bubble	-.00	-.04	-.00	-.04	-.19	-2.42	-.19	-2.41
N	2,976	2,976	2,602	2,602				
Adj. R. Sq.	.0799	.0796	.2244	.2242				

Note: This table presents regression results from the estimation of the following model:

$$Dep_i = \alpha + \beta_1 Private + \beta_2 Public + \beta_3 LnAssets + \beta_4 LnProceeds + \beta_5 VC + \beta_6 LnAge + \beta_7 Integer + \beta_8 HT + \beta_9 Internet + \beta_{10} Rank + \beta_{11} Primary + \beta_{12} NasLag + \beta_{13} PartialU + \beta_{14} PartialD + \beta_{15} Nineties + \beta_{16} Bubble + \varepsilon_i$$

where Dep is the dependent variable and is either Initial, OCI, Range, or Revision

We begin by examining the relation between prior debt and the cost of going public (measured by both Initial and OCI) in Table 3.[10] The coefficients on the control variables are generally in line with previous studies (e.g., Dolvin and Jordan, 2005). For example, issues with greater proceeds are associated with lower underpricing, but higher OCI. Further, issues priced on an integer have higher underpricing and issue costs. Issues taken public by higher quality underwriters have lower OCI. Also, issues going public during the bubble period, particularly those that were internet related, have higher levels of underpricing.

Specific to the focus of this study, prior private debt is not significantly related to underpricing or OCI, suggesting that prior private debt does not reduce indirect issuance costs.[11] These results are in contrast to Fama (1985) and James and Wier (2004), but they are consistent with the implicit predictions of Schenone (2004). Specifically, the majority of the IPOs we examine (i.e., 1986 to 1997) take place prior to the repeal of the Glass-Steagal Act; thus, Schenone predicts that prior debt issues should have no influence on reducing issuance costs.

In contrast to prior private debt, prior public debt is associated with both lower underpricing (although only marginally) and lower OCI, which suggests that prior public debt reduces the cost of going public (most likely from reduced information asymmetry), but private debt does not. Distinguishing between rated and unrated public debt (i.e., regressions 2 and 4) reveals that the reduction in costs, particularly OCI, is primarily a result of rated debt, which is consistent with a larger amount of information being available for these issues. As a whole, our results to this point lend support to the conclusions of Cai, Ramchand, and Warga (2004) that rated public debt reduces issuance costs; however, our findings provide more specific evidence on the true opportunity cost of issuance, as well as on the impact of the debt issue being rated.

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[10] The empirical specification for underpricing is based implicitly on the premise that the market price at the end of the first trading day reflects the true value of an issue, but some studies find market overreaction. This issue, assuming any overreaction is not systematic, should not bias our results. Moreover, because the offer price typically is adjusted immediately prior to issuance, it also would reflect any bias. Thus, because we measure the difference, rather than concentrating specifically on the aftermarket price, any potential bias should have little effect on our results. Further, by controlling for various time periods and issue characteristics, we broadly control for any potential bias associated with overreaction. We thank an anonymous referee for making this point.

[11] Although OCI controls for the level of share retention, it is possible that the level of stock retained is in itself a signal of issue quality. To address this possibility, we sort issues into those with overhang levels at or above the median (2.27) and those below. We repeat our analysis and find no significant differences in our results. We also repeat our analysis after including share overhang as an independent variable; however, our results again remain qualitatively unchanged. We thank an anonymous referee for making this point.

If prior debt issues reduce information asymmetry, then we would expect offer prices to exhibit lower volatility. Thus, to further examine the likelihood that the reduction in issue costs stems from lower information asymmetry, we also examine filing ranges and price revisions in Table 3. Consistent with Range and Revision measuring price volatility, many of the independent variables that control for asymmetry have the expected sign. For example, larger issuing firms are associated with smaller filing ranges and revisions. Also, high technology issues have larger filing ranges and revisions. Surprisingly, however, some variables have contrasting relations to Range and Revision. For example, higher quality underwriters are associated with smaller revisions, but larger filing ranges, which may result from larger underwriters being able to exert market power over their clients (e.g., Dolvin, 2005). Also, issues going public in the 1990s are associated with larger filing ranges, but lower revisions.

As above, the primary variables of interest are Private and Public, as well as the related dummy variables. Consistent with the insignificant relation between prior private debt and issue costs, we find that prior private debt issues have no influence on filing ranges or price revisions. We do find, however, that the existence of prior public debt is associated with both narrower filing ranges (again, marginally) and smaller price revisions, both of which are consistent with lower information asymmetry, as well as with the reduced cost of issuance discussed above. In contrast to our previous findings, the effect of prior public debt on price revisions seems unrelated to whether the debt is rated.

Public Debt Matched Sample

Our results above, consistent with previous studies, suggest that rated debt generally reduces the amount of information asymmetry and, therefore, lowers the cost of going public, but prior private debt has little influence. These results, however, evaluate firms with public debt (a small number) relative to all other IPO's and potentially mask the relations relative to more comparable firms. Thus, to make the comparison more meaningful, we create a matched sample of firms, where we match by offer date and issuing firm size, as measured by total assets.[12]

Based on our findings above (i.e., only public debt appears to be important), we conduct the matched analysis for firms with prior public debt. With the matched firms, we have a sample of 130 observations (65 with prior public debt and 65 matched firms). We repeat the second (i.e., even numbered) regression for each dependent variable in Table 3 and report the results in Table 4. Interestingly, we find the results to be much different.

[12] For robustness, we also match by sales, SIC code, profitability, proceeds, and age, generally finding similar results, particularly when matching size-based criteria.

Table 4—Matched Sample Regression Results

	(1) Initial		(2) OCI		(3) Range		(4) Revision	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	6.64	.33	-6.01	-.52	.12	2.89	.17	.15
Rated	-3.76	-.59	-2.65	-.72	-.02	-1.71	-.37	-1.27
PublicNonRated	-8.51	-.87	-2.03	-.36	-.02	-1.06	-.78	-1.78
LnAssets	-.49	-.12	-3.25	-1.36	.01	1.75	-.35	-1.91
LnProceeds	-4.05	-.65	5.96	1.66	-.01	-1.12	.62	2.20
VC	2.89	.45	3.90	1.05	.00	.16	.20	.69
LnAge	3.56	1.14	-.62	-.34	-.00	-.36	.11	.74
Integer	5.48	.71	1.70	.38	.02	1.33	.18	.48
HT	2.70	.36	-6.57	-1.53	.01	.95	.40	1.19
Internet	17.69	1.44	-12.35	-1.74	-.03	-1.05	.92	1.70
Rank	-.30	-.12	-.24	-.17	-.00	-.00	-.13	-.93
Primary	3.52	.58	5.47	1.55	.00	.24	-.09	-.31
NasLag	1.29	2.36	.01	.03	.00	1.38	.10	4.38
PartialU	.72	3.91	.16	1.52				
PartialD	.55	1.95	.24	1.48				
Nineties	8.96	.75	5.19	.76	.00	.03	.23	.37
Bubble	22.01	2.90	-2.30	-.52	.01	.68	-.20	-.59
N	130		130		130		130	
Adj. R^2	.3660		.0589		-.0299		.2477	

Note: This table presents regression results from the estimation of the following model:

$$Dep_i = \alpha + \beta_1 Rated + \beta_2 PublicNonRated + \beta_3 LnAssets + \beta_4 LnProceeds + \beta_5 VC + \beta_6 LnAge + \beta_7 Integer + \beta_8 HT + \beta_9 Internet + \beta_{10} Rank + \beta_{11} Primary + \beta_{12} NasLag + \beta_{13} PartialU + \beta_{14} PartialD + \beta_{15} Nineties + \beta_{16} Bubble + \varepsilon_i$$

where Dep is the dependent variable and is Initial, OCI, ShareOver, Range, or Revision

There now appears to be no highly significant relation between prior public debt, rated or not, and either of the issuance cost variables (i.e., Initial or OCI). Further, the relation to the offer price variables is only marginally significant. These results, based on our matching approach, are likely a product of underlying characteristics of the issuing firm that are reflected by their ability to assume public (or private) debt. In this particular situation, the ability to take on debt seems to be a reflection of the size of the issuing firm. Thus, failure to specifically control for this characteristic masks the true underlying relation. Therefore, the documented relationship between prior debt issuance and information asymmetry, which we (and others) previously find support for, seems to be a reflection of underlying firm characteristics (i.e., size).

Additional Robustness Checks

The formal regression model we suggest has a number of independent variables that may be related (e.g., Table 1). Thus, our results may be affected by multicollinearity. Therefore, we run a series of robustness tests designed to control for this possibility. Specifically, we begin by analyzing variance inflation factors (VIFs). A

suggested rule of thumb is that a value higher than 10 is problematic. Our factors are all below 3.0, with only three variables having a VIF above 2.0. The variables that have the strongest relation are LnSize and Rank. To address the possible effects of multicollinearity, we separately repeat the regressions using only one of these variables. We also conduct a similar process with the time period dummy variables, which exhibit a slight positive correlation. Our results in each case remain unchanged.

Rather than segmenting by public and private debt, we also conduct an analysis using dummy variables that identify (1) whether a firm had any type of debt and (2) whether the debt was public (e.g., the incremental effect of public debt). As would be expected, we find consistent results with those reported. To control for possible relations between public and private debt, we also separately examine IPOs with prior private debt relative to issues with no prior debt, as well as IPOs with prior public debt relative to issues with no prior debt. We find consistent results with those reported.

The results in Table 1 suggest that a greater percentage of the issues with prior public debt occurred during the internet bubble period (i.e., 1999 to 2000). Although we attempt to control for this relation using a time period dummy, we conduct an additional check by examining the pre-bubble period separately from the bubble period. We find that the coefficient on Private is larger and more significant in the 1986 to 1997 period and smaller and less significant in the post-Glass-Steagal period, both of which are consistent with Schenone's predictions.[13] The general results as reported above, however, are consistent across periods.

Last, following Cai, Ramchand, and Warga (2004) we eliminate firms with founding dates prior to 1970, as it is possible that these firms had public debt outstanding prior to this period. If firms did have debt prior to this date, SDC would fail to capture this information. We find that this elimination has little effect on our results, and our conclusions remain unchanged.

Conclusion

Many theories that attempt to address the large positive opportunity costs associated with equity issuance base their models on the existence of asymmetric information between buyers and sellers. Prior empirical studies that examine this relation typically concentrate on underpricing and find, consistent with theoretical predictions, that there is a positive relation between information asymmetry and the cost of going public. Dolvin and Jordan (2005), following Barry (1989), illustrate that focusing on underpricing may produce biased results, as this measure fails to

[13] Note that we cannot make a strict comparison to Schenone (2005) for the post-Glass-Steagal period because we do not have information on lenders that are able to take the firm public, as this is beyond the scope of our study.

control for the share retention decision. Thus, we replicate and extend existing studies by examining the influence of prior debt on the true wealth effect (i.e., opportunity cost of issuance—OCI) of the offering.

Specifically, we examine firms going public that have previously issued either private or public debt, hypothesizing that these previous security issues increase the amount of information available for potential equity investors and, therefore, reduce the cost of going public. Rather than focusing purely on underpricing as a measure of the cost of going public, we also examine the true wealth effect of the offering (i.e., OCI). We find that prior private debt is insignificantly related to OCI, which contrasts with prior studies; however, prior public debt, particularly rated debt, is negatively related to the cost of going public. We further extend our analysis by examining the relation between prior debt and both file ranges and price revisions. Consistent with the results related to the opportunity cost of issuance, we find that prior private debt is insignificantly related to these measures of asymmetry.

Another important omission in existing studies is a failure to control for underlying firm characteristics that may be associated with both the ability to issue debt (public or private) and the level of information asymmetry. Thus, we extend our analyses using a matched sample based on issue date and issuer size, as measured by firm assets. We find that the significant relationship between prior debt and issue costs disappears with this matching process.

As a whole, our preliminary results suggest that the negative relation between prior public debt and indirect issuance costs appears consistent with reductions in information asymmetry, which matches the findings of existing studies. The extensions we employ suggest that the relation is more likely a result of underlying firm characteristics rather than a true issuance cost reduction. Therefore, we conclude that the documented negative relationship is perhaps overemphasized and that any future study should make efforts to control for firm characteristics that are likely driving the results.

References

1. Barry, C., "Initial Public Offering Underpricing: The Issuer's View—A Comment," *Journal of Finance* (September 1989), pp. 1099-1103.

2. Benveniste, L., and P. Spindt, "How Investment Bankers Determine the Offer Price and Allocation of New Issues," *Journal of Financial Economics* (September 1989), pp. 213-232.

3. Bradley, D., J. Cooney, B. Jordan, and A. Singh, "Negotiation and the IPO Offer Price: A Comparison of Integer Versus Non-integer IPOs," *Journal of Financial and Quantitative Analysis* (September 2004), pp. 517-540.

4. Bradley, D., and B. Jordan, "Partial Adjustment to Public Information," *Journal of Financial and Quantitative Analysis* (December 2002), pp. 595-616.

5. Cai, N., L. Ramchand, and A. Warga, "The Pricing of Equity IPOs that Follow Public Debt Offerings," *Financial Management* (Winter 2004), pp. 5-26.

6. Carter, R., and S. Manaster, "Initial Public Offerings and Underwriter Reputation," *Journal of Finance* (September 1990), pp. 1045-1067.

7. Chung, K., M. Li, and L. Yu, "Assets in Place, Growth Opportunities, and IPO Returns," *Financial Management* (Autumn 2005), pp. 65-88.

8. Dolvin, S., "Market Structure, Changing Incentives and Underwriter Certification," *Journal of Financial Research* (Fall 2005), pp. 403-419.

9. Dolvin, S., and B. Jordan, "The Cost of Going Public to Preexisting Shareholders," *Working paper, SSRN* (2005).

10. Fama, E., "What's Different about Banks?" *Journal of Monetary Economics* (January 1985), pp. 5-29.

11. James, C., and P. Wier, "Borrowing Relationships, Intermediation and the Cost of Issuing Public Securities," *Journal of Financial Economics* (July 1990), pp. 149-171.

12. Loughran, T., and J. Ritter, "Why Don't Issuers Get Upset about Leaving Money on the Table in IPOs?" *Review of Financial Studies* (Summer 2002), pp. 413-443.

13. Loughran, T., and J. Ritter, "Why Has Underpricing Increased over Time?" *Financial Management* (Autumn 2004), pp. 5-37.

14. Ljungqvist, A., and W. Wilhelm, "IPO Allocations: Discriminatory or Discretionary," *Journal of Financial Economics* (February 2002), pp. 167-201.

15. Megginson, W., and K. Weiss, "Venture Capitalist Certification in Initial Public Offerings," *Journal of Finance* (July 1991), pp. 879-903.

16. Peterson, M., and R. Rajan, "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance* (March 1994), pp. 3-37.

17. Rock, K., "Why New Issues Are Underpriced," *Journal of Financial Economics* (January 1986), pp. 187-212.

18. Schenone, C., "The Effect of Banking Relationships on the Firm's IPO Underpricing," *Journal of Finance* (December 2004), pp. 2903-2958.