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Historical interest rates and debt market timing: evidence from the private placement market

Abstract

This paper examines the timing behavior in the US private placement market and then link it to the capital structure of the borrowing firms. First, the author classifies all private placement/144A firms into two categories: firms that borrow when debt market conditions are more favorable compared to a year ago (i.e. the yields have come down), and firms that borrow when debt market conditions are less favorable compared to a year ago (i.e. yields have gone up). Comparing the two groups, the author finds that firms that borrow when yields are low tend to borrow in larger amounts. After finding evidence of timing in the private placement market, the author continues with the capital structure tests. These tests reveal that while all other firms start reducing their leverage levels immediately after the offering, the “market timers” continue to increase their leverage levels for two more years, and then they start reducing their leverage levels. As a result, “market timers” have significantly higher leverage ratios compared to the other firms in the long run (i.e. 2 to 5 years). The results here do also support the tradeoff theory: on average, the private placement/144A issuers tend to move towards their pre-issue leverage levels.

Keywords: market timing, debt, private placements, interest rates, capital structure, leverage ratio.

JEL Classification: G30, G32.

Introduction

Both equity market timing and debt market timing focus on the same question: Do firms time their financing activities in order to reduce their cost of capital? While equity market timing focus on the relation between equity market conditions (i.e. market-to-book ratios, or stock values) and the value of the shares issued, debt market timing relates debt market conditions (i.e. interest rates) to the amount borrowed as well as to the maturity structure of the new issues.

The previous studies mainly focus on either corporate equity offerings or corporate bond offerings (i.e. public debt). They ignore other types of debt financing activities including bank loans and private placements. Although private placements are not as common as bond offerings or bank loans, they are the third largest source of debt financing in US after bond offerings and bank loans. We know that firms try to time their bond offerings. They try to issue bonds when interest rates are relatively low. But, do firms try to time the private placement market? Do they borrow more (and in longer maturities) when interest rates are more favorable? In other words, do managers observe the interest rates and make their borrowing decisions based on the changes in the interest rates?

Also, there is much discussion on “the capital structure implications of market timing”. Baker and Wurgler (2002) show that the market timers in the equity markets tend to have lower leverage ratios in the long run. Their findings imply that successful timers permanently lower their leverage ratios.

Baker and Wurgler’s (2002) theory is later called “The market timing theory of capital structure” by academics. Interestingly, this theory was not supported by the more recent studies (Alti, 2006; Kayhan and Titman, 2007). These newer studies find that the impact of timing on leverage disappears in two or three years. Therefore, the previous studies on equity market timing have conflicting results regarding the capital structure implications of market timing. While the discussion for the capital structure implications of equity market timing still continues, there is a new area of research emerging: Does debt market timing have any implications for the borrower’s capital structure? In other words, when firms time their borrowing activities (i.e. bond offerings, bank loans, or private placements), do they permanently alter their capital structure?

To answer these questions, in this study, I focus on the US private placement market to see if firms time their financing activities in this specific market. I also test for the capital structure implications of timing in this market in order to contribute to the discussion between Baker and Wurgler (2002) and the more recent studies. Therefore, this article contributes to the literature by answering these two main questions: (1) Do firms borrow in larger amounts and at longer maturities in the private placement/144a market when market conditions (i.e. the interest rates) are more favorable? (2) Is there any difference in the long run between the capital structures of “favorable market” (i.e. periods of low rates) and “unfavorable market” (i.e. periods of high rates) borrowers?

To the best of my knowledge, my article is the first one that links debt market conditions to the leverage ratios of firms that borrow in the private placement/144a market. I use observed interest rates as my proxy

for market conditions. In order to collect the private placement data, I use the Securities Data Corporation (SDC) "New Issues Database". To collect all other financial data that are necessary for my regression analyses, I use the Compustat database.

The paper proceeds as follows. Section 1 discusses the previous literature. Section 2 shows the hypotheses that are being tested. Section 3 describes the data and explains the methodology. Section 4 shows the results of the empirical tests. The final section concludes the paper.

1. Literature

Taggart (1977) and Marsh (1982) are the first studies that focus on debt market timing. These two studies show that, in order to reduce their cost of capital, firms time the markets by borrowing more in periods of relatively low interest rates. More recent studies (i.e. Barclay and Smith, 1995; Guedes and Opler, 1996; Stohs and Mauer, 1996) focus on the relation between the maturity choice and term premium (i.e. the difference between the yields of long- and short-term government debt). Using either data on new public debt offerings or balance sheet data on debt, these three studies find that, in order to reduce their cost of capital, new borrowers tend to choose shorter (longer) maturities when the term premium gets larger (smaller). Baker et al. (2003) confirm these findings.

The recent surveys by Graham and Harvey (2001) and Bancel and Mittoo (2004) reveal that a large fraction of chief financial officers prefer shorter (longer) maturities when the term premium gets larger (smaller). Therefore, these surveys confirm the earlier findings regarding the relation between the maturity choice and the term premium.

On the other hand, Butler et al. (2004) argue that firms are just reacting to (as opposed to forecasting) the increase in the relative cost of long-term debt (due to the monetary and fiscal policy of the United States government during the early 1980s). More recently, Barry et al. (2008) find that the level of interest rates relative to historical levels strongly affects debt issuance and debt maturity choice in the public debt market.

The previous research on market timing and its impact on the financing firms' capital structure have focused on equity markets. In their seminal article titled "Market Timing and Capital Structure", Baker and Wurgler (2002) show that the timing of IPOs and SEOs have long-lasting effects on the issuing firms' capital structure. They show that low (high) leverage firms are those that raised funds when their

market valuations were high (low), as measured by the market-to-book ratio.

Although Korajczyk and Levy (2003), Flannery and Rangan (2005), Hovakimian (2005), Alti (2006), Kayhan and Titman (2007), Huang and Ritter (2009), Elliott et al. (2007), and O'Brien et al. (2007) do support Baker and Wurgler (2002) findings on equity market timing, they do not support the capital structure implications of IPO and SEO market timing. These studies generally find that, within a period of two years, the impact of equity market timing on the issuing firms' capital structure disappears.

Although Hovakimian (2005) links capital structure to debt issues and debt reductions, he does not differentiate between "market timers" and "other firms", therefore he does not actually link debt market timing to capital structure. He argues that both debt issues and debt reductions have a significant long-lasting effect on capital structure, and he empirically shows that the leverage ratios of debt issuers three years after the offering are significantly higher than their pre-issue levels.

2. Hypotheses

The previous studies on market timing show that firms time their equity and bond offerings. In order to reduce their cost of capital (and therefore to increase their value) firms tend to issue equity when their market values are relatively high and they tend to issue bonds when interest rates in the market are relatively low. Some of the studies that focus on corporate bond offerings look at firms' timing behavior relative to past interest rates (i.e. backward-looking market timing), and some look at firms' timing behavior relative to future interest rates (i.e. forward-looking market timing).

Private placements are one of the three main sources of debt financing for US firms (i.e. others are bank loans and bond offerings). Although they are important as a financing source for US firms, they are ignored in the capital structure studies. Do firms time their private placements? Do they try to choose a relatively more favorable period to borrow money from these private financing sources? These questions are still unanswered at this point.

In order to fill this void in the capital structure literature, in this article, I focus on the private placement market and test for backward-looking market timing in this market. Backward-looking market timing states that managers do successfully time the markets by issuing more debt at longer maturities when interest rates are low relative to the past rates.

My hypotheses of interest for the private placement market are:

Hypothesis 1: Firms borrow more money in the private placement/144A market when interest rates are low relative to recent historical levels.

Hypothesis 2: Firms borrow at longer maturities in the private placement/144A market when interest rates are low relative to recent historical levels.

If firms time their borrowing, then will this affect their leverage levels in the long run? In other words, if a firm successfully times the private placement market, will this help the firm to reduce their leverage levels permanently? The impact of timing on leverage has been examined in the equity and bond markets, but it has not been done in the private placement market. Is timing in this market affect the borrower's leverage levels in the long run?

In this article, after showing evidence of timing in the private placement market, I examine the long run impact of timing on the borrowing firm's capital structure. In fact, this is the first article that tests for the long run impact of timing in the private placement/144A market on the borrower's capital structure. I differentiate between the "market timers" and the other firms, and compare these two groups' leverage ratios in the long run (i.e. up to a five-year period after the issue).

So, my hypothesis of interest regarding the long run impact of timing in this market on leverage is:

Hypothesis 3: Firms that borrow in the private placement/144A market when interest rates are low have low leverage ratios in the long run (i.e. up to five years after the borrowing).

3. Data and methodology

3.1. Data. The initial sample consists of all private placements and 144a issues between January 1, 1984 and December 31, 2004 reported by the Securities Data Company (SDC). I restrict the sample to exclude unit offers, financial firms with SIC codes between 6,000 and 6,999 and firms with book values of assets below \$10 million in 2004 dollars at the end of the last issue quarter. Since financing choices of subsidiary companies may be motivated by the parent companies' own needs, all subsidiary companies are dropped from the sample. After excluding the financial firms, the subsidiaries, the outliers and the observations without the required Compustat data, I am left with 2,164 private placements and 144a issues.

The characteristics of the private placement/144a firms are shown in Table 1. While the median *maturity* of a private placement/144a issue is 10.14 years, the median value of *proceeds scaled by assets* (i.e. the issue size) is 0.05, which is much smaller than the corresponding value for IPOs or SEOs. In other words, private placements/144a issues are much smaller events for the firms compared to equity issues.

As Table 1 shows, both the mean and the median values of these interest rate variables are negative. This is not surprising. Since the rates generally went down over the sample period, we expect to see negative mean and median values for *H2*, *H4*, *H6*, *H8* and *H12*.

Table 1. Summary statistics for private placements/144a issues

Variable	Median	Mean	SD	Skewness	Kurtosis
<i>Size</i>	5.42	5.51	1.82	-0.08	0.31
<i>Tangibility</i>	0.43	0.46	0.25	0.16	-1.22
<i>Profitability</i>	0.24	0.27	0.18	1.32	2.33
<i>M/B</i>	0.62	0.87	0.83	3.33	16.27
<i>Leverage</i>	0.35	0.37	0.18	0.67	0.69
<i>H2</i>	-0.26	-0.15	1.59	0.83	7.68
<i>H4</i>	-0.21	-0.34	2.12	-0.19	4.58
<i>H6</i>	-0.48	-0.38	2.00	-0.08	3.55
<i>H8</i>	-0.76	-0.52	1.95	1.30	5.18
<i>H12</i>	-0.94	-1.00	2.01	0.91	2.85
<i>Proceeds/A_t</i>	0.05	0.12	0.21	9.11	146.43
<i>Years to maturity</i>	10.14	16.25	24.08	3.00	7.60
Observations	2,164				

Notes: The sample covers private placements/144a issues from January 1984 through December 2004. *Size* is the natural logarithm of sales (Item 2). *Tangibility* is measured as net property, plant and equipment (Item 42)/Total assets (Item 44). *Profitability* is EBITDA (Item 21)/Total assets (Item 44). *M/B* is the (Total assets – Book value of equity + Market value of equity)/Total assets. *Leverage* is Long-term debt (Item 51) + Short-term debt (Item 45)/Total assets. *H2* is the difference between the current interest rates and the rates 2 quarters ago; *H4* is the difference between the current interest rates and the rates 4 quarters ago; *H6* is the difference between the current interest rates and the rates 6 quarters ago; *H8* is the difference between the current interest rates and the rates 8 quarters ago; and *H12* is the difference between the current interest rates and the rates 12 quarters ago. *Proceeds/A_t* is the total debt proceeds from the debt transaction scaled by end-of-quarter total assets. *Years to maturity* is the total number of years until the maturity date of the issue. Except for *Proceeds/A_t*, all variables are measured at the end of the previous quarter (*t-1*).

3.2. Methodology. A problem with private placements and 144a issues is the difficulty in finding the yield data for the entire period. Moody's has some of the yields after 1995 but it does not cover the 1984 to 1994 period at all.

Denis and Mihov (2003) have shown that the average new debt rating for non-bank private debt is "B" (S&P rating). Since the individual yields are not available, after considering Denis and Mihov (2003) findings, I have decided to collect the public debt yield data from Securities Data Company's "New Issues" database, and then use the "B" level corporate debt yields in each quarter as a proxy for private placement/144a yields. It is not a perfect measure, but it is in line with Denis and Mihov (2003) findings.

Using these "B" level corporate bond yields for all private placements/144a issues, I create the interest rate variables $H2$, $H4$, $H6$, $H8$ and $H12$ for each quarter. $H2$ is the difference between the current interest rates and the rates 2 quarters ago, $H4$ is the difference between the current interest rates and the rates 4 quarters ago, and so on.

To test for market timing, first I classify all private placements/144a issues into two categories: (1) firms that have issued debt when debt market conditions are less favorable compared to a year ago (i.e. $H4$ is positive, the yields have gone up); and (2) firms that have issued debt when debt market conditions are more favorable compared to a year ago (i.e. $H4$ is negative, yields have come down). Then, I perform a two-sample t -test that compares the means of private placement/144a issuer characteristics in periods of increasing yields versus decreasing yields. Since previous literature confirms firm *Size*, *Profitability*, *Tangibility*, *Leverage* and *M/B* as determinants of capital structure, I focus on these variables. I also compare the issue size (i.e. proceeds scaled by assets), the time to maturity and the interest rate variables $H2$, $H4$, $H6$, $H8$ and $H12$.

To test for the timing of private placements/144a issues in terms of the amount borrowed (i.e. *Proceeds scaled by assets*), the change in leverage and the level of leverage, the following regression model is used:

$$Y_t = c_0 + c_1 H4 + c_2 M / B_{t-1} + c_3 Profitability_{t-1} + c_4 Size_{t-1} + c_5 Tangibility_{t-1} + c_6 Leverage_{t-1} + \varepsilon_t, \quad (1)$$

where the dependent variable Y_t is the proceeds scaled by pre-issue assets in the first model (i.e. *Proceeds/A_{t-1}*), proceeds scaled by end-of-issue-quarter assets in the second model (i.e. *Proceeds/A_t*), the cumulative change in book leverage from the last day of the pre-issue quarter through the end of the issue quarter in the third model (i.e. $(D/A)_t - (D/A)_{t-1}$) and end-of-issue-

quarter leverage in the last model (i.e. $(D/A)_t$). The independent variable $H4$ is the increase in yields over the last 4 quarters. All other variables are as explained in Table 1.

To test for the timing of private placements/144a issues in terms of the maturity of the borrowing, the following regression model is used:

$$Years\ to\ maturity = c_0 + c_1 \Delta Yield + c_2 M / B_{t-1} + c_3 Profitability_{t-1} + c_4 Size_{t-1} + c_5 Tangibility_{t-1} + c_6 Leverage_{t-1} + \varepsilon_t, \quad (2)$$

where the dependent variable is the number of *years to maturity* for each debt offering, and the independent variable $\Delta Yield$ is $H2$, $H4$, $H6$, $H8$ or $H12$ (i.e. the increase in the yields over the last 2-, 4-, 6-, 8- and 12-quarters) in each model. Again, all other variables are as explained in Table 1.

In order to test for the long-run impact of market timing on capital structure, I run two regressions: First, I regress the change in each borrower's leverage ratio over the two-, three-, four- and five-year period after the offering, on $H4$ and the control variables, and later, I regress the level of each borrower's leverage ratio at the end of the second, third, fourth and fifth years, on $H4$ and the control variables.

The first regression model used is:

$$(D/A)_z - (D/A)_{t-1} = c_0 + c_1 H4 + c_2 M / B_{t-1} + c_3 Profitability_{t-1} + c_4 Size_{t-1} + c_5 Tangibility_{t-1} + c_6 Leverage_{t-1} + \varepsilon_t, \quad (3)$$

where the dependent variable $(D/A)_z - (D/A)_{t-1}$ is the cumulative change in book leverage from the last day of the pre-issue quarter through the end of quarters Issue + 8, Issue + 12, Issue + 16 and Issue + 20. All other variables are as explained previously.

The second regression model used is:

$$(D/A)_z = c_0 + c_1 H4 + c_2 M / B_{t-1} + c_3 Profitability_{t-1} + c_4 Size_{t-1} + c_5 Tangibility_{t-1} + \varepsilon_t, \quad (4)$$

where the dependent variable $(D/A)_z$ is the level of book leverage on the last day of quarters Issue + 8, Issue + 12, Issue + 16 and Issue + 20.

While I show the results for all private placements/144a issues in the sample, I also show the results for only the issues that will not mature over the stated period. For example, in the last column of Tables 5 and 6, all issues that will mature over the next five years are dropped from the sample; in the previous column, all issues that will mature over the next four years are dropped from the sample, etc.

4. Empirical results

The first three columns of Table 2 show the characteristics of firms that have borrowed in the private placement/144a market when debt market conditions are less favorable compared to a year ago (i.e. increasing yields), and the next three columns show the corresponding values for firms that have borrowed when debt market conditions are more favorable compared to a year ago (i.e. decreasing yields). I call the first group the “high-yield borrowers”, and the second group the “low-yield borrowers”. The last column shows the results of the two-sample *t*-test that compares the means of borrower characteristics in periods of increasing yields versus decreasing yields.

As we can see from the table, borrowers in favorable and unfavorable markets are similar in *Size*, *Tangibility*, *Profitability*, and *Leverage*. Only

the difference in *M/Bs* is significant at 10% level, which means that favorable market borrowers are generally firms with higher market values.

The *years to maturity* values are also similar for the two groups. However, the *Proceeds/A_t* values are significantly different for the two groups. While the mean value of *Proceeds/A_t* is 0.13 (i.e. 13%) for the favorable market borrowers, it is 0.09 (i.e. 9%) for the unfavorable market borrowers (the difference is significant at 1% level).

According to this table, there is no difference between the initial leverages (i.e. pre-issue leverages) of the two groups. In other words, firms in both groups start at almost the same leverage level. When they go to the private placement/144a market, on the other hand, if they find the rates low, then they borrow more (i.e. the result for *Proceeds/A_t* is significant).

Table 2. Comparison of firm and issue characteristics in periods of increasing yields versus decreasing yields

Variable	Increasing yields			Decreasing yields			2-sample <i>t</i> -test for means
	Median	Mean	SD	Median	Mean	SD	<i>p</i> -value
<i>Size</i>	5.48	5.57	1.76	5.39	5.47	1.87	0.2105
<i>Tangibility</i>	0.43	0.46	0.26	0.43	0.46	0.25	0.6923
<i>Profitability</i>	0.24	0.27	0.18	0.24	0.27	0.17	0.6563
<i>M/B</i>	0.59	0.83*	0.81	0.64	0.89*	0.84	0.0960
<i>Leverage</i>	0.34	0.36	0.17	0.36	0.37	0.18	0.1414
<i>Proceeds/A_t</i>	0.04	0.09***	0.14	0.06	0.13***	0.25	<0.0001
<i>Years to maturity</i>	10.14	16.24	23.83	10.14	16.25	24.27	0.9915
Observations	893			1,271			

Notes: The sample is divided into two subgroups: (1) all private placements/144a issues that are completed in periods of increasing yields compared to a year ago (i.e. *H4* is positive); and (2) all private placements/144a issues that are completed in periods of decreasing yields compared to a year ago (i.e. *H4* is negative). ***, ** and * denote 1%, 5% and 10% significance levels for the two-sample *t*-test comparing the means of private placement/144a issuer characteristics in periods of increasing yields versus decreasing yields.

In Table 3, I have four different regression models. The dependent variable is the “proceeds scaled by pre-issue assets” in the first model (i.e. *Proceeds/A_{t-1}*), the “proceeds scaled by end-of-issue-quarter assets” in the second model (i.e. *Proceeds/A_t*), the “cumulative change in book leverage from the last

day of the pre-issue quarter through the end of the issue quarter” in the third model (i.e. $(D/A)_t - (D/A)_{t-1}$) and the “end-of-issue-quarter leverage” in the last model (i.e. $(D/A)_t$). The independent variable *H4* is the increase in the yields over the last 4 quarters. All other variables are as explained in Table 1.

Table 3. Market timing effects on private placement/144a issuance activity (total proceeds scaled by assets and leverage)

Regression analysis				
Dependent variables	<i>Proceeds/A_{t-1}</i>	<i>Proceeds/A_t</i>	$(D/A)_t - (D/A)_{t-1}$	$(D/A)_t$
Independent variables				
<i>H4</i>	-0.006 (-2.07)	-0.006 (-3.10)	-0.003 (-2.51)	-0.005 (-2.49)
<i>M/B</i>	0.113 (13.54)	0.022 (4.16)	0.022 (7.32)	-0.022 (-4.23)
<i>Profitability</i>	0.059 (1.47)	0.024 (0.96)	0.043 (2.98)	-0.167 (-6.87)
<i>Size</i>	-0.076 (-20.80)	-0.053 (-23.34)	-0.010 (-7.57)	-0.027 (-12.17)
<i>Tangibility</i>	-0.075 (-2.72)	-0.093 (-5.38)	-0.008 (-0.79)	-0.050 (-2.90)

Table 3 (cont.). Market timing effects on private placement/144a issuance activity (total proceeds scaled by assets and leverage)

Regression analysis				
Dependent variables	$Proceeds/A_{t-1}$	$Proceeds/A_t$	$(D/A)_{t-1}(D/A)_{t-1}$	$(D/A)_t$
Independent variables				
<i>Leverage</i>	0.146 (3.75)	0.026 (1.06)	-0.086 (-6.10)	-
Adj. R^2	0.2772	0.2438	0.0931	0.0947
<i>N</i>	2,164	2,164	2,138	2,138

As we can see from the table, $H4$ explains all four dependent variables. It explains $Proceeds/A_{t-1}$ (coef = -0.006, t -statistic = -2.07) and $Proceeds/A_t$ (coef. = -0.006, t -statistic = -3.10). When $H4$ is lower (i.e. current rates are lower compared to the rates four quarters ago), proceeds are higher. This result implies

that managers actually observe the changes in the interest rates over the previous year and determine how much to borrow accordingly. Since firms borrow more when rates are lower, naturally, their leverage ratios go up during that quarter (i.e. hence we have negative coefficients for $(D/A)_{t-1}(D/A)_{t-1}$ and $(D/A)_t$.

Table 4. Market timing effects on private placement/144a issuance activity (*years to maturity*)

Regression analysis					
Dependent variable: <i>Years to maturity</i>					
Model	(1)	(2)	(3)	(4)	(5)
$H2$	-0.157 (-0.49)	-	-	-	-
$H4$	-	-0.144 (-0.59)	-	-	-
$H6$	-	-	-0.651 (-2.49)	-	-
$H8$	-	-	-	-0.933 (-3.49)	-
$H12$	-	-	-	-	-1.150 (-4.39)
<i>M/B</i>	-0.853 (-1.27)	-0.870 (-1.30)	-0.806 (-1.21)	-0.733 (-1.10)	-0.656 (-0.98)
<i>Profitability</i>	1.739 (0.54)	1.740 (0.54)	1.210 (0.38)	0.614 (0.19)	0.398 (0.12)
<i>Size</i>	-0.852 (-2.89)	-0.859 (-2.91)	-0.887 (-3.01)	-0.820 (-2.78)	-0.776 (-2.64)
<i>Tangibility</i>	7.109 (3.19)	7.125 (3.20)	7.049 (3.17)	6.500 (2.92)	6.310 (2.84)
<i>Leverage</i>	-16.032 (-5.13)	-16.055 (-5.13)	-15.872 (-5.08)	-15.607 (-5.00)	-15.517 (-4.98)
Adj. R^2	0.0172	0.0173	0.0200	0.0227	0.0259
<i>N</i>	2,126	2,126	2,126	2,126	2,126

In Table 4, the *years to maturity* of each private placement/144a issue is regressed against the five firm-specific control variables and an interest rate variable (i.e. $H2$, $H4$, $H6$, $H8$ or $H12$) in each of the five models. The goal here is to see if firms try to lower their cost of capital by borrowing at longer maturities in periods of low interest rates. Again, I expect to find negative coefficients for the interest rate variables since these variables are measured as the difference between the current rates and the past rates.

As can be seen from the first two columns, $H2$ and $H4$ are statistically insignificant (the coefficients are -0.157 and -0.144, and the t -statistics are -0.49 and -0.59). On the other hand, the next three columns show that $H6$, $H8$ and $H12$ are all significant predictors of *years to maturity* of private placements/

144a issues. The regression coefficients for $H6$, $H8$ and $H12$ are -0.651 (t -statistics = -2.49), -0.933 (t -statistics = -3.49) and -1.150 (t -statistics = -4.39), respectively. These results indicate that when interest rates are low compared to the rates one-and-a-half, two, or three years ago, managers tend to issue longer maturity private debt.

To see the capital structure implications of borrowing in favorable versus unfavorable periods, I run two sets of regressions. The results of these regressions are shown in Tables 5 and 6. In Table 5, I regress the cumulative change in the leverage ratios of the private placement/144a firms over the next two, three, four, or five years after the borrowing against the five firm-specific control variables and the $H4$ variable. The results are shown in the first four columns. The last four columns in Table 5 exclude

debt that will mature over the next 8, 12, 16 and 20 quarters. My objective here is to take out the effects of the new offerings themselves. I want to see how firms deal with their capital structures after the offering, and to see that more clearly, I have to exclude the impact of the maturing original offering (if it matures over that time frame). In Table 6, I use the level of leverage itself (rather than the change in leverage) as my dependent variable. Here, I am excluding the *Leverage* (i.e. pre-issue leverage) since it is highly correlated to the dependent variable $(D/A)_z$ (i.e. the level of leverage two, three, four and five years after the issue).

Tables 5 and 6 show that the impact of timing on capital structure continues over time. In Table 5, for all issues, the coefficient for *H4* is -0.01 and signi-

ficant (*t*-statistics = -2.17) at the end of quarter Issue + 8, -0.01 and significant (*t*-statistics = -1.87) at the end of quarter Issue + 12, -0.00 and insignificant (*t*-statistics = -0.55) at the end of quarter Issue + 16, and -0.01 and significant (*t*-statistics = -1.98) at the end of quarter Issue + 20.

Table 6 examines the impact of timing on the level of leverage, and the results are similar to the results in Table 5. For all issues, the coefficient for *H4* is -0.01 and significant (*t*-statistics = -2.72) at the end of quarter Issue + 8, -0.01 and significant (*t*-statistics = -2.59) at the end of quarter Issue + 12, -0.01 and insignificant (*t*-statistics = -1.22) at the end of quarter Issue + 16, and -0.01 and significant (*t*-statistics = -1.98) at the end of quarter Issue + 20.

Table 5. Persistence of the impact of private placement/144a market timing on the change in leverage

Dependent variable: $(D/A)_z - (D/A)_{t-1}$								
	All issues				Issues that will not mature over the period			
z	Issue + 8	Issue + 12	Issue + 16	Issue + 20	Issue + 8	Issue + 12	Issue + 16	Issue + 20
Independent variables								
<i>H4</i>	-0.01 (-2.17)	-0.01 (-1.87)	-0.00 (-0.55)	-0.01 (-1.98)	-0.01 (-2.15)	-0.01 (-1.66)	-0.00 (-0.38)	-0.01 (-1.39)
<i>M/B</i>	0.03 (5.49)	0.06 (7.26)	0.06 (4.46)	0.00 (0.49)	0.04 (5.68)	0.06 (7.75)	0.07 (4.72)	0.01 (1.19)
<i>Profitability</i>	0.03 (1.22)	0.09 (2.79)	0.09 (1.58)	0.03 (0.90)	0.02 (0.68)	0.08 (2.37)	0.09 (1.48)	0.06 (1.54)
<i>Size</i>	-0.01 (-5.76)	-0.02 (-5.98)	-0.03 (-5.38)	-0.02 (-6.21)	-0.02 (-5.48)	-0.02 (-4.94)	-0.03 (-4.62)	-0.02 (-4.94)
<i>Tangibility</i>	0.03 (1.81)	0.07 (2.92)	0.07 (1.84)	0.04 (1.59)	0.03 (1.53)	0.07 (2.83)	0.08 (1.88)	0.07 (2.70)
<i>Leverage</i>	-0.16 (-6.17)	-0.11 (-3.34)	-0.19 (-3.53)	-0.35 (-9.08)	-0.17 (-6.09)	-0.10 (-3.03)	-0.21 (-3.51)	-0.44 (-11.52)
Adj. <i>R</i> ²	0.08	0.09	0.05	0.08	0.08	0.09	0.06	0.15
<i>N</i>	1,676	1,573	1,466	1,388	1,576	1,415	1,273	1,072

Table 6. Persistence of the impact of private placement/144a market timing on the level of leverage

Dependent variable: $(D/A)_z$								
	All Issues				Issues that will not mature over the period			
z	Issue + 8	Issue + 12	Issue + 16	Issue + 20	Issue + 8	Issue + 12	Issue + 16	Issue + 20
Independent variables								
<i>H4</i>	-0.01 (-2.72)	-0.01 (-2.59)	-0.01 (-1.22)	-0.01 (-2.70)	-0.01 (-2.54)	-0.01 (-2.32)	-0.01 (-0.86)	-0.01 (-1.61)
<i>M/B</i>	-0.02 (-1.98)	-0.01 (-0.59)	0.00 (0.01)	-0.04 (-4.57)	-0.01 (-1.46)	0.00 (0.31)	0.01 (0.71)	-0.03 (-3.37)
<i>Profitability</i>	-0.14 (-4.03)	-0.06 (-1.57)	-0.05 (-0.81)	-0.08 (-1.86)	-0.15 (-4.30)	-0.07 (-1.60)	-0.04 (-0.57)	-0.04 (-0.89)
<i>Size</i>	-0.03 (-9.35)	-0.03 (-8.83)	-0.04 (-7.45)	-0.03 (-8.41)	-0.03 (-9.24)	-0.03 (-8.17)	-0.04 (-6.72)	-0.03 (-7.60)
<i>Tangibility</i>	-0.02 (-1.03)	0.00 (0.12)	0.02 (0.37)	-0.00 (-0.14)	-0.04 (-1.46)	0.00 (0.05)	0.01 (0.33)	0.02 (0.57)
Adj. <i>R</i> ²	0.07	0.05	0.04	0.06	0.07	0.05	0.04	0.06
<i>N</i>	1,678	1,575	1,469	1,391	1,578	1,417	1,275	1,074

Figure 1 shows the leverage ratios of “high-yield borrowers” and “low-yield borrowers” at the end of the pre-issue quarter, the issue quarter, and 8, 12, 16 and 20 quarters after the issue. Just before the debt offering, the “low-yield borrowers” have slightly higher debt ratios compared to the “high-yield borrowers” (37.5% versus 36%), but the difference

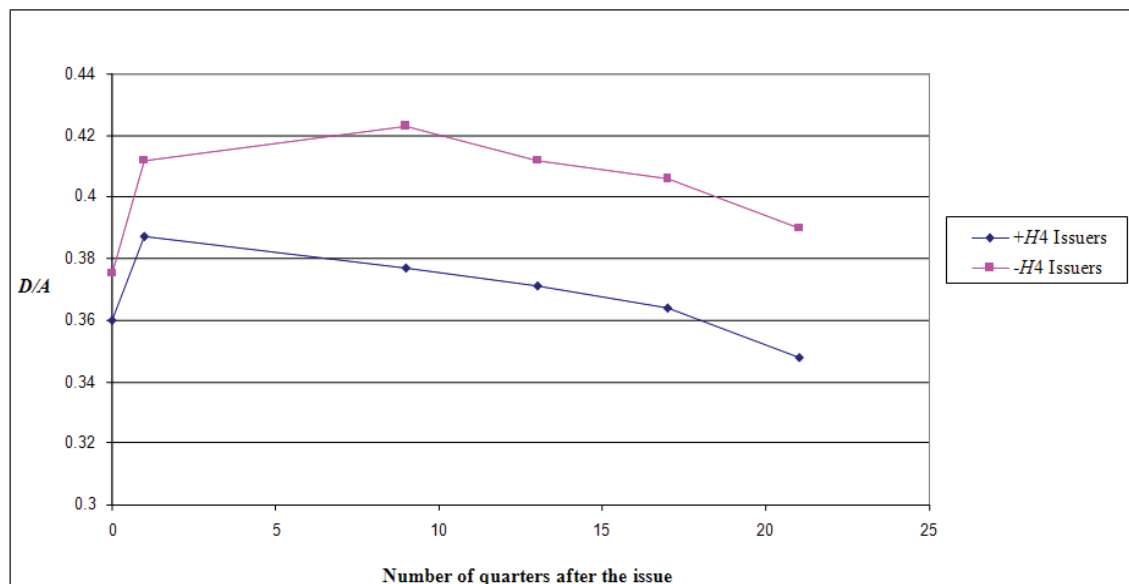
is statistically insignificant (*p*-value > 0.10). As we have seen in Tables 2 and 3, the “low-yield borrowers” time the market and borrow more at the offering, so at the end of the issue quarter, their debt ratios are significantly higher (significant at the 1% level) than the debt ratios of the “high-yield borrowers” (41.2% versus 38.7%).

Interestingly, the “high-yield borrowers” start reducing their leverage ratios immediately after the offering, while the “low-yield borrowers” continue to borrow more for two more years. Therefore, at the end of the second year, the difference between the leverage ratios of the two groups gets even larger (still significant at the 1% level). At that point, while the mean leverage ratio of the “low-yield borrowers” is 42.3%, the corresponding number for the “high-yield borrowers” is only 37.7%.

In the third, fourth and fifth years after the offering, both groups reduce their leverages aggressively. They reduce their debt ratios almost at the same rate, and as a result, the difference between the two groups’ leverage ratios is still significant at the end of the third, fourth and fifth years (significant at the 1% level). While the mean leverage ratios at the end of the third, fourth and fifth years are

41.2%, 40.6% and 39%, respectively, for the “low-yield borrowers”, the corresponding numbers are 37.1%, 36.4% and 34.8%, respectively, for the “high-yield borrowers”.

As we have seen in Tables 2 and 3, there is evidence of timing in the private placement/144a market. Firms tend to borrow more when the rates are low compared to the previous year’s rates. With regard to the capital structure implications, I find that the “low-yield borrowers” (i.e. market timers) follow an active policy of increasing their leverage ratios for two more years, while the other firms start reducing their debt levels immediately after the borrowing. In the third year, the “market timers” also start lowering their leverages. However, since both groups reduce their debt levels at similar rates, the difference between the two groups’ leverage ratios is still significant at the end of the third, fourth and fifth years.



	Pre-issue quarter	Issue quarter	Issue + 8	Issue + 12	Issue + 16	Issue + 20
All Issues	0.369	0.402	0.405	0.396	0.389	0.373
+H4 Issuers	0.360	0.387***	0.377***	0.371***	0.364***	0.348***
-H4 Issuers	0.375	0.412***	0.423***	0.412***	0.406***	0.390***

Notes: ***, ** and * denote 1%, 5% and 10% significance levels for the two-sample *t*-test comparing the means of the leverage ratios of private placement/144a issuers in periods of increasing yields versus decreasing yields at the end of the pre-issue quarter, the issue quarter, and 8, 12, 16 and 20 quarters after the issue.

Fig. 1. Leverage ratios of market timers versus other firms in the long run

To conclude, the results in this article indicate that firms time the private placement/144a market, and when they do that, they permanently alter their capital structures (i.e. they have higher debt ratios in the long-run). Table 3 shows that firms borrow more when interest rates are relatively low compared to the rates four quarters ago. They try to take advantage of the lower interest rates by borrowing more in these periods. Table 4 shows that firms also adjust the maturities of their loans depending on the level of interest rates. Table 4 shows that when interest

rates are low compared to the rates six, eight, or twelve quarters ago, firms tend to borrow in longer maturities. So, Tables 3 and 4 together provide evidence of firms’ timing behavior in the private placement market with respect to both the size of the loan and the maturity of the loan.

Tables 5 and 6 show that the impact of timing on capital structure continues over time (although some of the results are only marginally significant). Firms that borrow when interest rates are low tend to borrow more, and in the long-run, they tend to have

higher leverage levels compared to the other firms. So, market timing does have a long run impact on capital structure. The results here do also support the tradeoff theory: on average, private placement/144a firms (i.e. both “high-” and “low-yield borrowers”) tend to move towards their pre-issue leverage levels. In fact, the “high-yield borrowers” go even lower than their original debt levels at the end of the fifth year.

Conclusion

In this paper, I examine the timing of private placements and its impact on borrowing firms’ capital structure. If the Market Timing Theory of Capital Structure holds for private placements/144a issues, the timing of private placements would have a permanent impact on leverage. I find evidence that supports this theory. First, on average, the borrowers in the private placement/144a market seem to take advantage of the relatively low rates in the market. The average “proceeds scaled by assets” is larger for the “low yield borrowers” than that of the “high yield borrowers”. This finding is in line with Barclay and Smith (1995), Guedes and Opler (1996), Stohs and

Mauer (1996), Baker et al. (2003), Barry et al. (2008), as well as Graham and Harvey (2001) and Bancel and Mittoo (2004) surveys. Secondly, there is a significant difference between the leverage ratios of “market timers” and the other firms in the long run. My capital structure tests show that while all other firms start reducing their leverage levels immediately after the offering, the “market timers” continue to increase their leverage levels for two more years and then they start reducing their leverage levels. As a result, “market timers” have significantly higher leverage ratios compared to the other firms in the long run (i.e. 2 to 5 years).

In this study, I also examine the relation between the interest rates and the maturity choice. The results show that although the rates up to a year ago do not seem to explain the maturity choice, the rates two and three years ago seem to be important determinants of the debt maturity choice. In other words, firms do tend to choose longer maturity debt when the rates are low compared to the rates two or three years ago. This finding is in line with the previous studies.

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