Bond Market Access, Credit Quality, and Capital Structure: Canadian Evidence

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We examine the impact of bond market access (measured by having a credit rating) on leverage for Canadian high credit quality (HQ) and low credit quality (LQ) firms, and find that the leverage impact is more pronounced for LQ firms. The results are similar for U.S. firms. Our results are confirmed when we control for the firm's credit quality, examine the change in leverage around rating initiation, and account for the issue size effect. A similar leverage impact for Canadian and U.S. LQ firms suggests that the Canada-U.S. bond market integration has mitigated the financial constraints for Canadian LQ firms.

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1. Introduction

Most of the capital structure literature focuses on demand-side factors, assuming implicitly that supply-side constraints have little effect on capital structure decisions. For example, the tradeoff theory states that each firm chooses its optimal capital structure by comparing its costs and benefits of issuing new debt, assuming that the supply of capital is infinitely elastic. Faulkender and Petersen (2006) argue that this is a strong assumption because market frictions, such as asymmetric information and agency costs, that make capital structure relevant could also be associated with a firm's source of capital. They show that U.S. firms with public bond market access, as measured by having a credit rating, have about six to eight percentage points higher debt ratios than firms without access, after controlling for demand-side factors.

The impact of bond market access on leverage is likely to differ for firms with different credit quality and across countries. Unlike the U.S., which has the world's largest and deepest bond market in both high and low quality bonds, most countries have small and illiquid markets comprised primarily of high quality bonds. Therefore, low quality firms in most countries could face more severe supply-side constraints relative to high quality firms. The literature suggests that high quality firms could maintain less than optimal leverage because of their greater concern of rating downgrades whereas low quality firms could increase their leverage after access to public debt market to enhance their financial flexibility (Kisgen, 2006; Gilson and Warner, 1997). Thus, we expect a stronger impact of bond market access on leverage for low quality firms compared to their high quality peers, after controlling for other determinants of leverage.

In this study, we examine this prediction in a sample of Canadian high and low credit quality firms (defined as firms with investment-grade and speculative-grade ratings, respectively) in the 1990-2003 period. We also compare the Canadian findings with the evidence in a U.S. sample of high and low quality firms in the same period.

The Canadian sample provides a rich setting to examine the issue for several reasons. First, Canadian and U.S. bond markets are closely linked, share similar institutional structures, and follow similar credit rating guidelines. These common features provide us with an independent sample to test whether the significant impact of the bond market access on leverage observed in the U.S. also holds in a non-U.S. sample. Second, the Canadian market is small, less liquid, and consists primarily of investment-grade bonds. Therefore, low quality (hereafter "LQ") Canadian firms could be more credit-constrained and are more likely to increase leverage to enhance their financial flexibility than their high quality (hereafter "HQ") peers. Lastly, the Canadian bond market has increasingly integrated with the U.S. market, and Canadian firms with ratings can access the U.S. market using primarily the Canadian disclosures. However, while Canadian HQ firms can issue debt in the Canadian or U.S. market, the almost non-existent Canadian high-yield market implies that Canadian LQ firms have little choice but to access the U.S. high-yield market for their financing needs—similar to their U.S. LQ peers. This common source of financing for both Canadian and U.S. LQ firms provides us with a natural experiment to test whether and to what extent the Canada-U.S. bond market integration mitigates the financial constraints faced by the Canadian LQ firms in their home market.

We first confirm that Canadian firms with bond market access, as measured by having a credit rating, have about eight percentage points higher leverage than firms without access, after controlling for other determinants of leverage. We also find that both Canadian and U.S. LQ firms exhibit about 12 percentage points higher leverage than their HQ peers.

We examine three competing (though not mutually exclusive) explanations for the LQ firms' stronger leverage effect. The first possibility is that Canadian LQ firms could be initially credit constrained because of limited debt options in the domestic debt market. The acquisition

of a bond rating allows them to whet their appetite for debt, and consequently, drives a large increase in leverage (*market access* effect). The second possibility is that the higher leverage for LQ firms could be partially driven by their lower credit quality (*credit quality* effect). To control for the credit quality effect, we first generate a credit quality measure for all firms (rated and unrated) in our sample based on firm-specific variables including leverage, and then estimate the incremental effect of bond market access on leverage for all rated firms. We find that both Canadian and U.S. LQ firms exhibit about nine percentage points higher leverage than their home HQ peers, even after controlling for the credit quality effect. The third explanation is that the higher leverage for LQ firms could simply be a mechanical fact because LQ firms tend to have a smaller asset base compared to HQ firms (*issue size* effect). We find that the stronger leverage impact for LQ firms persists after accounting for the issue size effect in both country samples.

We also find that Canadian LQ firms increase their leverage significantly around the rating initiation period by placing almost all their debt issues in the U.S., and that the impact on leverage is similar for Canadian and U.S. LQ firms. This result supports the notion that Canada-U.S. debt market integration has reduced the financial constraints faced by Canadian LQ firms in their home market.

2. Literature review and testable hypotheses

2.1. The Canadian corporate bond market and U.S. market linkages

The Canadian corporate bond market is closely linked with the U.S. market and has adopted most of the U.S. market's structures, practices, and institutional arrangements.[1] In both markets, nonfinancial corporations are large users comprising about half of the new issues. The credit rating agencies follow similar rating guidelines, and many Canadian firms are rated by

[1] The Canadian bond market grew rapidly in the 1990s. At the end of 2006, the outstanding amount of Canadian domestic corporate debt securities was U.S.$116 billion, up from U.S $48 billion in 1990 [Bank for International Settlements (BIS), Securities statistics and syndicated loans, Table 16B (http://www.bis.org/statistics/secstats.htm)].

both Canadian and U.S. rating agencies (Purda, 2005). Most institutional investors face similar regulatory constraints for investments in low quality bonds, and the corporate bond markets in both countries are segmented into investment-grade and speculative-grade sectors.

The Canadian bond market became increasingly integrated with the U.S. market in the 1990s. The 1991 Canada-U.S. Multijurisdictional Disclosure System (MJDS) allows eligible Canadian issuers to make cross-border security offerings in the U.S. using mostly Canadian disclosure documents and ratings provided by Canadian rating agencies. As a result, Canadian firms are heavy users of the U.S. bond market and since 1993 about 48% of the Canadian debt has been issued in the U.S.

The Canadian bond market has two distinctive features that influence whether a Canadian firm issues bonds in the U.S. or Canada. First, the Canadian HQ bond market is mature, but the domestic LQ market is still in infancy and only accounts for about three percent of the annual corporate debt issuance in Canada. The Canadian LQ firms receive financing primarily through bank loans, private placements, and income trusts, and therefore, are likely to be more credit constrained than HQ firms. Freedman and Engert (2003) find that high-yield Canadian borrowers meet almost all of their financing requirements in the deep and liquid U.S. high-yield bond market.

Second, the Canadian bond market is also shallower than the U.S. market as the demand-side factors limit the size of a bond issue that can be successfully placed in Canada. Anderson, Parker, and Spence (2003) show that the top asset managers in Canada manage about CDN$68 billion assets, less than one tenth of their peers in the U.S. (USD$854 billion). They argue that the small issue size is a function of a small number of Canadian institutional managers, together with the smaller average size of funds under management. The small asset size, combined with

the regulatory constraints on a single-name exposure, limit the size of corporate bond issues that can be placed on the Canadian market at any one time. The Canadian bond market is also less liquid than the U.S. market. Because most Canadian investors follow a buy-and-hold investment strategy, the secondary market trading of corporate bonds is thin for all corporate bonds. Thus, to issue large size bonds that cannot be easily absorbed in the domestic market, Canadian firms have to go to the U.S., regardless of their credit quality.

In Table 1, we compare Canadian industrial firms' straight bond issuances with those by U.S. and non-Canadian foreign firms in the U.S market between 1990 and 2003 using the Thomson Financial SDC Platinum Global New Issues (SDC) database.

[Insert Table 1 about here]

Panel A of Table 1 confirms that Canadian firms rely heavily on the U.S. bond market for their financing needs. From 1990 to 2003, Canadian firms issued 239 issues (about 40% of the total 600 new bonds issued) in the U.S. compared to 251 issues by non-Canadian foreign firms. The Canadian LQ firms, on the other hand, placed more issues in the U.S. (N=76) than all other foreign LQ issuers combined (N=60).

Panels B and C of Table 1 show significant differences in issuer and issue characteristics between HQ and LQ firms. The Canadian HQ firms issue only about 31% (163/524) of their bonds in the U.S. market. They face higher median gross underwriter spreads in the U.S. (0.65% versus 0.50%; $p<0.01$) and use the U.S. market primarily for large debt issues. A typical Canadian HQ firm raises an average of $246 million in a U.S. bond issue, more than twice the amount in Canada ($91 million). The difference persists when we compare the proceeds adjusted by the pre-issue asset size (4.73% compared to 3.27%). By contrast, the Canadian LQ firms issue all their bonds in the U.S. high-yield market. Although Canadian LQ issuers are significantly small-

er than the Canadian HQ issuers (median total assets $1,337 million versus $5,574 million), they also tend to raise a large amount in a typical U.S. bond issue (median proceeds $167 million). A typical Canadian LQ firm also raises significantly larger amounts in the U.S. than its HQ peer when we adjust dollar proceeds by pre-issue assets (13.87% versus 4.73%). All LQ issuers, regardless of their nationality, exhibit similar issuer and issuance characteristics; none of the issue size and underwriting cost differences are statistically significant between issuers from different countries.

The relatively large issue size in the U.S. high-yield market suggests that the economy of scale consideration might be an important determinant of issue size. Lee, Lochhead, Ritter, and Zhao (1996) show that issue size is larger and economy of scale is steeper in the U.S. high-yield market compared to the investment-grade market. For example, the total issue cost for a typical high-yield bond issue declines from 3.84% to 2.96% as the issue size increases from $60 million to over $200 million, whereas the decline is minimal for an investment grade bond (from 0.98% to 0.93%). In summary, the U.S. market is a supplemental market for Canadian HQ firms but is a primary market for Canadian LQ firms—similar to their U.S. LQ peers.

2.2. Testable hypotheses

2.2.1. Bond market access and capital structure

Access to the public bond market could influence a firm's capital structure decision because of a potentially lower cost of debt and increased supply of debt capital. The literature suggests that small, risky, and informationally opaque firms with high growth opportunities tend to choose bank debt over the public bond market, whereas large and mature firms are more likely to borrow from the public bond market (e.g., Faulkender, 2005; Petersen and Rajan, 1994).

The cost of bank and private debt, however, could be substantially higher than the public debt because of the higher levels of active monitoring, information collecting, contracting, and

sub-optimal liquidation. These costs will be borne by the borrowers, and consequently, firms that depend solely on bank debt or other forms of private debt will likely maintain a lower leverage level compared to firms with bond market access.

Faulkender and Petersen (2006) argue that the differences in private and public debt markets imply that firms with bond market access should have higher leverage compared to firms without access because lenders are willing to provide more funds (quantity channel) or firms can access a cheaper source of capital (price channel). They find strong support for this hypothesis in a U.S. sample and show that firms with bond market access (measured by having a credit rating) have between six and eight percentage points higher leverage than firms without access, after controlling for demand-side factors and endogeneity of having a credit rating.

As discussed in Section 2.1, since the Canadian and U.S. corporate bond markets share similar institutional structure and are highly integrated, we should also observe a higher leverage for Canadian firms with bond market access—similar to that in the U.S. We examine the following hypothesis:

H1: Firms with bond market access (having a credit rating) will have higher leverage than firms without access, all else being equal.

2.2.2. Credit quality and capital structure

There are two main reasons why the impact of bond market access on leverage could differ between HQ and LQ firms: financial flexibility and credit ratings. Financial flexibility is a firm's ability to respond to shocks to its cash flows or its investment opportunity sets. Recent surveys show that both U.S. and European Chief Financial Officers (CFOs) identify the desire for financial flexibility as the most important determinant of the firm's debt policy, followed by the concern for credit rating as the second most important determinant (e.g., Graham and Harvey, 2001; Bancel and Mittoo, 2004).

The concerns for financial flexibility and credit ratings could differ between HQ and LQ firms. HQ firms generally have higher financial flexibility but are likely to be more concerned about credit ratings than LQ firms because changes in the ratings could affect several discrete benefits tied to credit ratings. For instance, access to the commercial paper, Eurobond, or the interest swap market normally requires a minimum level credit rating. Most bond contracts are also conditional on maintaining a minimum rating, and downgrades in ratings can trigger a higher cost of debt, additional disclosure burden, and financial distress. Kisgen (2006) argues that the concern about credit ratings leads high quality firms to maintain a lower leverage than implied by the traditional tradeoff and pecking order theories. He finds that firms close to a credit rating change maintain lower leverage than their peers, and that this difference is strongest between investment-grade and speculative-grade firms.

Low quality firms with bond market access, on the other hand, could increase their leverage using public debt issues to enhance their financial flexibility and to lower the impact of credit rationing of lenders and the adverse macroeconomic conditions. Stiglitz and Weiss (1981) argue that borrowers could face credit rationing from banks even if they are willing to pay a higher interest rate because the increase in the interest rate could endogenously cause an increase in the total riskiness of banks' loan portfolios due to adverse selection and adverse incentive effects. Gilson and Warner (1997) argue that speculative bonds have several advantages over bank debt, including less restrictive covenants, less secured assets, and longer maturities. They find that low quality firms issue speculative-grade debt to pay down bank debt after a decline in operating performance to protect them against bank debt covenants and to enhance their financial flexibility.

In sum, high and low quality firms are likely to have different tradeoffs between financial flexibility and concerns about maintaining credit rating and therefore might react differently to the bond market access. As discussed in Section 2.1, Canadian HQ firms have the option to issue debt in the Canadian or U.S. market, and they tend to go to the U.S. primarily for large issues. Canadian HQ firms will be highly concerned about maintaining their discrete benefits in both markets and could maintain lower than optimal leverage. By contrast, the LQ firms have no choice but to access the U.S. high-yield market to meet their financing needs. Consequently, they could raise large amounts of debt in the public debt market to enhance their financial flexibility and for economy of scale consideration. We test the following hypothesis:

H2: The impact of bond market access (having a credit rating) on leverage will be greater for low credit quality firms than for high credit quality firms, all else being equal.

3. Data and sample description

3.1. Data

We begin with all Canadian firms that are included in the Compustat Canadian data set from fiscal year 1990 to 2003. Following prior capital structure studies, we exclude the regulated and financial firms (SIC codes 4000-4999 and 6000-6999, respectively). We also require that the firm's total assets, common shares outstanding, and book equity be greater than zero, and complete data must be available for firm-specific variables commonly used in the literature to measure the firm's demand for capital. We are left with a panel of 4,741 firm-year observations.

We use Standard and Poor's (S&P) long-term issuer credit rating as a proxy for bond market access. Because the S&P does not cover all Canadian firms with outstanding public debt, we also manually collect ratings from the Dominion Bond Rating Services (DBRS).

We define the firm's credit rating as follows: For Canadian firms that are covered both by S&P and DBRS, we use the S&P rating; otherwise we use the DBRS rating.[2] Based on this criteria, 15% (or 700) firm-year observations in our sample have bond market access. This percentage is similar to that reported in Faulkender and Petersen (2006) and shows that public debt is not a major source of capital for many public firms. We further group the firms with ratings into HQ and LQ firms. A firm is defined as a HQ (LQ) firm if its rating is BBB (BB) or above (below). The HQ firms comprise about 72% of our sample with ratings.

3.2. Leverage ratios

We define debt ratio as the ratio of long-term debt over the sum of total debt and the market value of equity because the firm's long-term credit ratings will more directly impact the long-term debt ratio than the total debt ratio.

[Insert Table 2 about here]

Panel A of Table 2 shows that the firms with bond market access have significantly higher leverage than firms without access (30.91% versus 15.25%; $p<0.01$). This pattern holds across the whole distribution (e.g., the 25th, 50th and 75th percentiles). The higher leverage for firms with ratings stems largely from LQ firms as they have 32.19 percentage points greater leverage than firms without access. This difference is only 9.24 percentage points for HQ firms.

3.3. Industry and firm characteristics

The observed leverage difference between firms with and without bond market access could be partly driven by differences in firm or industry characteristics. Panel B of Table 2 compares the leverage ratios across industries based on Standard Industry Classification (SIC) codes. We divide our sample firms into five broad sectors; about 74% of the firms belong to the manufacturing (48%) and resource (26%) sectors. Although leverage ratios vary across sectors, firms

[2] Conditional on the firm having an S&P or DBRS rating; 39% (272/700) observations are covered by both agencies; 34% (236/700) are only covered by the S&P; and the remaining 27% (192/700) are only covered by the DBRS.

with bond market access have consistently higher leverage ratios than firms without access. The leverage difference is also more pronounced for LQ firms across all sectors. For instance, LQ firms in the manufacturing sector have 32.96 percentage points higher debt ratios than firms without access, whereas HQ firms have 8.93 percentage points higher debt ratios than firms without access.

[Insert Table 3 about here]

Table 3 shows that firms with bond market access differ significantly from those without access on several firm characteristics. The most pronounced difference is in firm size. The average size of firms with access is substantially larger than firms without access ($5,153 million versus $374 million). Firms with access also have more tangible assets, are more profitable, and have lower cash flow volatility than firms without access. The firms with access are, however, low growth firms, irrespective of whether growth opportunities are measured by market-to-book ratio, R&D ratio, or sales growth rate.

The industry and firm characteristic differences between firms with and without access suggest that we need to control for these effects to draw meaningful conclusions about the impact of the supply-side effects on leverage.

4. Empirical evidence: Bond market access and leverage

4.1. Multiple regressions

To test the impact of bond market access on leverage after controlling for demand-side factors, we use the following regression:

$$\begin{aligned} LEVERAGE_{it} = {} & \alpha + \beta_1 ACCESS_{it} + \beta_2 SIZE_{it} + \beta_3 M/B_{it} + \beta_4 TANGIB_{it} \\ & + \beta_5 PROFIT_{it} + \beta_6 NDTS_{it} + \beta_7 RETN + \beta_8 RISK_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where LEVERAGE denotes the market debt ratio. ACCESS equals one if the firm has a credit rating, and *i* and *t* denote the i^{th} firm and t^{th} year, respectively.

The remaining explanatory variables are those commonly used in the capital structure literature (e.g., Rajan and Zingales, 1995; Welch, 2004). Firm size (SIZE) is the natural logarithm of total assets, and Asset tangibility (TANGIB) is the ratio of the firm's net plant and equipment over total assets. Both variables are expected to be positively correlated with leverage. The market-to-book ratio (M/B) is defined as the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets, and it measures the firm's growth opportunities. Profitability (PROFIT) is the average of the ratio of the firm's operating income before depreciation divided by its total sales over the past three years. Non-debt tax shields (NDTS) is the ratio of depreciation over total assets, and cash flow volatility (RISK) is the standard deviation of the ratio of the firm's cash flow over total sales in the past three years. The variables, M/B, PROFIT, NDTS, and RISK, are expected to be negatively associated with leverage. To control for the debt ratio dynamics over time, we also use the previous year's equity return (RETN) because an increase in the market value of the firm will lower the market debt ratio.

We use ordinary least squares (OLS) with robust standard errors (White, 1980) and a fixed firm effects model. We also include industry dummies (based on three-digit SIC code) in the OLS regression, and year dummies in both OLS and fixed effects regressions.

4.2. Regression results

Table 4 reports that the coefficient on ACCESS is positive and significant at the 1% level for both the OLS and fixed effects models. For instance, in the fixed effects model, firms with bond market access have 7.55 percentage points higher leverage than firms without access, after controlling for the demand-side effects.

[Insert Table 4 about here]

The signs of the coefficients on the control variables are generally consistent with prior studies. As expected, both SIZE and TANGIB have a significant positive effect on leverage whereas RETN has a negative effect. PROFIT is not significant in any specification.

We also check robustness of our results to the endogeneity of the credit rating decision using the two-stage least squares approach (2SLS) suggested in Wooldridge (2002) (results not tabulated for brevity). In the first stage of the 2SLS, we use two instrumental variables: the percentage of firms with ratings (% Rated Firms) in the same industry and firm age (AGE), calculated as the firm's fiscal year minus the year of incorporation. Both variables are more likely correlated with the access dummy but less correlated with leverage. Our results confirm that the impact of bond market access on leverage is statistically and economically significant, even after controlling for the endogeneity of having credit ratings.

We also subject our results to several additional tests. We examine the effect in a control sample by matching each rated firm with an unrated firm based on the year, the first two-digit SIC code, and as close as possible on firm size. We also run regression (1) in a sub-sample of firms by excluding firms with zero debt. Our findings still hold.

5. Empirical evidence: The impact of credit quality on leverage

We use the following regression to test the impact of bond market access on leverage for high and low credit quality firms:

$$LEVERAGE_{it}=\alpha+\beta_1 ACCESS_{it}+\beta_2 ACCESS_{it}*LQ_{it}+\beta_3 SIZE_{it}+\beta_4 M/B_{it} +\beta_5 TANGIB_{it}+\beta_6 PROFIT_{it}+\beta_7 NDTS_{it}+\beta_8 RETN_{it}+\beta_9 RISK_{it}+\varepsilon_{it} \quad (2)$$

where LQ equals one if the firm's credit rating is BB or below. The interactive term ACCESS*LQ reflects the incremental effect of bond market access for LQ firms compared to HQ firms. A stronger leverage impact for LQ firms implies that β_2 should be significantly greater than zero.

[Insert Table 5 about here]

The results in Table 5 support the notion that the impact of bond market access on leverage is more pronounced for LQ firms. The coefficient on ACCESS*LQ (β_2) is consistently positive and significant at the 1% level under all specifications. For example, the fixed effects model results (column 2) show that Canadian LQ firms have over 12 percentage points higher leverage than their HQ peers.[3]

5.1. Lower quality firms' higher leverage? Market access, credit quality, or issue size effect

There are three alternative (but not mutually exclusive) explanations for the stronger leverage effect observed for the Canadian LQ firms. The first possibility is that Canadian LQ firms could be initially credit constrained and under-levered because they have fewer debt options in the Canadian bond market. The acquisition of a bond rating allows them to whet their appetite for debt, and consequently, drives a large increase in leverage (*market access* effect). Second, since leverage is an important determinant of a firm's credit rating, the observed higher leverage for Canadian LQ firms could be partially driven by their lower credit quality (*credit quality* effect). The third explanation is purely mechanical in nature. When firms issue debt, the impact on leverage will be greater for firms with smaller asset bases. Since LQ firms tend to be smaller, their leverage ratio will increase more dramatically than for HQ firms (*issue size* effect).

We need to measure the impact of bond market access on leverage after controlling for the credit quality and issue size effects. We do this analysis for both Canadian and U.S. sample firms in the remainder of the paper. The Canada-U.S. comparison allows us to better distinguish among these different effects for several reasons. First, as discussed in Section 2.1, since both Canadian and U.S. LQ firms use the U.S. debt market as their primary source of financing, we

[3] We perform several additional robustness checks. First, we repeat our analysis using book debt ratio, which is defined as long-term debt divided by the sum of total debt and the book value of equity. The results are similar to those based on market debt ratio. Second, since more than 90% of the LQ firms in our sample are rated by the S&P, we rerun regression (2) excluding the DBRS rated sample; again, the main findings hold.

should observe similar *credit quality* and *issue size* effects in both samples. Second, because Canadian and U.S. bond markets are integrated, a similar *market access* effect for U.S. and Canadian LQ firms will confirm that market integration has effectively lowered the constraints for Canadian LQ firms. Lastly, a stronger leverage effect for U.S. LQ firms compared to U.S. HQ firms will support the notion that LQ firms face more severe supply-side constraints than their HQ peers even in the U.S.

5.2. The leverage impact for high and low quality firms: Canadian versus U.S. evidence

5.2.1. Leverage comparison for U.S. HQ and LQ firms

We obtain the U.S. sample from Compustat using the same selection criteria and period as for our Canadian sample. The U.S. sample size (N=51,209) is ten times larger than the Canadian sample and has a similar proportion of HQ observations (10% versus 11%) but a larger proportion of LQ observations (8% versus 4%). The average market ratios for the U.S. firms with no ratings, HQ ratings, and LQ ratings are 13.87%, 19.70%, and 42.09%, respectively, and are lower than those for their Canadian peers (15.25%, 24.49%, and 47.44%, respectively).

The regression (2) results for the U.S. sample are reported in columns 3 and 4 of Table 5 and show that U.S. LQ firms also have a stronger leverage impact compared to HQ firms, similar to that in the Canadian sample. For instance, under the fixed effects model (columns 2 and 4), the coefficients on ACCESS and ACCESS*LQ are 2.09 (t=1.82) and 12.11 (t=8.68) for the Canadian sample and 1.20 (t=2.70) and 12.17 (t=26.74) for the U.S. sample, respectively. We next examine both U.S. and Canadian samples to distinguish among the three alternative explanations.

5.2.2. Credit quality effect: Canadian versus U.S. evidence

To separate the market access and credit quality effects, we first create a credit quality measure for all firms in our sample (rated and nonrated ones), and then estimate the incremental

effect of bond market access on leverage while controlling for the credit quality effect. We use a two-step procedure separately in Canadian and U.S. samples.

In the first step, we follow the approach in Brockman and Unlu (2009) and create a predicted LQ dummy variable for all firms. Specifically, for our rated firms we first estimate a maximum likelihood logit regression in which the dependent variable is an indicator variable that is equal to one if the firm has a speculative-grade rating. The independent variables in this regression are the firm's market debt ratio (LEVERAGE), the natural logarithm of firm size (SIZE), cash flow volatility (RISK), and profitability (PROFIT). Our in-sample predictions show that the logit model has strong predictive power. Consistent with the credit rating literature, the results show that firms with smaller size, higher leverage, and higher cash flow volatility are more likely to receive a speculative-grade rating. Based on the estimated coefficients from the logit model, we compute the probability of having a low credit quality, predicted LQ dummy (LQ_HAT), for each firm-year observation for the rated and non-rated firms. We set the LQ_HAT equal to one if the estimated probability of LQ exceeds 50%. Based on this procedure, our sample consists of four categories: non-rated HQ and LQ firms, and rated HQ and LQ firms.

In the second step, we modify the regression (2) to separate the effects of bond market access and credit quality. We replace ACCESS*LQ in regression (2) with ACCESS*LQ_HAT and also include LQ_HAT in the new regression.

[Insert Table 6 about here]

We report the results in Table 6 and our focus is on two coefficients. The first, LQ_HAT, controls for the credit quality effect for LQ firms without bond market access. Using fixed effects result as an example, the positive and significant coefficients on LQ_HAT in both Canadian (11.13, t=15.21) and U.S. (9.65, t=29.79) samples confirm that LQ firms have significantly high-

er leverage than HQ firms even without the bond market access. The second coefficient of interest is the interactive term, ACCESS*LQ_HAT, which captures the different effect of bond market access on leverage between LQ and HQ firms. The coefficients on ACCESS*LQ_HAT are also positive and significant for both Canadian (9.76, t=6.66) and U.S. (9.04, t=19.35) firms. This confirms that LQ firms have a stronger impact of bond market access on leverage, even after controlling for the credit quality effect. Additionally, the coefficients on ACCESS*LQ_HAT in Table 6 are only two to three percentage points lower than those in Table 5. The coefficients on ACCESS are also positive and similar in both Canadian (3.98, t=3.71) and U.S. (3.66, t=8.57) samples, supporting that the greater leverage impact for LQ firms is not an artifact of the Canadian sample or a function of credit quality.

5.2.3. Market access effect around credit rating initiation: Canadian versus U.S. evidence

To conduct a direct test of the impact of bond market access on leverage for HQ and LQ firms, we examine the change in the firm's leverage around the period that it obtains its first credit rating. We use a sub-sample of Canadian and U.S. firms that have complete data for two years before (-2nd to -1st year) and two years after (0 to 1st year) the initiation of credit ratings. We classify firms as either HQ or LQ based on the first rating that is assigned in year 0. We remove firms that experience a change in their credit quality from year 0 to year 1 to eliminate the effects of credit quality changes. The Canadian sub-sample consists of 172 firm-year observations (92 HQ and 80 LQ observations) and the U.S. sub-sample has 1,640 firm-year observations (504 HQ and 1,136 LQ observations).

[Insert Table 7 about here]

Panel A of Table 7 reports the average market debt ratios around the rating initiation period. Compared to the pre-rating level, the LQ firms increase their leverage substantially after obtaining ratings, whereas HQ firms show little increase in leverage in both the U.S. and Cana-

dian samples. The average market debt ratios for the Canadian and U.S. LQ firms increase by 18.13 and 14.69 percentage points (both changes are significant at the 1% level), respectively, whereas the increase is only 2.51 and 3.59 percentage points for the HQ firms and is statistically significant only for the U.S. firms.

To control for demand-side effects, we run a modified regression (1) in which the ACCESS dummy is replaced with the RATING INITIATION dummy, an indicator variable that is equal to one after (and including) the first year that the firm has a credit rating. We run the OLS regression with robust errors separately for the HQ and LQ firms.

The results in Panel B confirm that the impact of initial bond market access is more pronounced for the LQ firms. The Canadian LQ firms increase their leverage by about 18 percentage points after the rating initiation, the coefficient on RATING INITIATION in column (2) is 17.94, t=6.03; whereas their HQ peers have insignificant increase in their leverage, the coefficient on RATING INITIATION in column (1) is -0.02, t=-0.01. The results are similar in the U.S. sample.

We conduct several robustness checks for our analysis. First, we pool the Canadian and U.S. LQ sub-sample and test whether the coefficients on RATING INITIATION are significantly different in the two samples. The t-tests fail to reject that the coefficients are different at any reasonable significance level (results not tabulated for brevity). Second, we also find that the LQ firms exhibit characteristics of low credit quality even before acquiring the rating in both Canadian and U.S. samples. They are smaller and have lower asset tangibility, interest coverage ratio and profitability, and higher cash flow volatility compared to their HQ peers in the pre-rating period (most differences are significant at less than the 5% level). Lastly, we also examine the issuance market for Canadian firms in the rating initiation year and are able to find issuance data

for 30 firms (16 HQ and 14 LQ) in the SDC database. We find that Canadian LQ firms placed 13 of the 14 issues in the rating initiation year in the U.S. market, whereas their HQ peers placed only 50% of the issues in the U.S. This result supports the view that the leverage impact for Canadian LQ firms stems primarily from their access to the U.S. bond market.

5.2.4. Issue size effect: Canadian versus U.S. evidence

In this section, we examine whether LQ firms increase their leverage more than HQ firms in a typical debt issue, after controlling for the issue size effect. To do this analysis, for each HQ and LQ firm we first calculate the percentage point change in leverage ratio from the previous year (ΔLEVERAGE = $\text{Leverage}_t - \text{Leverage}_{t-1}$) using annual firm-level data from the Compustat database. We then compute the debt issue size (ISSUE SIZE) as the ratio of the annual change in long-term debt over the previous year's book value of total assets. We focus on a sub-sample in which issue size is greater than 5% of the previous year's total assets, similar to that in several prior studies (e.g., Hovakimian, Opler, and Titman, 2001).

[Insert Table 8 about here]

The univariate results in Panel A of Table 8 show that both firm size and issue size have a strong association with the changes in debt ratios in both country samples. For example, the mean pre-issue total assets for Canadian LQ firms is about one-fourth that for their HQ peers ($1,205 million versus $5,366 million), and consequently, their mean debt issue size as a percentage of the pre-issue total assets is more than twice that for HQ issuers (31.35% versus 14.32%). The larger issue size for the LQ issuers translates into a much larger increase in their debt ratio in the issue year (12.17 percentage points), almost twice that for HQ firms (6.48 percentage points). We observe a similar pattern in the U.S. sample.

To control for issue size and other demand-side effects on leverage, we run the following regression (3) in the pooled sample of HQ and LQ firms:

$$\Delta LEVERAGE_{i,t}=\alpha+\beta_1 ISSUE\ SIZE_{i,t}+\beta_2 PRE\_LEV_{i,t}+\beta_3 LQ_{it}+\beta_4 SIZE_{i,t-1}+\beta_5 M/B_{i,t-1}$$
$$+\beta_6 TANGIB_{i,t-1}+\beta_7 PROFIT_{i,t-1}+\beta_8 NDTS_{i,t-1}+\beta_9 RETN_{i,t-1}+\beta_9 RISK_{i,t-1}+\varepsilon_{i,t} \quad (3)$$

where PRE_LEV is leverage in the pre-issue year and the remaining control variables are defined in previous sections.

The regression results are provided in Panel B of Table 8. The results confirm that issue size is a major determinant of change in leverage for both Canadian and U.S. firms. For instance, ISSUE SIZE is positively and significantly related to the ΔLEVERAGE (coeff.=0.28, $p<0.01$ in column 1) in the Canadian sample and remains significant when we include PRE_LEV in column 2. However, issue size cannot fully explain the leverage change associated with debt issuance since the coefficient on LQ in column 3 is positive and significant (coeff.=6.09, $p<0.10$). The results are similar in the U.S. sample.[4] Overall, we find a higher leverage impact for LQ firms in both Canadian and U.S. samples after controlling for issue size and other determinants of leverage.

6. Summary and conclusions

In this study, we examine the impact of bond market access on capital structure for Canadian high credit quality (HQ) and low credit quality (LQ) firms in the 1990-2003 period. We hypothesize a greater leverage impact for LQ firms than for HQ firms, and our results support this contention. We find that Canadian LQ firms have substantially higher leverage than HQ firms, after controlling for the demand-side, credit quality, and issue size effects. We find similar results in a U.S. sample.

Our study makes two contributions to the capital structure literature. First, capital structure theory suggests that the impact of bond market access on leverage will be stronger for LQ

[4] The higher statistical significance level for the coefficient on LQ in the U.S. sample compared to the Canadian sample (1% versus 10%) could reflect the differences in the U.S. and Canadian sample sizes (N=2,413 versus 177). We test whether the coefficients on LQ are different between the U.S. and Canadian samples after controlling for issue size by pooling both samples and confirm that the coefficients are not significantly different.

firms since they are likely to be more financially constrained than their HQ peers. However, this prediction is difficult to test because while bond market access (having a credit rating) can increase leverage, higher leverage can also lead to lower credit ratings. To control for the credit quality effect, we untangle these two effects by first generating a credit quality measure for all firms in our sample based on firm-specific variables including leverage, and then estimate the incremental effect of bond market access on leverage for the rated firms. We find that both Canadian and U.S. LQ firms exhibit about nine percentage points higher leverage than their home HQ peers, even after controlling for the credit quality effect. Our results not only confirm Faulkender and Petersen's (2006) findings that bond market access is an important determinant of a firm's capital structure but also show that this impact is stronger for LQ firms.

Second, this is the first study to examine the implication of Canada-U.S. bond market integration on the capital structure for Canadian firms. Because the Canadian high-yield market is almost non-existent, the Canadian LQ firms have no option but to access the U.S. high-yield market for their financing needs—similar to their U.S. LQ peers. This common source of financing provides us with unique data to test whether the Canada-U.S. bond market integration mitigates the financing constraints faced by Canadian LQ firms in their home market. Our tests in a U.S. sample show that the impact of U.S. bond market access on leverage is similar for Canadian and U.S. LQ firms. Several prior studies show that Canadian-U.S. equity market integration has lowered the cost of equity capital for Canadian firms (e.g., Mittoo, 2006). Our study complements this stream of literature by showing that the Canada-U.S. bond market integration also enhances the financial flexibility and leverage for Canadian firms, especially for Canadian LQ firms.

References

Anderson, S., R. Parker, and A. Spence, 2003. Development of the Canadian corporate debt market: Some stylized facts and issues, *Bank of Canada Financial System Review* December, 35-41.

Bancel, F. and U.R. Mittoo, 2004. Cross-country determinants of capital structure choice: A survey of European firms, *Financial Management* 33, 103-132.

Brockman, P. and E. Unlu, 2009. Dividend policy, creditor rights, and the agency costs of debt, *Journal of Financial Economics* 92, 276-299.

Faulkender, M., 2005. Hedging or market timing? Selecting the interest rate exposure of corporate debt. *Journal of Finance* 60, 931-962.

Faulkender, M. and M.A. Petersen, 2006. Does the source of capital affect capital structure? *Review of Financial Studies* 19, 45-79.

Freedman, C., and W. Engert, 2003. Financial developments in Canada: Past trends and future challenges, *Bank of Canada Review* Summer, 3-16.

Gilson, S.C. and J.B. Warner, 1997. Junk bonds, bank debt, and financial flexibility. *Working Paper*, Harvard Business School.

Graham, J.R. and C.R. Harvey, 2001. The theory and practice of corporate finance: Evidence from the field, *Journal of Financial Economics* 60, 187-243.

Hovakimian, A., T. Opler, and S. Titman, 2001. The debt-equity choice, *Journal of Financial and Quantitative Analysis* 36, 1-24.

Kisgen, D.J., 2006. Credit ratings and capital structure, *Journal of Finance* 61, 1035-1072.

Lee, I., S. Lochhead, J. Ritter, and Q. Zhao, 1996. The costs of raising capital, *Journal of Financial Research* 19, 59-74.

Mittoo, U.R., 2006. The multijurisdictional disclosure system and value of equity offerings, *Journal of International Financial Management and Accounting* 17, 52-83.

Petersen, M.A. and R.G. Rajan, 1994. The benefits of lending relationships: Evidence from small business data, *Journal of Finance* 49, 3-37.

Purda, L.D., 2005. Mergers in the bond rating industry: Does rating provider matter? *Journal of Multinational Financial Management* 15, 155-169.

Rajan, R.G. and L. Zingales, 1995. What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50, 1421-1460.

Stiglitz, J.E. and A. Weiss, 1981. Credit rationing in markets with imperfect information, *American Economic Review* 71, 393-410.

Welch, I., 2004. Capital structure and stock returns, *Journal of Political Economy* 112, 106-131.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica* 48, 817-838.

Wooldridge, J.M., 2002. Econometric analysis of cross section and panel data, *The MIT Press*.

Table 1

Comparison of bond issue and issuer characteristics in Canadian and U.S. markets

Table 1 reports summary statistics for non-convertible debt issuance by industrial firms in the U.S. and Canadian public bond markets. We collect data from the Thomson Financial SDC Platinum Global New Issues (SDC) database for the 1990-2003 period. We break down the issues by high quality (HQ) and low quality (LQ). High (Low) quality issues are those with a Standard & Poor's rating of BBB and above (BB+ and below) or a Moody's rating Baa and above (Ba1 and below). Proceeds is the principal amount in the U.S. dollars issued in the U.S. or Canadian market. Issue size (%) is the ratio of proceeds to the assets before offerings. Gross underwriter spread (%) is the ratio of total management fees to the proceeds. All summary information, except the number of issuance, is based on the median values. In this analysis, we exclude 17 issues by non-Canadian firms in the Canadian market.

	Canadian market	U.S. market			Wilcoxon rank sum z test		
	Canadian issuers	Canadian issuers	U.S. issuers	Other foreign issuers			
	(1)	(2)	(3)	(4)	(1)=(2)	(2)=(3)	(2)=(4)
Panel A: All issues							
Number of issues	361.00	239.00	7,068.00	251.00			
Number of LQ issues	0.00	76.00	1,175.00	60.00			
Percentage of LQ issues (%)	0.00	31.80	16.62	23.90			
Median proceeds ($mil.)	91.40	200.00	100.00	225.00	-13.21***	10.15***	-1.39
Total assets before issuance ($mil.)	2,853.80	4,479.50	5,673.50	4,437.20	-3.01***	-4.82***	-2.01**
Issue size (%)	3.27	5.73	2.04	4.70	-6.76***	10.37***	1.67*
Gross underwriter spread (%)	0.50	0.75	0.65	0.65	-9.95***	6.13***	2.74***
Panel B: HQ issues							
Median proceeds ($mil.)	91.40	245.90	100.00	249.30	-12.56***	10.02***	-1.28
Total assets before issuance ($mil.)	2,853.80	5,574.10	7,018.60	7,115.50	-6.91***	-3.75***	-2.57***
Issue size (%)	3.27	4.73	1.42	3.62	-3.80***	10.52***	1.97**
Gross underwriter spread (%)	0.50	0.65	0.65	0.65	-6.26***	5.45***	3.07***
Panel C: LQ issues							
Median proceeds ($mil.)		167.05	150.00	171.85		1.34	-0.21
Total assets before issuance ($mil.)		1,337.00	1,063.90	1,062.15		0.56	0.78
Issue size (%)		13.87	15.34	18.75		0.30	-0.37
Gross underwriter spread (%)		2.25	2.50	2.33		-0.04	0.27

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 2.

Leverage comparison by bond market access and credit quality

Table 2 reports the leverage ratios for Canadian nonfinancial and non-regulated firms during 1990-2003. Panel A compares the leverage ratios between firms with and without bond market access and firms with high credit quality (HQ) and low credit quality (LQ). A firm is defined as with (without) bond market access if it has (does not have) an S&P or DBRS long-term credit rating in the respective year. A firm is defined as a HQ (LQ) firm if its credit rating is BBB or above (BB or below) in the respective year. The market debt ratio is the ratio of long-term debt over the sum of total debt and the market value of equity. The significance levels of *t*-tests (Wilcoxon rank sum z tests) are reported following the Mean (Median) differences. Panel B shows the leverage ratio difference across industries. The broad industry sectors are based on the firms' primary SIC codes. Resource sector: SIC<2000. Manufacturing sector: 2000<=SIC<4000. Wholesale & Retail sector: 5000<=SIC<6000. Service sector: 7000<=SIC<9000. Others: SIC>=9000.

Panel A: Leverage comparison by bond market access, and credit quality

Market debt ratio (%)	N	Mean	25%	Median	75%
(1) Total sample	4,741.00	17.56	0.35	11.60	28.54
(2) Without bond market access	4,041.00	15.25	0.05	7.93	25.22
(3) With bond market access	700.00	30.91	16.84	26.94	42.17
(4) High quality (HQ)	504.00	24.49	15.09	23.33	33.15
(5) Low quality (LQ)	196.00	47.44	30.00	48.67	65.14
Difference: (3) - (2)		15.66***	16.79	19.01***	16.95
Difference: (4) - (2)		9.24***	15.04	15.40***	7.93
Difference: (5) - (2)		32.19***	29.95	40.74***	39.92
Difference: (5) - (4)		22.95***	14.91	25.34***	31.99

Panel B: Comparison of debt ratios by industry, bond market access, and credit quality

Industries	Without access		With access		HQ		LQ		*t*-test	
	N	*Debt ratio*	*N*	*Debt ratio*	*N*	*Debt ratio*	*N*	*Debt ratio*	Access vs. Without access	HQ vs. LQ
Resource	1,151.00	14.17	102	21.90	81	20.68	21	26.62	***	**
Manufacturing	1,817.00	15.70	446	31.53	318	24.63	128	48.66	***	***
Wholesale & Retail	510.00	16.22	110	30.59	94	27.79	16	47.02	***	***
Service	547.00	15.03	39	45.83	11	20.11	28	55.93	***	***
Others	16.00	18.46	3	63.95			3	63.95	***	

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 3

Selected firm characteristics by bond market access and credit quality

Table 3 reports firm characteristics for Canadian nonfinancial and non-regulated firms during 1990-2003. A firm is defined as with (without) bond market access if it has (does not have) an S&P or DBRS long-term credit rating in the respective year. A firm is defined as a high (low) quality firm if its credit rating is BBB or above (BB or below) in the respective year. The market debt ratio is the ratio of long-term debt over the sum of total debt and the market value of equity. Asset tangibility is the ratio of net plant and equipment over total assets. Market-to-book ratio is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. R&D ratio is the ratio of research and development over sales. R&D ratio is coded as zero if the firm does not report any R&D. Sales growth is the growth rate of sales over the past year. Profit is the ratio of operating income before depreciation divided by the total sales. Risk is the standard deviation of the ratio of cash flow over total sales over the past three years. Equity return is the previous year's equity return. Non-debt tax shield is the ratio of depreciation over total assets. The significance levels of *t*-tests (Wilcoxon rank sum z tests) are reported under the columns of Mean (median) tests.

	Without bond market access	With bond market access	High quality	Low quality	Mean (median) tests	
	(1)	(2)	(3)	(4)	(2) - (1)	(4) - (3)
Total assets ($mil.)	373.90	5,153.15	6,437.23	1,851.21	***	***
	(109.61)	(2,943.60)	(4,104.50)	(1,275.16)	***	***
Asset tangibility	0.41	0.52	0.53	0.48	***	***
	(0.37)	(0.54)	(0.55)	(0.53)	***	***
Market-to-book ratio	2.03	1.36	1.38	1.29		*
	(1.25)	(1.20)	(1.27)	(1.05)	**	***
R&D ratio	1.82	0.01	0.01	0.02		***
	(0.00)	(0.00)	(0.00)	(0.00)	**	***
Sales growth	0.63	0.10	0.10	0.11		
	(0.10)	(0.07)	(0.07)	(0.06)	***	
Profit	-3.65	0.17	0.18	0.14	**	***
	(0.09)	(0.15)	(0.16)	(0.12)	***	***
Risk	4.82	0.05	0.04	0.09	**	***
	(0.04)	(0.02)	(0.02)	(0.04)	***	***
Equity return	0.24	0.11	0.12	0.08	***	
	(0.00)	(0.05)	(0.06)	(-0.07)	***	***
Non-debt tax shield	0.06	0.05	0.05	0.05	***	*
	(0.05)	(0.05)	(0.05)	(0.04)		***

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4

The impact of bond market access on leverage

Table 4 shows the results of OLS regression with robust standard errors (White, 1980) and fixed firm effects for a sample of Canadian nonfinancial and non-regulated firms during 1990-2003. The dependent variable is market debt ratio, which is defined as the ratio of long-term debt over the sum of total debt and the market value of equity. ACCESS equals one if the firm has an S&P or DBRS long-term credit rating. SIZE is the natural logarithm of total assets. M/B is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. TANGIB is the ratio of net plant and equipment over total assets. PROFIT is the average ratio of operating income before depreciation divided by the total sales over the past three years. NDTS is the ratio of depreciation over total assets. RETN is the previous year's equity return. RISK is the standard deviation of the ratio of cash flow over total sales over the past three years. The R^2 reported under the OLS regression is adjusted R^2. The R^2 reported under the fixed firm effect regression is within estimation R^2. Industry dummies are included in the OLS regression. Year dummies are included in the OLS and fixed firm effects regressions. The coefficients on those dummies are not reported in the table, but are available. *t*-values are reported in parentheses.

	Dependent variable: Market debt ratio	
	OLS with robust S.E.	Fixed firm effects
	(1)	(2)
INTERCEPT	12.77	-6.81
	(1.86)*	(-3.51)***
ACCESS	4.73	7.55
	(4.78)***	(7.81)***
SIZE	1.73	4.15
	(9.93)***	(12.10)***
M/B	-0.00	0.03
	(-0.28)	(1.96)**
TANGIB	19.85	17.46
	(11.29)***	(9.08)***
PROFIT	-0.01	0.01
	(-1.49)	(0.81)
NDTS	4.07	5.41
	(1.06)	(2.26)**
RETN	-1.11	-0.88
	(-5.55)***	(-6.48)***
RISK	-0.01	0.01
	(-1.67)*	(0.82)
3-digit SIC dummies	Yes	
Year dummies	Yes	Yes
N	4,741	4,741
R^2	0.42	0.14

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 5

The impact of bond market access on leverage for high and low quality firms: Canadian versus U.S. evidence

Table 5 shows the regression results of whether the impact of bond market access on leverage is different between firms with high and low credit quality. The regression models are OLS regression with robust standard errors (White, 1980) and fixed firm effects regression for the Canadian and U.S. nonfinancial and non-regulated firms during 1990-2003. The dependent variable is market debt ratio, which is defined as the ratio of long-term debt over the sum of total debt and the market value of equity. ACCESS equals one if the firm has a long-term credit rating. LQ equals one if the firm has a credit rating BB or below in the respective year. ACCESS*LQ is the interactive term of ACCESS and LQ. SIZE is the natural logarithm of total assets. M/B is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. TANGIB is the ratio of net plant and equipment over total assets. PROFIT is the average ratio of operating income before depreciation divided by the total sales over the past three years. NDTS is the ratio of depreciation over total assets. RETN is the previous year's equity return. RISK is the standard deviation of the ratio of cash flow over total sales over the past three years. The R^2 reported under the OLS regressions are adjusted R^2. The R^2 reported under the fixed firm effect regressions are within estimation R^2. Industry dummies are included in the OLS regressions. Year dummies are included in the OLS and fixed firm effects regressions. The coefficients on those dummies are not reported in the table, but are available. *t*-values are reported in parentheses.

	Canadian sample		U.S. sample	
	OLS with robust S.E.	Fixed firm effects	OLS with robust S.E.	Fixed firm effects
	(1)	(2)	(3)	(4)
INTERCEPT	12.11	-6.35	10.62	-4.09
	(1.77)*	(-3.30)***	(7.50)***	(-7.11)***
ACCESS	-2.88	2.09	-2.03	1.20
	(-3.11)***	(1.82)*	(-6.68)***	(2.70)***
ACCESS*LQ	20.72	12.11	22.66	12.17
	(12.85)***	(8.68)***	(56.10)***	(26.74)***
SIZE	2.10	4.14	0.81	4.03
	(12.38)***	(12.19)***	(16.05)***	(34.95)***
M/B	0.00	0.03	-0.70	-0.35
	(0.13)	(1.97)**	(-4.19)***	(-15.75)***
TANGIB	19.60	17.32	20.02	20.30
	(11.23)***	(9.09)***	(33.53)***	(28.08)***
PROFIT	-0.01	0.01	-0.00	-0.00
	(-1.79)*	(0.82)	(-0.03)	(-0.11)
NDTS	4.64	5.26	-7.29	7.70
	(1.19)	(2.21)**	(-4.55)***	(5.72)***
RETN	-1.13	-0.86	-0.01	-0.01
	(-5.53)***	(-6.40)***	(-1.58)	(-3.82)***
RISK	-0.01	0.01	-0.00	-0.00
	(-1.85)*	(0.84)	(-0.37)	(-0.20)
3-digit SIC Dummies	Yes		Yes	
Year Dummies	Yes	Yes	Yes	Yes
N	4,741	4,741	51,209	51,209
R^2	0.45	0.15	0.34	0.13

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6

Separating the effects of bond market access and credit quality on leverage

Table 6 reports the second step results of the approach to separate the effects of bond market access and credit quality on leverage. In the first step of the approach, we create an estimated low credit quality dummy (LQ_HAT) for all rated and nonrated firms (see the paper for a detail discussion of the first step logit model). The following reported results are based on the OLS regression with robust standard errors (White, 1980) and fixed firm effects regression for the Canadian and U.S. nonfinancial and non- regulated firms during 1990-2003. The dependent variable is market debt ratio, which is defined as the ratio of long-term debt over the sum of total debt and the market value of equity. ACCESS equals one if the firm has a long-term credit rating. ACCESS*LQ_HAT is the interactive term of ACCESS and LQ_HAT. SIZE is the natural logarithm of total assets. M/B is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. TANGIB is the ratio of net plant and equipment over total assets. PROFIT is the average ratio of operating income before depreciation divided by the total sales over the past three years. NDTS is the ratio of depreciation over total assets. RETN is the previous year's equity return. RISK is the standard deviation of the ratio of cash flow over total sales over the past three years. The R^2 reported under the OLS regressions are adjusted R^2. The R^2 reported under the fixed firm effect regressions are within estimation R^2. Industry dummies are included in the OLS regressions. Year dummies are included in the OLS and fixed firm effects regressions. The coefficients on those dummies are not reported in the table, but are available. *t*-values are reported in parentheses.

	Canadian sample		U.S. sample	
	OLS with robust S.E.	Fixed firm effects	OLS with robust S.E.	Fixed firm effects
	(1)	(2)	(3)	(4)
INTERCEPT	-7.46	-23.12	-10.63	-16.02
	(-1.09)	(-10.85)***	(-7.53)***	(-23.55)***
ACCESS	1.14	3.98	5.66	3.66
	(1.35)	(3.71)***	(23.54)***	(8.57)***
LQ_HAT	12.53	11.13	15.87	9.65
	(18.47)***	(15.21)***	(56.11)***	(29.79)***
ACCESS*LQ_HAT	17.69	9.76	13.01	9.04
	(11.43)***	(6.66)***	(31.59)***	(19.35)***
SIZE	3.77	5.54	2.25	4.78
	(19.05)***	(16.32)***	(36.82)***	(41.61)***
M/B	0.02	0.04	-0.58	-0.32
	(1.62)	(2.78)***	(-4.09)***	(-14.65)***
TANGIB	18.51	16.82	19.71	19.66
	(10.73)***	(9.15)***	(34.20)***	(27.77)***
PROFIT	-0.01	0.01	-0.00	-0.00
	(-2.66)***	(0.75)	(-0.36)	(-0.17)
NDTS	4.71	5.78	-6.47	7.88
	(1.32)	(2.52)**	(-4.07)***	(5.98)***
RETN	-1.12	-0.85	-0.01	-0.01
	(-5.55)***	(-6.54)***	(-1.89)*	(-4.25)***
RISK	-0.01	0.01	-0.00	-0.00
	(-2.44)**	(0.91)	(-0.67)	(-0.27)
3-digit SIC dummies	Yes		Yes	
Year dummies	Yes	Yes	Yes	Yes
N	4,741	4,741	51,209	51,209
R^2	0.49	0.21	0.39	0.16

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 7

The change in leverage around rating initiation: Canadian versus U.S. evidence

Table 7 reports the evidence of whether high and low credit quality firms change leverage ratios after it obtains its first credit rating. We use a sub-sample of Canadian and U.S. firms that have full data of two years before and after its rating initiation. Panel A reports the univariate results. Year 0 is the year when the firm obtains the credit rating for the first time. We test whether debt ratios are different between high quality and low quality firms in each of the years -2 to 1. We also test whether debt ratios increase in years 0 and 1 compared to that in years -2 and -1. Panel B reports the OLS regression results with robust standard errors (White, 1980) for high and low quality firms separately. The market debt ratio is the ratio of long-term debt over the sum of total debt and the market value of equity. RATING INITIATION equals one after (including) the first year that the firm receives a credit rating. SIZE is the natural logarithm of total assets. M/B is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. TANGIB is the ratio of net plant and equipment over total assets. PROFIT is the average ratio of operating income before depreciation divided by the total sales over the past three years. NDTS is the ratio of depreciation over total assets. RETN is the previous year's equity return. RISK is the standard deviation of the ratio of cash flow over total sales over the past three years. Industry and year dummies are included in the regression but the coefficients are not reported in the table to conserve space. *t*-values are reported in parentheses.

Panel A: Market debt ratios (%) around rating initiation

	Canadian sample		U.S. sample	
Relative year to the credit rating initiation	High quality	Low quality	High quality	Low quality
Year (-2)	26.02	28.81	12.06	22.44***
Year (-1)	27.10	32.10	12.20	23.50***
Year (0)	30.29	48.41***	14.79	36.74***
Year (1)	27.85	48.76***	16.64	38.57***
Difference between years (0,1) and years (-2,-1)	2.51	18.13	3.59	14.69
	(0.72)	(3.91)***	(3.09)***	(11.41)***

Panel B: Regression on the initial leverage effect of bond market access

	Canadian sample		U.S. sample	
	High quality	Low quality	High quality	Low quality
	(1)	(2)	(3)	(4)
INTERCEPT	-2.83	-14.72	9.85	39.85
	(-0.08)	(-0.57)	(1.02)	(5.27)***
RATING INITIATION	-0.02	17.94	2.46	13.76
	(-0.01)	(6.03)***	(2.68)***	(12.04)***
SIZE	8.43	9.40	0.42	-1.57
	(2.34)**	(2.54)**	(0.37)	(-2.08)**
M/B	-13.37	3.64	-3.21	-2.17
	(-3.61)***	(1.91)*	(-5.99)***	(-4.05)***
TANGIB	-30.25	42.98	-16.28	4.43
	(-2.34)**	(1.72)*	(-2.45)**	(0.94)
PROFIT	40.07	37.79	1.05	1.41
	(1.90)*	(1.91)*	(0.22)	(0.84)
NDTS	-12.08	83.32	-14.75	-3.98
	(-0.26)	(2.66)**	(-0.42)	(-0.79)
RETN	3.08	-0.18	-0.84	-1.93
	(1.02)	(-0.14)	(-0.80)	(-3.76)***
RISK	24.60	-1.01	6.00	0.10
	(3.26)***	(-0.06)	(0.64)	(0.09)
3-digit SIC dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
N	92	80	504	1,136
Adjusted R^2	0.84	0.80	0.59	0.55

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 8

Issue size effect: Canadian versus U.S. evidence

Table 8 examines whether LQ firms increase leverage more than HQ firms, after controlling for the issue size effect. We use a sub-sample of Canadian and U.S. firms where their change in long-term debt ratio is greater than 5% of the previous year's total assets. Panel A reports the univariate results. Panel B reports the OLS regression results with robust standard errors (White, 1980). The dependent variable is ΔLEVERAGE. ISSUE SIZE is the ratio of the annual change in long-term debt over previous year's book value of total assets. PRE_LEV is pre-issue market debt ratio. The market debt ratio is the ratio of long-term debt over the sum of total debt and the market value of equity. LQ equals one if the firm has a credit rating BB or below in the respective year. SIZE is the natural logarithm of total assets. M/B is the ratio of the book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets. TANGIB is the ratio of net plant and equipment over total assets. PROFIT is the average ratio of operating income before depreciation divided by the total sales over the past three years. NDTS is the ratio of depreciation over total assets. RETN is the previous year's equity return. RISK is the standard deviation of the ratio of cash flow over total sales over the past three years. Industry and year dummies are included in the regression but the coefficients are not reported in the table to conserve space. *t*-values are reported in parentheses.

Panel A: Issue size and change in leverage in debt issue year

	Canadian sample		U.S. sample	
	High quality (*N*=124)	Low quality (*N*=53)	High quality (*N*=1,222)	Low quality (*N*=1,191)
Issue size (%)	14.32	31.35	17.16	35.29
Pre-issue total assets ($mil)	5,365.89	1,205.06	7,431.01	996.82
Market debt ratio (%)				
- debt ratio in pre-issue year	22.02	37.49	17.31	33.03
- debt ratio in issue year	28.50	49.66	24.07	44.31
- debt ratio increase in issue year	6.48	12.17	6.76	11.28

Panel B: Regressions on the change in leverage and issue size

	Canadian sample			U.S. sample		
	(1)	(2)	(3)	(4)	(5)	(6)
INTERCEPT	22.06	34.29	26.77	31.26	43.18	30.21
	(1.96)*	(3.43)***	(2.77)***	(4.98)***	(6.67)***	(4.83)***
ISSUE SIZE	0.28	0.22	0.22	0.07	0.06	0.06
	(4.64)***	(4.39)***	(4.28)***	(2.37)**	(2.34)**	(2.33)**
PRE_LEV		-0.29	-0.34		-0.20	-0.27
		(-4.25)***	(-4.51)***		(-11.42)***	(-13.62)***
LQ			6.09			7.28
			(1.76)*			(9.67)***
SIZE	0.47	-0.60	0.61	-1.41	-2.04	-0.56
	(0.33)	(-0.50)	(0.51)	(-4.03)***	(-5.82)***	(-1.67)*
M/B	-4.41	-5.84	-5.43	-0.50	-1.19	-1.18
	(-2.63)***	(-2.69)***	(-2.61)***	(-2.64)***	(-4.47)***	(-4.61)***
TANGIB	-11.50	-7.13	-5.65	-4.43	-3.18	-2.20
	(-1.02)	(-0.84)	(-0.66)	(-1.82)*	(-1.39)	(-1.00)
PROFIT	1.29	-2.82	-4.87	-0.70	-0.35	-1.11
	(0.17)	(-0.40)	(-0.66)	(-0.74)	(-0.41)	(-1.22)
NDTS	-43.64	-32.06	-28.04	-19.39	-32.64	-30.89
	(-0.94)	(-0.78)	(-0.62)	(-1.74)*	(-3.17)***	(-3.12)***
RETN	2.37	1.41	1.17	0.46	0.27	-0.01
	(1.33)	(0.80)	(0.71)	(1.05)	(0.72)	(-0.01)
RISK	14.46	11.71	4.26	-1.34	-0.71	-2.42
	(1.66)*	(1.52)	(0.52)	(-0.67)	(-0.39)	(-1.26)
3-digit SIC dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	177	177	177	2,413	2,413	2,413
Adjusted R^2	0.40	0.52	0.54	0.24	0.30	0.33

*, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.