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by Zhaoxia Xu

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Zhaoxia Xu

Financial Markets Department
Bank of Canada
Ottawa, Ontario, Canada K1A 0G9
zxu@bankofcanada.ca

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Abstract

This paper studies the impact of market timing on Canadian firms' capital structure and makes a comparison with U.S. firms. There is no evidence that market timing affects Canadian firms' capital structure in the same manner as it affects their U.S. counterparts. The effect of past equity issues on Canadian firms' capital structure is transitory. Canadian firms adjust at a faster rate toward the leverage target than U.S. firms. These results challenge the generality of the market-timing theory of capital structure.

JEL classification: G32
Bank classification: Financial markets; International topics

Résumé

L'auteure examine si la théorie selon laquelle les entreprises optent pour le financement par actions lorsque les conditions sont favorables sur le marché aide à expliquer la structure du capital des firmes canadiennes. À l'issue d'une comparaison entre le Canada et les États-Unis, elle constate que rien ne démontre qu'un tel comportement influe de la même manière dans les deux pays : l'incidence des émissions passées d'actions sur la structure du capital des firmes canadiennes est temporaire. Ces dernières retournent en effet plus rapidement à leur niveau cible d'endettement que leurs consœurs américaines. Ces résultats remettent en question la validité générale de la théorie examinée.

Classification JEL : G32
Classification de la Banque : Marchés financiers; Questions internationales

I. Introduction

In firms' financing decisions, equity market timing is the practice of issuing equity instead of debt at high equity market values (Baker and Wurgler (2002)). Many papers have provided evidence that U.S. firms time the equity market by issuing equity at high equity market values, for example Loughran, Ritter, and Rydqvist (1994), Hovakimian, Opler, and Titman (2001). Baker and Wurgler (2002) relate market timing with capital structure and find that these market timing financing decisions have long-lasting effects on capital structure. They, therefore, suggest a market-timing theory that a firm's observed capital structure is the cumulative outcome of its past attempts to time the equity market.[1]

The finding of the persistent effect of market timing on leverage is inconsistent with the traditional static trade-off theory. The static trade-off theory argues that firm value is maximized at an optimal debt ratio, which is based on the trade-off between tax benefits and the expected bankruptcy costs of debt. This theory suggests that a firm's capital structure is determined by its own characteristics and predicts no cumulative effects of past financing decisions on the firm's current leverage ratio.

Baker and Wurgler's paper initiated a new wave of debate in capital structure research. A central question is how persistent is the impact of past financing decisions such as equity market timing on capital structure. The static trade-off theory predicts that when shocks cause deviations from this optimum, firms will quickly rebalance toward the target. Therefore, past financing decisions should not have long-lasting effects on capital structure. The

[1] Another two versions of equity market timing are the dynamic adverse selection cost version of Myers and Majluf (1984) with rational managers and investors and the dynamic mispricing version with irrational investors (or managers). See Baker and Wurgler (2002) for detailed discussions on these two versions of equity market timing. This analysis focuses on Baker and Wurgler (2002)'s market-timing theory.

market-timing theory, in contrast, says that firms do not have an optimal debt ratio, so they do not quickly rebalance away the effects of past securities issues. Therefore, past financing decisions affect capital structure persistently.

The empirical evidence is mixed. Huang and Ritter (2007) support Baker and Wurgler (2002), showing that historical securities issues influenced by equity risk premia affect capital structure persistently and firms adjust very slowly toward target leverage. However, a few papers challenge Baker and Wurger's findings of the persistent effects of market timing on capital structure. Hovakimian (2006) shows that the driving force behind Baker and Wurgler (2002)'s results is not past equity market timing, but the growth opportunities not captured by the current market-to-book ratio. Kayhan and Titman (2007) also point out that the significance of the Baker and Wurgler (2002) measure may be largely due to the fact that historical market-to-book ratios may capture other determinants of capital structure choices, such as growth opportunities.

The papers mentioned above only focus on U.S. firms and yet no consensus has been reached. A study that extends to other countries could potentially help test the robustness and generality of the market-timing theory. Canada is a good candidate, since Canada and U.S. have similar economic landscapes, legal systems, cultural and social traditions as well as financial market structure and regulations. Presumably, market timing should have similar impacts on Canadian and U.S. firms' capital structure. If this is the case, the results will provide more evidence on the importance of market timing in the determination of firms' capital structure. If this is not the case, it will cast doubt on the generality of the market timing theory.

In this paper, I test the market timing hypothesis using Canadian data and compare with

the U.S. results. This paper first provides evidence that both Canadian and U.S. firms appear to time the market by issuing equity at high market values. There is a significantly positive relation between the amount of equity issuance and a firm's market value proxied by market-to-book ratio and market-to-book ratio relative to the industry median. This is consistent with the previous evidence that larger equity issues occur at high market valuations (For example, Alti (2006) and Hovakimian et al. (2001)).

Next, a regression model similar to Baker and Wurgler (2002) is tested. Interestingly, the market-timing measure, the weighted average of historical market-to-book ratios, does not have a significant impact on Canadian firms' capital structure as it does on U.S. firms' leverage. As a further examination, a direct test of whether initial public offering (IPO) equity issues, a well-documented market timing event, affect a firm's subsequent-year leverage ratio is conducted. Consistent with the results on estimating Baker and Wurger's regression model, the equity issues at the IPO significantly affect U.S. firms', but not Canadian firms', current leverage ratios.

To further confirm the difference in the impacts of market timing on Canadian and U.S. firms' capital structure, a cumulative adjustment model is estimated to obtain the cumulative speed of adjustment. The cumulative speed of adjustment indicates how fast a firm adjusts toward its target leverage ratio since the market timing event. If a firm quickly rebalances away the effect of market timing, it will appear to adjust toward the target fast. A quick adjustment also suggests there is a more important role for the optimal debt ratio in a firm's capital structure decisions and that past financing activities play no role in determining the current leverage ratio. Compatible with the above results, Canadian firms are found to adjust toward the leverage target much faster than their U.S. counterparts.

Finally, investigations on the potential reasons for the difference between Canadian and U.S. firms find that the difference in size and industry composition of firms in the two countries cannot explain the results. A matched U.S. sample by size and industry still exhibit significant impact of market timing on capital structure. The investigation suggests that a relative smaller infusion of equity capital and thus a smaller reduction in leverage combined with more debt usage may explain the transitory effect of equity market timing on Canadian firms' leverage ratios. However, there may be other unexplored factors attribute to the observed difference.

This study contributes to the literature in two respects. First, these results on Canadian firms challenge the generality of the market-timing theory of capital structure. There is no evidence of a long-term impact on Canadian firms' capital structure as predicted by the the market-timing theory. Second, this study increases the understanding of Canadian firms' capital structure, since few work on investigating market-timing in Canada. Canadian firms' capital structure appears to be better explained by the traditional determinants of leverage variables.

The rest of the paper is organized as follows. Section II describes the data. Section III tests the impact of market timing on capital structure. Section IV studies how equity issues at the IPO affect capital structure. Section V estimates the cumulative speed of adjustment. Section VI discusses the results and Section VII concludes.

II. Data and Summary Statistics

The financial statement data of Canadian firms used in this study are from COMPUSTAT Canadian and Report on Business (ROB) and those of American firms are from COMPU-

STAT.[2] The sample period is between January 1, 1985 and December 31, 2006. The initial public offering (IPO) dates are determined using Securities Data Company (SDC) data. The SDC data period is from January 1, 1986 to December 31, 1999.[3] Firms in the financial industry with SIC codes between 6000 and 6999 in COMPUSTAT or ROB industry classification code 13.6 are excluded from the sample. Firms are required to have financial data available for the last fiscal year before the IPO. Firms are included in the sample until the first year they exit COMPUSTAT. For comparability reasons, Canadian dollar amounts are converted to U.S. dollars. Numbers reported in U.S. dollars are not adjusted. Firms with a book value of total assets less than $5 million are excluded. The sample is winsorized at 1% and 99%.

Figure 1 plots the detrended three-month moving average number of IPOs conducted by Canadian and U.S. firms. The number of IPOs for each month is determined using SDC data.[4] Following Alti (2006), a three-month moving average is taken for the monthly number of IPOs to smooth out the seasonal variation. To remove the effect of economic growth, the monthly moving average IPO volume is de-trended at a rate of 0.25% per month.[5] As shown in Figure 1, Canadian firms offer fewer IPOs than U.S. firms. The median number of IPOs is 13 for Canadian firms and 35 for U.S. firms. An unreported figure shows that Canadian firms also conduct fewer seasoned equity offerings (SEO) than U.S. firms. The median number of SEOs is 24 for Canadian firms and 50 for U.S. firms.

The fewer number of IPOs by Canadian firms compared to U.S. firms may be related

[2]COMPUSTAT Canadian and ROB are merged to get more observations for Canadian firms. ROB data items are converted into COMPUSTAT ones using financial formula for the purpose of comparison with U.S. firms.

[3]SDC data stop at 1999 to avoid involving truncation bias when studying data several years after IPO.

[4]Using Financial Post new issuance database for Canadian firms yields similar results.

[5]Annual economic growth is assumed to be 3%

to some features in the Canadian tax system that discourage companies from going public. For example, the corporate tax rate is significantly lower for Canadian-controlled private companies than that for public companies. Brown, Mintz, and Wilson (2000) document that the combined federal and provincial corporate tax rate on the first $200,000 of business income is 21% for private corporations and 43% for public ones. Figure 1 shows that relatively more Canadian firms went public in years 1987 and 1988. This may be because of the Junior Capital Pool program that was initiated by the Alberta Stock Exchange in November 1986. This program helped many small Canadian firms, especially firms in the oil and gas industry, raise capital through an IPO in the late 1980s. Comparing the industry distributions of IPOs in the two countries (based on 1 digit SIC codes), IPOs from the mining sector account for 43% of the total Canadian IPO volume, while IPOs from the manufacturing sector rank first for the U.S. (Figure 2).

Table I compares the summary statistics for firm characteristics and financing decisions of Canadian and U.S. firms. The IPO year is defined as the fiscal year when a firm goes public. The year prior to the IPO is called the pre-IPO year and IPO+k year is the k'th fiscal year after the IPO. Each IPO+k subsample includes only firms surviving k years after the IPO. The Canadian sample is much smaller than the U.S. one: there are 164 Canadian firms and 2800 U.S. firms in the pre-IPO year. The number of observations decreases over time due to bankruptcy, acquisition or merger, and other reasons which cause a firm to exit from COMPUSTAT or ROB databases.

Book leverage, D/IC, is defined as the ratio of book debt to invested capital. Book debt is debt in current liabilities (COMPUSTAT Annual Item 34) plus long term debt (Item 9).[6]

[6]For observations only available in the ROB database, the corresponding data item are used. Appendix lists the definitions of all variables.

Book equity is stockholders' equity (Item 216) plus minority interest (Item 38). Book debt plus book equity is defined as invested capital. Market leverage, D/M, is defined as the ratio of book debt to the market value of invested capital. The market value of invested capital is book debt plus market equity. Market equity is common shares outstanding (Item 25) times share price (Item 199). The short-term debt ratio, SD/IC, is debt in current liabilities divided by invested capital. The long-term debt ratio, LD/IC, is the ratio of long term debt to invested capital. Net debt issues d are defined as the change in book debt divided by invested capital. Net equity issues e are the change in book equity minus the change in retained earnings divided by invested capital.

Table I shows that both Canadian and U.S. firms are heavily leveraged in the pre-IPO year. More than 50% of their invested capital is debt. When decomposing the debt into long-term and short-term debt, we can see that on average Canadian firms rely more on short-term debt than U.S. firms. 40% of Canadian firms' debts are short term, while only 30% of debt used by U.S. firms is short term. In the IPO year, both Canadian and U.S. firms issue a large amount of equity at relatively higher market-to-book ratios (M/B ratio is defined as the ratio of market equity to book equity), indicating that they time the equity market. Funds raised in equity issues are used to retire debt and increase cash balances. However, Canadian firms issue a substantially smaller amount of equity than U.S. firms. The smaller infusion of equity results in a smaller drop in Canadian book leverage ratio (38% drop) than in U.S. debt ratio (52% drop).

After going public, Canadian firms subsequently have relatively higher leverage ratios. There is no significant difference in long-term debt ratios between firms in the two countries, but Canadian firms still have relatively more short-term debt than their U.S. counterparts.

Heavier usage of short-term debt is consistent with the higher tangibility ratio (property, plant and equipment (Item 8) divided by total assets (Item 6), PPE/A) of Canadian firms, since short-term debts usually need tangible assets as collateral.

Comparing with U.S. firms, Canadian public firms in the sample on average are more profitable, measured by $EBITDA/A$ (earnings before interest, taxes, and depreciation (Item 13) divided by total assets). However, they have much lower market-to-book ratios, indicating lower market values and fewer growth opportunities. The lower valuation of Canadian-listed firms compared to U.S.-listed firms can be mainly explained by a country discount factor (King and Segal (2003)). Canadian firms spend much less on research and development ($R\&D$ (Item 46)) and invest more on fixed assets (measured by capital expenditure (Item 128) INV/A), resulting in higher tangible ratios. The Canadian sample has larger tangible assets, which may be simply because a large proportion of firms in the sample are in the mining sector.

Canadian firms pay more dividends (common dividends (Item 21) divided by book equity, DIV/E) and hold less cash (cash and short-term investments (Item 1) divided by total assets, $CASH/A$). The higher dividend payments in Canada may be due to the dividend tax credit that effectively reduces the individual tax rate on dividends received from Canadian corporations. In Canada, individual shareholders are entitled to an equivalent of a 25% dividend tax credit on Canadian dividend income; there is no special tax treatment on dividends in the United States, (Brown et al. (2000)). Also, Canada has a much higher effective tax rate on capital gains than the United States.[7] The lower tax burden on capital gains relative to dividends in the United States induces U.S. shareholders to prefer capital

[7]See Brown et al. (2000) for details.

gains to dividends. Hence, U.S. companies generally pay less dividends than Canadian firms. In addition, intercorporate dividends are generally free of corporate tax in Canada; while in the United States, companies generally need to pay tax on intercorporate dividends except corporations that jointly file a consolidated return.

III. Equity Market Timing and Capital Structure

A. Market Timing

The practice of equity market timing has been documented in many studies. The most direct evidence is the survey paper by Graham and Harvey (2001), which finds that two-thirds of CFOs admit that perceived misvaluation is a primary concern of financing decisions. The literature also shows that initial public offerings (IPO) and the subsequent seasoned equity offerings (SEO) coincide with high market valuations.[8] The long-run underperformances of these equity issues are also interpreted as evidence of equity market timing.[9]

To examine whether Canadian and U.S. firms in the sample raise more equity capital to take advantage of the relatively lower costs of equity offered by high market valuations, a direct test of the impact of M/B ratios on the amount of equity issues is conducted. Chen and Zhao (2004) investigate the role of the market-to-book ratio in corporate financing decisions and provide evidence that firms with a higher market-to-book ratio are more likely to issue equity because of lower external financing costs.

To examine how the amount of equity issuance varies with fluctuations in market value, net equity issuance is regressed on the M/B ratio. A positive relation is expected if more

[8]See Pagano, Panetta, and Zingales (1998) and Gravelle (1996) for initial public offerings and Taggart (1977) Marsh (1982) Korajczyk, Lucas, and McDonald (1991), Asquith and Mullins (1986), Jung, Kim, and Stulz (1996), and Hovakimian et al. (2001) for seasoned equity offerings. Ritter (2003) documents the evidence for market timing.

[9]See, for example, Ritter (1991) and Loughran and Ritter (1995)

equity is issued at higher market values. To address the concern about the variation in market values across industries, a market-to-book ratio relative to the industry median market-to-book ratio ($RelM/B$) is used to replace M/B. The $RelM/B$ measures how high or low a firm's market-to-book ratio is relative to its industry peers. A larger value for $RelM/B$ indicates a high market value of the firm and potentially an overvaluation.

Table II reports the estimation results using all firm-year observations. As expected, the coefficient on the M/B ratio is significantly positive, implying that firms issue more equity as their M/B ratios go up. The result also holds after controlling for time series and individual firm effects. Similarly, equity issues increase with $RelM/B$. The positive relation between equity issuance amount and market values is consistent with the practice of equity market-timing.[10]

B. The Impact of Market Timing on Leverage

Above we documented that market timing does occur. Now we examine whether market timing has a significant effect on Canadian and U.S. firms' capital structure. If a firm's capital structure is explained by the static trade-off theory, the firm will adjust toward its target leverage ratio whenever there is a deviation from the optimal level. In this case, market timing should not have a long-lasting impact on the firm's capital structure. However, if there is a long-lasting impact, it implies a minimal role for the traditional static trade-off theory.

Following Baker and Wurgler (2002), I use the external finance weighted average market-to-book ratio (MB_{efwa}) as a market-timing measure to test the market timing theory of the

[10]These results only reflect the sensitivity of the amount of yearly equity issues on market values for public firms, but not for private firms because of the unavailability of firm valuation data.

capital structure. The market-timing measure is defined as

$$MB_{efwa,t} = \sum_{s=0}^{t-1} \frac{e_s + d_s}{\sum_{r=0}^{t-1} e_r + d_r} \times \left(\frac{M}{B}\right)_s, \tag{1}$$

where the summations are taken starting in the IPO year and ending in the year t-1 to avoid collinearity in the regression; e and d denote net equity and net debt issues, respectively; $(e_s + d_s)/(\sum_{r=0}^{t-1} e_r + d_r)$ is the ratio of current period external finance to the total external finance over the study period. Following Baker and Wurgler (2002), the minimum weights are set to zero. Firm-year observations with MB_{efwa} bigger than 10 are dropped. The $MB_{efwa,t}$ takes a bigger value if a firm raises external funds at high market-to-book ratios, since it gives larger weights to higher market valuations. This may not be a perfect measure of market timing, and as such an alternative measure is used in the later section.

To investigate the relation between leverage and market timing, a regression model similar to Baker and Wurgler (2002) is estimated. Specifically, the current year leverage ratio is regressed on the market-timing measure MB_{efwa} and four other main determinants of capital structure, namely market-to-book ratio (M/B), profitability (EBITDA/A), size (log(S)), and tangibility (PPE/A).

$$\begin{aligned} L_t &= \alpha_0 + \alpha_1 MB_{efwa,t-1} + \alpha_2 \left(\frac{M}{B}\right)_{t-1} + \alpha_3 \left(\frac{EBITDA}{A}\right)_{t-1} \\ &\quad + \alpha_4 log(S)_{t-1} + \alpha_5 \left(\frac{PPE}{A}\right)_{t-1} + \epsilon_t. \end{aligned} \tag{2}$$

where L_t represents leverage ratios. M/B, $EBITDA/A$, $log(S)$, and PPE/A are firm characteristic variables identified by previous research as the main determinants of a firm's capital structure (Rajan and Zingales (1995) and Booth, Aivazian, Demirguc-kunt, and Maksimovic (2001)). An insignificant coefficient on MB_{efwa} will provide more support for the static trade-off theory.

C. Results

Table III reports the results of the regression model for both book and market leverage. The impact of firm characteristics on leverage is consistent with previous research on the determinants of leverage and the effects are similar for Canadian and U.S. firms. The market-to-book has a negative effect on capital structure, which is consistent with Myers (1977) underinvestment theory and the difficulty of borrowing against intangible assets such as future growth opportunities. The negative coefficient on $EBITDA/A$ is consistent with the hypothesis that more profitable firms have a larger amount of internal funds and thus demand less debt. $log(S)$, a proxy for size, is positively related to leverage because larger firms have more debt capacity. The tangibility of assets measured by PPE/A has a positive coefficient, which is consistent with the view that firms with more tangible assets have more debt because tangible assets can serve as collateral.

However, the impact of the market-timing measure on capital structure is different across firms in the two countries. Consistent with Baker and Wurgler (2002) and others, MB_{efwa} is found to have a significantly negative impact on U.S. firms' capital structure. The effect is significant even 7 years after IPO. Interestingly, the same result does not hold for Canadian firms. The market-timing measure does not significantly affect Canadian firms' capital structure. The signs of the MB_{efwa} coefficient are mixed and mostly insignificant. The result for Canadian firms is more consistent with the prediction of the trade-off theory that firms should quickly rebalance away the effect of past equity issues, so that market timing does not have long-lasting effects on capital structure. A regression model including only the traditional variables that imply an optimal leverage like M/B, profitability, size, and tangibility also yields higher R^2s when using Canadian data than when using U.S. data. It

suggests that the traditional determinants of capital structure can better explain Canadian firms' leverage ratios.

D. Alternative Market Timing Measure

The weighting scheme of MB_{efwa} implicitly assumes that equity issuance is the main way of external financing when there is a timing opportunity in the equity markets. This assumption may not always be plausible, especially in countries where stock markets are relatively less developed than U.S. markets. To circumvent this, I also use a ratio of current equity financing to total equity financing over the study period as weights. Using this equity financing ratio as the weights emphasizes the response of the firm' equity issues to market-to-book ratio changes. The alternative market-timing measure is defined as:

$$MB_{eqwa,t} = \sum_{s=0}^{t-1} \frac{e_s}{\sum_{r=0}^{t-1} e_r} \times \left(\frac{M}{B}\right)_s, \tag{3}$$

Table IV repeats regression (2) using this alternative market-timing measure. It shows that market timing still significantly affects the capital structure of U.S. firms, but not Canadian firms. The results are also robust to regressions controlling for time series effects using year dummies. Another concern is the relatively smaller sample of Canadian firms. Regressions that estimate the standard errors using a bootstrap technique do not change these results either.[11]

IV. Impact of IPO Equity Issues on Leverage

The market timing theory predicts that firms do not rebalance away the impact of market timing on their leverage. A more direct test of the hypothesis would be to identify a market

[11]The tables are not presented to save space, but are available upon request.

timing event and examine its subsequent effects. Initial public offering (IPO) may be the most well-known market timing behaviour. Many studies have shown that IPO issuers do time the market.[12] We know that equity issues at the IPO reduce a firm's leverage. The question is whether the firm will quickly rebalance away the effect in subsequent years. Past equity issuance should not affect the firm's current leverage under the static trade-off theory. However, the market-timing theory predicts that they have a persistent effect. Thus, a direct test of the impact of equity issues on current leverage will help distinguish between these competing theories. The regression model includes the IPO equity issues as a regressor, controlling for firm characteristics, time series effects, and firm effects as follows:

$$\begin{aligned} L_{i,t} &= \alpha_0 + \sum_{j=1}^{T} \alpha_{1,j} e_{i,IPO} \times yr_t + \alpha_2 \left(\frac{M}{B}\right)_{i,t-1} + \alpha_3 \left(\frac{EBITDA}{A}\right)_{i,t-1} \\ &\quad + \alpha_4 log(S)_{i,t-1} + \alpha_5 \left(\frac{PPE}{A}\right)_{i,t-1} + yr_t + u_i + \epsilon_{i,t}. \end{aligned} \tag{4}$$

where $e_{i,IPO}$ is the net equity issuance in the IPO year by firm i; yr_t is year dummy; $\sum_{j=1}^{T} e_{i,IPO} \times yr_t$ is the sum of the interactive terms between net equity issues in the IPO year and the dummies for j years after IPO.

The coefficient $\alpha_{1,j}$ captures the direct impact of IPO equity issues on the firm's current capital structure j years after the issuance. If firms quickly rebalance away the effect of equity infusion, the coefficient should be insignificant in the subsequent years after IPO. The advantage of this test is that it isolates the effect of IPO from other market timing attempts. A persistent and significant coefficient would indicate that firms do not quickly rebalance away the effect of past equity issues. In comparison, the market-timing measure, MB_{efwa}, contains both IPO and SEO equity issues, and therefore, it is not clear whether the persistent effect is a consequence of non-rebalancing or repeated market timing.

[12] See, for example, Ritter (1991), Loughran and Ritter (1995), and Purnanandam and Swaminathan (2004)

Table V presents the results of the regression model for both Canadian and U.S. firms. The model is estimated controlling for the correlations within panels.[13] Consistent with the results in the previous section, IPO equity issues have different impacts on the capital structure of firms in the two countries. For U.S. firms, the equity issues in the IPO year have a significantly negative impact on current leverage. Equity infusion at IPO significantly reduces leverage ratio and the effect is relatively persistent. As time passes, the impact of the IPO equity issues on U.S. firms' current capital structure decreases.

In contrast, the effect of equity issues at the IPO is weak and transitory for Canadian firms. For the book leverage regression, the coefficients on IPO equity issues are generally insignificant. For the market leverage regression, the coefficients on e_{IPO} are significantly negative only up to 3 years after IPO. Furthermore, the significant level is much lower than that for the U.S. firms. The results of Canadian firms are more consistent with the prediction of the trade-off theory. Past equity issues do not appear to have a long-lasting effect on Canadian firms' capital structure. Canadian firms rebalance away the impact of market timing equity issues much more quickly than their U.S. counterparts.

V. Cumulative Speed of Adjustment

The above analyses show that the impact of market timing on Canadian firms' capital structure is more transitory than in the United States. This implies that Canadian firms immediately rebalance away the effects of past financing activities and therefore adjust toward the leverage target more quickly than U.S. firms. That is, Canadian firms should have a faster speed of adjustment. To test this conjecture, a cumulative adjustment model is estimated

[13]Bootstrap estimations yield similar results.

to obtain the cumulative speed of adjustment. A cumulative adjustment model, instead of a partial adjustment model, is tested to take account of‘ the fact that firms may not make adjustments every year and the speed of adjustment may be different each year which is not permitted by a partial adjustment model. A cumulative adjustment model can estimate the extent to which leverage changes from the event year are explained by deviations of the event year leverage ratio from the target.

$$L_{i,t} - L_{i,IPO} = \alpha(L^*_{i,t} - L_{i,IPO}). \tag{5}$$

where $L_{i,t}$ is the leverage ratio of firm i at year t; $L_{i,IPO}$ is the leverage ratio of firm i at IPO year; and $L^*_{i,t}$ is firm i's target leverage at year t; α measures the cumulative speed of adjustment since the IPO year. It indicates how fast a firm has closed the gap between the leverage target and its debt ratio at IPO year. $0 < \alpha < 1$ would indicate a partial adjustment; $\alpha = 0$ would imply no adjustment, and $\alpha = 1$ would indicate a complete adjustment. The reduced-form, cumulative adjustment model is then:

$$L_{i,t} = (1 - \alpha)L_{i,IPO} + \alpha L^*_{i,t} \tag{6}$$

Unfortunately, the target leverage ratio is unobservable. The most commonly used proxy is the prediction from the beginning-of-period firm characteristics of the form:

$$L^*_{i,t} = \gamma + \beta X_{i,t-1} + (\eta_t + v_{i,t}). \tag{7}$$

where $X_{i,t-1}$ is a vector of firm characteristics that determine a firm's leverage ratio including M/B, $EBITDA/A$, $log(S)$, and PPE/A, η_t is the time series effect, and $v_{i,t}$ is the disturbance term. With the above specification, the target debt ratio may vary both across firms and over time (Fama and French (2002), Flannery and Rangan (2006), and Huang and Ritter

(2007)). The fitted values from this regression model are used as a proxy for the leverage target.

Table VI presents the OLS estimates of the cumulative speed of adjustment for Canadian and U.S. firms. Canadian firms on average adjust at a speed of 58% two years after IPO.[14] Seven years after IPO, Canadian firms almost close the gap between the leverage ratio and their leverage target. However, U.S. firms adjust much more slowly than Canadian firms. Two years after IPO, U.S. firms adjust 32% toward the target and the annual speed of adjustment decreases in subsequent years. They only reduce half of the deviation from the target by seven years after IPO. Canadian firms' fast speed of adjustment is consistent with the above results that equity market timing only has a very short-term effect on their capital structure.

VI. Potential Reasons on the Observed Differences

It's somehow surprising to find that market timing does not affect the capital structure of Canadian firms as it does with U.S. firms, given that Canadian and U.S. economic landscapes are similar in may ways, including inflation, market interest rates, and economic growth. This section attempts to examine the possible reasons explaining the different impacts of market timing on Canadian and U.S. firms' capital structure.

[14]Theoretically, the sum of the coefficients on $L_{i,IPO}$ and $L^*_{i,t}$ should be one. However, the sum of the estimated coefficients is one because the unobserved target leverage ratio, $L^*_{i,t}$, is proxied by fitted valued from Equation eq:target which may be subject to estimation errors. One may need to be cautious in making influences on the estimated speed of adjustment.

A. Industry Distributions

Figure 2 has shown that the majority of Canadian IPOs are from the mining sector, while the biggest fraction of U.S. IPOs are from the manufacturing industry. So, the differences in industry distributions could be a potential reason for the discrepancy in the impacts of market timing on Canadian and U.S. firms' capital structure.

To explore this possibility, Figure 3 compares the industry distributions of sample firms.[15] Although the majority of IPOs by Canadian firms are from mining sector while those by U.S. firms are from manufacturing, the difference does not hold for firms in the final regression samples. In both samples, the manufacturing sector accounts for the largest proportion. The substantial drop in the number of mining firms from the Canadian IPO sample may be because many mining sector IPOs are small firms using the Junior Capital Pool Program. These firms will be delisted by the Alberta Stock Exchange if they fail to complete their major transaction (usually an asset acquisition) in 18 months. However, firms in the final regression samples are relatively larger firms. As a robustness check, controlling for industry effects in the estimation of the above models yields similar results. Therefore, industry distributions cannot explain the different effects of market timing on capital structure in the two countries.

B. Matched U.S. Sample Results

As documented in Table I, Canadian firms are generally smaller than U.S. firms. It is possible that the difference in the impacts of market timing on leverage is due to difference in size of firms in the two countries. To examine this possibility, I identify a group of U.S. firms

[15] 10% of Canadian firms are not in this figure, because ROB database do not have the SIC codes.

that are of similar size and in the same industries based on one-digit SIC codes as Canadian firms and reestimate the regressions using this subsample.

Table VII confirms that the findings for U.S. firms are generally preserved in this matched sample. Specification (1) demonstrates that the market timing measure, MB_{efwa} still has a significantly negative impact on the market leverage ratio, although the effect is less significant using the book leverage ratio. Equity issues at IPO significantly affect the firms' current leverage several years after IPO as shown in Specification (2). The speeds of adjustment for these matched U.S. firms are still slower than the Canadian firms. These U.S. firms only close 52% of the gap in the IPO-year leverage ratio and the target debt ratio 7 years after IPO, which is in contrast to the 91% adjustment by Canadian firms. In sum, the difference in the impacts of market timing on capital structure in Canada and the U.S.A. cannot be fully explained by the difference in size or industry composition of firms in the two countries.

C. Equity Issues

Table I showed that Canadian firms raise much less equity capital than U.S. firms, so the infusion of equity reduces Canadian firms' leverage ratios to a smaller extent than it does for U.S. firms. The average leverage ratio of Canadian firms drops from 50% to 31% while that of U.S. firms drops from 51% to 25% in the IPO year. To further compare the difference in equity issues, Figure 4 plots the annual median proceeds from IPO raised by Canadian and U.S. firms scaled by each firm's total assets to take account the fact that bigger firms can issue larger amounts of equity than smaller firms.[16]

The Canadian firms' median proceeds from IPO are smaller than their U.S. counter-

[16]Firms with total assets less than \$0.01 million are excluded to avoid the influence of extreme ratios from small denominators.

parts'.[17] In addition, Canadian firms conducted fewer SEOs and raised less funds from SEOs. The median number of SEOs per month for Canadian firms is 24 and that for U.S. firms is 50 and the median amount of funds raised through SEOs by Canadian firms scaled by firm size is 12% and that by U.S. firms is 17%. The relatively infrequent and smaller amount of fund raised by Canadian firms through SEOs implies that the rebalancing efforts toward the leverage target are less offset.

Witmer and Zorn (2007) find that Canadian firms face higher costs of equity than U.S. firms, which may explain the smaller amount of equity issued by Canadian firms. The smaller infusion of equity capital results in smaller impacts on Canadian firms' capital structure. Therefore, it may be easier for Canadian firms to offset the smaller effects. In addition, Canadian firms use more debt than U.S. firms in the subsequent years after IPO as shown in Table I. The debt issues indicate Canadian firms' effort to rebalance away the effect of equity issues. The smaller magnitude of reduction in leverage ratios caused by equity issues combined with more debt usage in the subsequent years may explain the more transitory effects of market timing equity issues on Canadian firms' capital structure.

Although the smaller infusion of equity issues and more reliance on debt may help to explain quicker rebalanceing behavior of Canadian firms, there may be potentially other factors account for the difference in capital structure adjustments of firms in the two countries. For example, Frank and Goyal (2007) show that CEOs matter a lot for the variation in leverage among U.S. firms using hand-collected data about backgrounds and characteristics of the executives. The potential differences among CEOs of firms in the two countries

[17]The exceptions are Year 1989 and Year 1990 which are mainly a result of very few observations in matched Canadian IPO and financial variable sample. The unscaled annual average proceeds per issue in Canada is smaller than those in the U.S.A.

might play a role in explaining the differential behaviour of capital structure. However, this possibility is not investigated in this study due to the availability of data.

VII. Conclusions

This paper compares the impacts of market timing on Canadian and U.S. firms' capital structure. Market timing, measured by the historical market-to-book ratio, does not affect Canadian firms' capital structure as it affects U.S. counterparts. Compared to the United States, the effects of past equity issues at the IPO on Canadian firms' current leverage ratio are more short lived. Canadian firms rebalance away the effect of market timing more quickly and adjust much faster toward the leverage target than U.S. firms. These findings challenge the generality of Baker and Wurgler (2002)'s market timing theory. Canadian firms' capital structure appears to be better explained by the firm characteristic variables suggested by the traditional trade-off theory.

Table I: Compare Summary Statistics for Firm Characteristics and Financing Decisions of Canadian and U.S. Firms

This table reports the means and the standard deviations of main variables used in the paper. Book leverage D/IC is net book debt divided by invested capital. Net book debt is defined as current liabilities (COMPUSTAT Annual Item 34) plus long term debt (Item 9). Book equity (E) is stockholders' equity (Item 216) plus minority interest (Item 38). Net book debt plus book equity is defined as invested capital. Market leverage D/M is the ratio of book debt to market value of assets (Item 25 $\times$ Item 199 plus book debt). Short-term debt ratio SD/IC is debt in current liabilities divided by invested capital. Long-term debt ratio LD/IC is the ratio of long term debt to invested capital. Market-to-book ratio M/B is defined as market equity divided by book equity. $EBITDA/A$ is earnings before interest, taxes, and depreciation (Item 13) divided by total assets. $log(S)$ is the logarithm of net sales (Item 12). PPE/A denotes net property, plant and equipment (Item 8) divided by total assets. R&D is research and development expenditure (Item 46, replaced by zero if missing). INV/A is capital expenditures (Item 128) normalized by total assets. DIV/E is common dividends (Item 21) divided by book equity. $CASH/A$ is defined as cash and short-term investments (Item 1) divided by total assets. Newly retained earnings $\Delta RE/A$ is defined as the change in retained earnings (Item 36) divided by total assets. Net debt issues d is defined as the change in book debt divided by invested capital. Net equity issues e is the change in book equity minus the change in retained earnings divided by invested capital. All variables except M/B and $log(S)$ are in percentage term.

Panel A: Canadian Firms

	N	D/IC	SD/IC	LD/IC	D/M	M/B	EBITDA/A	log(S)	PPE/A	R&D	INV/A	DIV/E	CASH/A	$\Delta RE/A$	d	e
Pre-IPO	164	50.29	20.03	30.50	-	-	15.78	3.37	34.98	2.08	10.66	2.50	10.07	-	-	-
		(33.96)	(19.90)	(28.80)	-	-	(15.60)	(1.73)	(26.28)	(7.02)	(13.63)	(7.87)	(17.48)	-	-	-
IPO	158	30.95	11.16	19.57	17.87	2.80	15.02	3.64	31.76	1.59	11.88	2.10	20.17	1.33	-3.78	33.51
		(26.58)	(14.06)	(21.11)	(19.45)	(2.66)	(12.90)	(1.68)	(23.39)	(3.95)	(13.20)	(6.04)	(22.72)	(12.82)	(22.56)	(30.46)
IPO+1	157	31.56	12.72	18.84	24.51	2.36	10.60	3.90	34.04	1.96	12.46	1.16	16.43	-0.48	7.41	17.83
		(24.44)	(15.37)	(18.28)	(23.58)	(2.22)	(14.45)	(1.63)	(24.96)	(4.64)	(13.11)	(2.72)	(20.63)	(17.72)	(22.42)	(29.22)
IPO+2	147	34.66	12.45	22.21	31.10	1.91	9.41	4.17	35.29	2.61	10.39	1.36	12.88	-2.36	7.92	6.96
		(24.61)	(15.21)	(20.51)	(26.22)	(1.88)	(14.37)	(1.57)	(25.54)	(6.39)	(10.00)	(4.01)	(18.60)	(18.79)	(17.85)	(16.62)
IPO+3	134	37.09	14.25	22.81	33.47	1.86	8.39	4.31	34.91	3.12	9.38	1.22	13.18	-3.26	5.54	4.99
		(26.28)	(17.75)	(21.42)	(28.25)	(1.98)	(15.34)	(1.64)	(24.24)	(7.50)	(10.62)	(3.55)	(18.85)	(15.57)	(18.52)	(13.20)
IPO+4	124	36.24	13.44	22.80	34.26	1.72	8.27	4.43	34.98	3.18	9.39	1.42	14.36	-5.38	-0.35	6.23
		(26.69)	(17.72)	(22.20)	(29.43)	(1.60)	(15.96)	(1.64)	(24.43)	(8.74)	(12.74)	(4.03)	(21.10)	(26.90)	(21.31)	(23.68)
IPO+5	111	37.32	14.03	23.03	32.53	1.73	8.93	4.54	35.18	3.00	7.36	1.32	13.47	-6.49	-2.03	7.27
		(31.27)	(19.38)	(24.97)	(29.72)	(2.11)	(18.88)	(1.68)	(24.58)	(6.78)	(9.43)	(3.17)	(20.61)	(23.64)	(19.52)	(23.44)
IPO+6	100	36.94	12.23	23.59	29.51	1.76	9.24	4.59	36.09	3.66	6.76	1.31	14.67	-2.74	-3.72	4.02
		(33.17)	(16.69)	(26.14)	(27.98)	(1.91)	(16.99)	(1.76)	(24.02)	(8.10)	(9.08)	(4.25)	(20.78)	(20.88)	(20.78)	(25.03)
IPO+7	94	31.10	8.38	22.22	25.80	2.14	8.39	4.68	34.05	4.45	6.08	1.47	14.50	-2.23	-1.39	12.27
		(28.21)	(13.32)	(23.07)	(25.37)	(2.30)	(15.88)	(1.85)	(22.28)	(12.04)	(7.55)	(3.68)	(19.21)	(21.23)	(18.39)	(27.32)

Panel B: U.S. Firms

	N	D/IC	SD/IC	LD/IC	D/M	M/B	EBITDA/A	log(S)	PPE/A	R&D	INV/A	DIV/E	CASH/A	$\Delta RE/A$	d	e
Pre-IPO	2800	51.44	15.38	35.03	-	-	6.75	3.80	27.87	9.90	9.03	2.70	17.41	-	-	-
		(45.92)	(21.57)	(38.20)	-	-	(28.91)	(1.75)	(22.80)	(19.31)	(9.13)	(8.01)	(22.69)	-	-	-
IPO	2749	24.64	5.67	18.76	13.15	4.62	8.76	4.21	24.09	5.22	8.44	2.56	28.96	-3.29	-6.81	58.69
		(30.16)	(10.98)	(26.44)	(18.08)	(4.99)	(19.35)	(1.62)	(22.11)	(10.22)	(8.97)	(7.59)	(27.94)	(23.60)	(57.40)	(41.65)
IPO+1	2552	28.04	6.96	20.94	18.77	3.42	6.77	4.55	26.22	6.43	9.15	0.57	22.78	-4.68	7.22	15.86
		(30.97)	(13.59)	(27.06)	(22.35)	(4.17)	(21.05)	(1.60)	(22.49)	(12.90)	(8.87)	(2.79)	(24.62)	(28.57)	(24.54)	(31.25)
IPO+2	2277	31.21	7.83	23.00	22.41	3.11	5.06	4.75	27.43	7.09	8.06	0.62	20.66	-10.31	3.47	10.28
		(33.64)	(15.70)	(27.98)	(25.30)	(4.11)	(22.47)	(1.60)	(22.82)	(14.07)	(7.97)	(2.94)	(23.54)	(48.31)	(61.26)	(70.73)
IPO+3	2019	32.36	8.51	23.26	24.52	2.80	5.01	4.91	27.52	7.49	6.93	0.63	19.69	-9.69	0.71	10.53
		(35.02)	(16.86)	(28.58)	(27.03)	(3.98)	(22.01)	(1.62)	(22.67)	(14.80)	(6.98)	(2.89)	(22.89)	(42.08)	(63.55)	(32.28)
IPO+4	1789	32.77	7.89	24.27	25.38	2.85	5.86	5.06	27.76	7.03	6.17	0.67	19.84	-7.94	1.32	7.07
		(36.06)	(16.43)	(29.48)	(27.84)	(4.01)	(20.61)	(1.64)	(22.98)	(13.75)	(6.46)	(3.05)	(23.05)	(37.69)	(25.04)	(83.56)
IPO+5	1598	33.56	8.46	24.54	25.12	2.71	6.92	5.19	27.51	6.53	6.59	0.76	19.80	-6.63	-2.89	4.85
		(37.59)	(17.42)	(30.71)	(27.61)	(3.84)	(19.02)	(1.68)	(22.71)	(13.67)	(19.97)	(3.34)	(22.71)	(43.56)	(51.91)	(97.27)
IPO+6	1455	34.02	7.55	25.44	25.29	2.55	7.56	5.29	27.34	5.92	5.86	0.80	20.06	-5.10	-4.71	5.20
		(40.03)	(16.07)	(32.41)	(27.87)	(3.56)	(17.87)	(1.71)	(22.61)	(11.47)	(6.03)	(3.50)	(22.56)	(37.61)	(93.77)	(47.90)
IPO+7	1306	35.08	7.75	26.50	25.35	2.60	7.82	5.42	27.47	5.83	5.85	0.78	19.70	-3.31	-1.18	6.03
		(39.85)	(16.80)	(33.21)	(27.39)	(3.61)	(17.83)	(1.71)	(22.78)	(11.04)	(6.38)	(3.24)	(21.97)	(39.73)	(56.40)	(29.58)

Table II: Equity Issue and Market Value

This table reports the sensitivity of equity issues on market values. The dependent variable is net equity issues in each year, defined as the change in book equity minus the change in retained earnings divided by invested capital. In Panel A, the independent variable market value is measured by market-to-book ratio M/B, market equity divided by book equity. In Panel B, market value is measured by market-to-book ratio relative to industry median market-to-book ratio. The industry median market-to-book ratio is the median of M/Bs of firms in the same industry based on two-digit SIC code each year. The estimates of constant are not reported. Absolute value of t-statistics are in bracket. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

	Canada			US		
			Panel A			
M/B_t	3.25***	3.05***	1.25***	1.16***	1.11***	1.43***
	(16.37)	(15.51)	(5.71)	(2.72)	(3.04)	(3.46)
Year Dummies	N	Y	Y	N	Y	Y
Firm Dummies	N	N	Y	N	N	Y
N	3499	3499	3499	24754	24754	24754
R^2	0.07	0.06	0.11	0.00	0.00	0.02
			Panel B			
$RelM/B_t$	5.04***	5.09***	1.95***	2.26**	1.62*	2.73**
	(6.29)	(11.56)	(4.00)	(2.02)	(1.70)	(2.50)
Year Dummies	N	Y	Y	N	Y	Y
Firm Dummies	N	N	Y	N	N	Y
N	3493	3493	3493	24754	24754	24754
R^2	0.03	0.04	0.10	0.00	0.00	0.02

Table III: The Impact of MB_{efwa} on Leverage: Canada and U.S. Comparison

This table reports results of regressions of book and market leverage on equity finance weighted average market-to-book ratio (MB_{efwa}) and firm characteristic variables.

$$L_t = \alpha_0 + \alpha_1 MB_{efwa,t-1} + \alpha_2 \left(\frac{M}{B}\right)_{t-1} + \alpha_3 \left(\frac{EBITDA}{A}\right)_{t-1} + \alpha_4 log(S)_{t-1} + \alpha_5 \left(\frac{PPE}{A}\right)_{t-1} + \epsilon_t.$$

Book leverage is book debt divided by invested capital. Book debt is defined as current liabilities (COMPUSTAT Annual Item 34) plus long term debt (Item 9). Book equity is stockholders' equity (Item 216) plus minority interest (Item 38). Book debt plus book equity is defined as invested capital. Market leverage is the ratio of book debt to market value of assets (Item 25 $\times$ Item 199 plus book debt). MB_{efwa} is external finance weighted average of market-to-book ratio. Firm-year observations with MB_{efwa} bigger than 10 are dropped. Market-to-book ratio is defined as market equity divided by book equity. $EBITDA/A$ is earnings before interest, taxes, and depreciation (Item 13) divided by total assets. $log(S)$ is logarithm of net sales (Item 12). PPE/A denotes net property, plant and equipment (Item 8) divided by total assets. Absolute value of t-statistics are in parentheses. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

Panel A: Book Leverage

	Canada						U.S.					
	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7
$MB_{efwa,t-1}$	0.33	-1.87	-1.84	-5.20***	-1.54	-0.72	-1.40***	-2.71***	-3.04***	-1.10**	-1.23**	-1.80***
	(0.18)	(1.20)	(1.12)	(2.69)	(0.87)	(0.51)	(3.32)	(5.84)	(6.39)	(2.04)	(2.12)	(2.89)
M/B_{t-1}	-4.07*	-2.09	-4.25**	-3.76	-5.82**	-3.68**	-0.78***	-0.39	-1.17***	-1.50***	-1.71***	-2.01***
	(1.80)	(1.04)	(2.41)	(1.55)	(2.53)	(2.04)	(2.68)	(1.24)	(3.73)	(3.91)	(4.16)	(4.70)
$EBITDA/A_{t-1}$	-0.43**	-0.46**	-0.48***	-0.88***	-1.11***	-0.57**	-0.35***	-0.38***	-0.34***	-0.27***	-0.43***	-0.32***
	(2.49)	(2.60)	(3.05)	(3.36)	(5.46)	(2.23)	(8.09)	(7.74)	(6.11)	(4.20)	(5.69)	(3.63)
$\log(S)_{t-1}$	4.21***	6.69***	5.62***	3.90*	4.13**	5.15***	5.95***	6.33***	5.60***	5.61***	4.09***	3.16***
	(2.73)	(4.32)	(3.59)	(1.91)	(2.10)	(2.94)	(10.54)	(9.73)	(7.95)	(7.17)	(5.01)	(3.59)
PPE/A_{t-1}	0.19*	0.25**	0.36***	0.46***	0.37**	0.45***	0.39***	0.32***	0.29***	0.31***	0.40***	0.35***
	(1.94)	(2.49)	(3.52)	(3.19)	(2.23)	(3.08)	(11.10)	(8.10)	(6.49)	(6.36)	(7.55)	(6.15)
N	101	89	82	73	63	59	1672	1416	1217	1058	927	810
R^2	0.12	0.22	0.36	0.30	0.40	0.28	0.18	0.16	0.17	0.14	0.14	0.13

Panel B: Market Leverage

	Canada						U.S.					
	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7
$MB_{efwa,t-1}$	-1.43	-2.04	-1.67	-4.52***	-2.49*	-0.81	-2.50***	-3.49***	-4.01***	-2.58***	-2.87***	-2.65***
	(0.75)	(1.23)	(0.94)	(2.81)	(1.68)	(0.63)	(8.01)	(10.24)	(11.44)	(6.82)	(7.09)	(6.07)
M/B_{t-1}	-6.51***	-5.63**	-7.84***	-7.33***	-8.35***	-4.22**	-0.88***	-1.15***	-1.22***	-1.68***	-1.54***	-2.11***
	(2.80)	(2.61)	(4.15)	(3.68)	(4.35)	(2.48)	(4.09)	(4.95)	(5.27)	(6.23)	(5.19)	(6.99)
$EBITDA/A_{t-1}$	-0.40**	-0.57***	-0.59***	-0.93***	-0.58***	-0.39*	-0.18***	-0.22***	-0.23***	-0.19***	-0.26***	-0.20***
	(2.23)	(2.95)	(3.47)	(4.34)	(3.44)	(1.74)	(5.65)	(6.12)	(5.66)	(4.29)	(4.94)	(3.30)
$log(S)_{t-1}$	4.18**	7.05***	5.42***	4.44**	2.65	4.47***	4.32***	4.94***	4.58***	4.41***	3.86***	3.20***
	(2.63)	(4.28)	(3.23)	(2.63)	(1.62)	(2.87)	(10.44)	(10.35)	(8.89)	(7.96)	(6.71)	(5.19)
PPE/A_{t-1}	0.08	0.21*	0.29**	0.33***	0.24*	0.40***	0.28***	0.23***	0.26***	0.28***	0.29***	0.26***
	(0.73)	(1.97)	(2.61)	(2.71)	(1.70)	(3.05)	(10.99)	(8.01)	(7.92)	(8.03)	(7.73)	(6.52)
N	99	88	82	72	63	59	1698	1435	1223	1061	936	815
R^2	0.23	0.28	0.41	0.44	0.42	0.32	0.24	0.25	0.28	0.26	0.24	0.23

Table IV: The Impact of Market Timing on Leverage using Alternative Measure

This table reports results of regressions of book leverage on equity finance weighted average market-to-book ratio (MB_{eqwa}) and firm characteristic variables.

$$L_{i,t} = \alpha_0 + \alpha_1 MB_{eqwa,i,t-1} + \alpha_2 \left(\frac{M}{B}\right)_{i,t-1} + \alpha_3 \left(\frac{EBITDA}{A}\right)_{i,t-1} + \alpha_4 log(S)_{i,t-1} + \alpha_5 \left(\frac{PPE}{A}\right)_{i,t-1} + \epsilon_t.$$

Book leverage is book debt divided by invested capital. Book debt is defined as current liabilities (COMPUSTAT Annual Item 34) plus long term debt (Item 9). Book equity is stockholders' equity (Item 216) plus minority interest (Item 38). Book debt plus book equity is defined as invested capital. MB_{eqwa} is equity finance weighted average of market-to-book ratio. Market-to-book ratio is defined as market equity divided by book equity. $EBITDA/A$ is earnings before interest, taxes, and depreciation (Item 13) divided by total assets. $log(S)$ is logarithm of net sales (Item 12). PPE/A denotes net property, plant and equipment (Item 8) divided by total assets. Absolute value of t-statistics are in parentheses. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

	Canada						U.S.					
	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7	IPO+2	IPO+3	IPO+4	IPO+5	IPO+6	IPO+7
$MB_{eqwa,t-1}$	-0.78	-2.49	-1.47	-5.69**	-7.09	-3.48	-1.50***	-2.65***	-2.56***	-1.14**	-2.56**	-2.84**
	(0.38)	(1.12)	(0.86)	(2.60)	(1.46)	(1.13)	(3.44)	(5.67)	(5.27)	(2.13)	(2.11)	(2.20)
M/B_{t-1}	-3.65*	-2.81	-4.86***	-3.33	-5.45**	-4.40**	-0.20	0.12	-0.91***	-0.91**	-0.83**	-1.37***
	(1.68)	(1.21)	(2.81)	(1.35)	(2.38)	(2.50)	(0.67)	(0.41)	(2.93)	(2.58)	(2.40)	(3.64)
$EBITDA/A_{t-1}$	-0.39**	-0.49***	-0.50***	-0.84***	-1.06***	-0.58**	-0.40***	-0.37***	-0.34***	-0.34***	-0.57***	-0.39***
	(2.27)	(2.65)	(3.08)	(3.19)	(4.92)	(2.09)	(9.26)	(7.65)	(6.12)	(5.11)	(7.80)	(4.44)
$log(S)_{t-1}$	3.80**	6.92***	5.24***	3.10	3.45	2.62	6.08***	6.06***	5.71***	4.99***	4.08***	3.30***
	(2.59)	(4.27)	(3.48)	(1.53)	(1.64)	(1.37)	(10.90)	(9.39)	(8.10)	(6.30)	(4.88)	(3.66)
PPE/A_{t-1}	0.17	0.23**	0.34***	0.49***	0.39**	0.71***	0.39***	0.34***	0.31***	0.34***	0.46***	0.38***
	(1.61)	(2.21)	(3.25)	(3.35)	(2.39)	(4.63)	(11.35)	(8.55)	(7.12)	(6.68)	(8.59)	(6.81)
N	100	85	82	73	65	62	1685	1445	1245	1098	1035	909
R^2	0.17	0.28	0.39	0.34	0.41	0.37	0.17	0.15	0.15	0.11	0.13	0.10

Table V: The Impact of IPO Equity Issues on Leverage

This table reports results of regressions of book and market leverage on equity issues in IPO year and firm characteristic variables. The model is estimated controlling for the correlations within panels.

$$L_{i,t} = \alpha_0 + \sum_{j=1}^{T} \alpha_{1,j} e_{i,IPO} \times yr_t + \alpha_2 \left(\frac{M}{B}\right)_{i,t-1} + \alpha_3 \left(\frac{EBITDA}{A}\right)_{i,t-1} + \alpha_4 log(S)_{i,t-1} + \alpha_5 \left(\frac{PPE}{A}\right)_{i,t-1} + yr_t + u_i + \epsilon_{i,t}.$$

Book leverage is book debt divided by invested capital. Book debt is defined as current liabilities (COMPUSTAT Annual Item 34) plus long term debt (Item 9). Book equity is stockholders' equity (Item 216) plus minority interest (Item 38). Book debt plus book equity is defined as invested capital. Market leverage is the ratio of book debt to market value of assets (Item 25 $\times$ Item 199 plus book debt). Market leverage is the ratio of book debt to market value of assets (Item 25 times Item 199 plus book debt). e_{IPO} is net equity issues in the IPO year. $e_{i,IPO} \times yr_t$ is interactive terms between net equity issues at the IPO and the dummies for each year after IPO. Market-to-book ratio is defined as market equity divided by book equity. $EBITDA/A$ is earnings before interest, taxes, and depreciation (Item 13) divided by total assets. $log(S)$ is logarithm of net sales (Item 12). PPE/A denotes net property, plant and equipment (Item 8) divided by total assets. Absolute value of t-statistics are in parentheses. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

	Book	Leverage	Market	Leverage
	Canada	U.S.	Canada	U.S.
$e_{IPO} \times yr_1$	-0.10	-0.17***	-0.13	-0.13***
	(1.09)	(5.48)	(1.48)	(8.30)
$e_{IPO} \times yr_2$	-0.13*	-0.18***	-0.12*	-0.16***
	(1.66)	(6.30)	(1.69)	(9.75)
$e_{IPO} \times yr_3$	-0.18**	-0.17***	-0.17**	-0.16***
	(2.26)	(4.69)	(2.23)	(8.56)
$e_{IPO} \times yr_4$	-0.14*	-0.12***	-0.12	-0.17***
	(1.69)	(3.20)	(1.50)	(8.35)
$e_{IPO} \times yr_5$	-0.09	-0.12***	-0.04	-0.16***
	(1.01)	(3.06)	(0.48)	(8.03)
$e_{IPO} \times yr_6$	-0.14	-0.07**	-0.05	-0.13***
	(1.49)	(2.02)	(0.58)	(6.38)
$e_{IPO} \times yr_7$	-0.19*	-0.03	-0.10	-0.10***
	(1.82)	(0.78)	(1.03)	(5.18)
M/B_{t-1}	-2.39***	-0.59***	-4.48***	-1.14***
	(5.43)	(3.42)	(10.83)	(13.35)
$EBITDA/A_{t-1}$	-0.53***	-0.41***	-0.43***	-0.27***
	(8.19)	(11.00)	(7.02)	(12.20)
$log(S)_{t-1}$	4.38***	4.24***	3.99***	3.08***
	(7.46)	(8.87)	(7.29)	(8.64)
PPE/A_{t-1}	0.26***	0.37***	0.18***	0.27***
	(6.41)	(11.15)	(4.75)	(11.74)
N	735	10710	728	10823
R^2	0.22	0.15	0.28	0.23

Table VI: Cumulative Speed of Adjustment

This table estimates the cumulative speed of adjustment from the cumulative adjustment model.

$$L_{i,t} - L_{i,IPO} = \alpha(L^*_{i,t} - L_{i,IPO})$$

$$L_{i,t} = (1-\alpha)L_{i,IPO} + \alpha L^*_{i,t}$$

where $L_{i,t}$ is the leverage ratio of firm i at year t; $L_{i,IPO}$ is the leverage ratio of firm i at IPO year; α measures the cumulative speed of adjustment since the IPO year; and $L^*_{i,t}$ is firm i's target leverage at year t estimated from:

$$L^*_{i,t} = \gamma + \beta X_{i,t-1} + \eta_t + v_{i,t}$$

where $X_{i,t-1}$ is a vector of firm characteristics that determine a firm's leverage ratio including M/B, $EBITDA/A$, $log(S)$, and PPE/A, η_t is time series effects, and $v_{i,t}$ is the disturbance term. Book leverage is book debt divided by invested capital. Book debt is defined as current liabilities (COMPUSTAT Annual Item 34) plus long-term debt (Item 9). Book equity is stockholders' equity (Item 216) plus minority interest (Item 38). Book debt plus book equity is defined as invested capital. Market-to-book ratio is defined as market equity divided by book equity. $EBITDA/A$ is earnings before interest, taxes, and depreciation (Item 13) divided by total assets. $log(S)$ is logarithm of net sales (Item 12). PPE/A denotes net property, plant and equipment (Item 8) divided by total assets. The estimates of constant are not reported. Absolute value of t-statistics are in bracket. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

	Canada			U.S.		
	IPO+2	IPO+4	IPO+7	IPO+2	IPO+4	IPO+7
L_{IPO}	0.42***	0.27***	0.09	0.68***	0.53***	0.51***
	(6.37)	(3.10)	(0.89)	(35.23)	(19.53)	(14.24)
L^*_t	0.59***	0.78***	0.97***	0.49***	0.61***	0.66***
	(8.67)	(9.39)	(7.86)	(22.90)	(21.71)	(16.57)
N	133	109	84	2055	1582	1043
R^2	0.79	0.76	0.67	0.72	0.62	0.57

Table VII: Matched U.S. Sample Results

This table presents the results of the impact of the market timing measure, equity issues at IPO, and estimated cumulative speed of adjustment using the matched U.S. firms with similar size and industry as the Canadian firms. The constant estimates are not reported. Absolute value of t-statistics are in bracket. $***$ denotes 1% significant level, $**$ denotes 5% significant level, and $*$ denotes 10% significant level.

	Specification (1)		Specification (2)		Specification (3)		
	Book L	Market L	Book L	Market L	IPO+2	IPO+4	IPO+7
$MB_{efwa,t-1}$	-0.81	-3.84***					
	(1.07)	(6.14)					
M/B_{t-1}	-2.93***	-1.82***	-1.16***	-1.74***			
	(4.79)	(3.64)	(3.49)	(6.76)			
$EBITDA/A_{t-1}$	-0.43***	-0.22***	-0.49***	-0.31***			
	(4.55)	(2.85)	(5.96)	(4.75)			
$log(S)_{t-1}$	5.01***	4.78***	4.39***	3.64***			
	(4.36)	(5.09)	(4.45)	(4.71)			
PPE/A_{t-1}	0.71***	0.41***	0.66***	0.33***			
	(9.67)	(6.83)	(10.59)	(6.57)			
$e_{IPO} \times yr_1$			-0.10	-0.18***			
			(1.17)	(2.78)			
$e_{IPO} \times yr_2$			-0.14*	-0.27***			
			(1.72)	(4.18)			
$e_{IPO} \times yr_3$			-0.10	-0.29***			
			(1.11)	(4.29)			
$e_{IPO} \times yr_4$			-0.27***	-0.30***			
			(2.62)	(3.71)			
$e_{IPO} \times yr_5$			-0.28***	-0.27***			
			(2.66)	(3.26)			
$e_{IPO} \times yr_6$			-0.21*	-0.22**			
			(1.73)	(2.28)			
$e_{IPO} \times yr_7$			-0.01	-0.15			
			(0.09)	(1.51)			
L_{IPO}					0.68***	0.52***	0.48***
					(9.07)	(6.21)	(3.66)
L_t^*					0.51***	0.62***	0.72***
					(6.59)	(7.35)	(5.54)
N	453	457	639	645	124	93	60
R^2	0.27	0.30	0.25	0.29	0.78	0.74	0.67

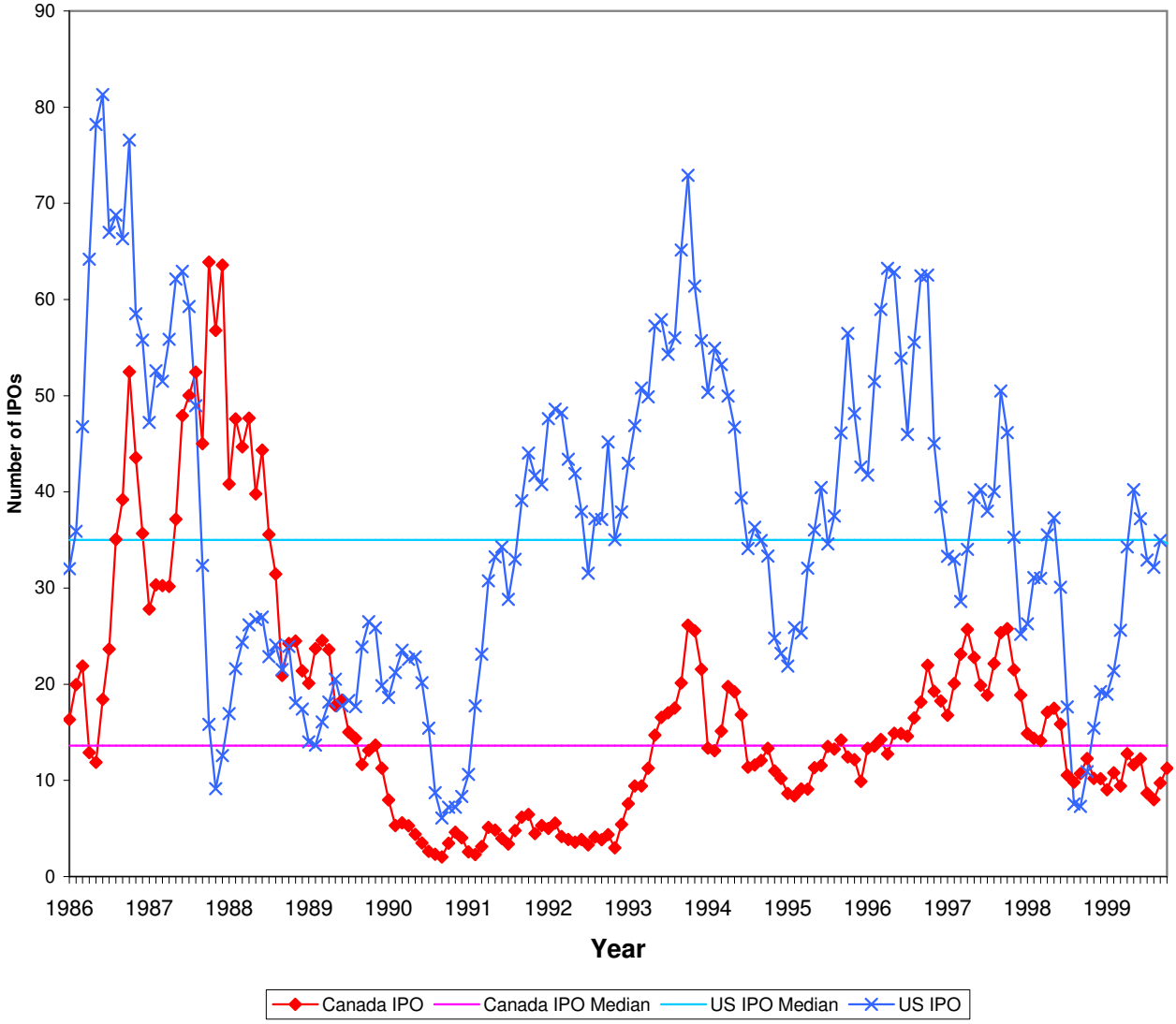

Figure 1: De-trended monthly moving average number of IPOs 1986-1999.

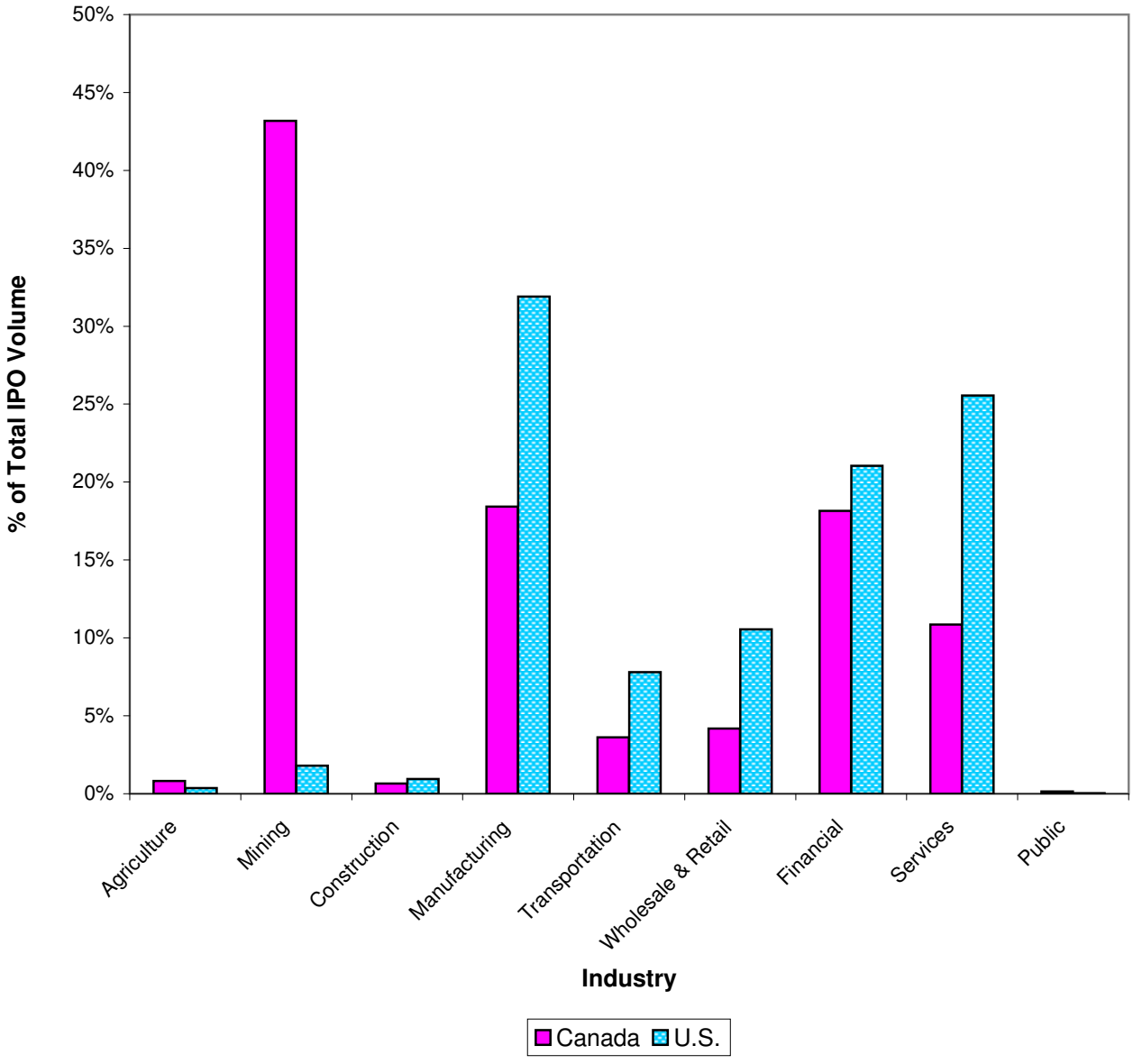

Figure 2: Industry distribution of IPOs 1986-1999.

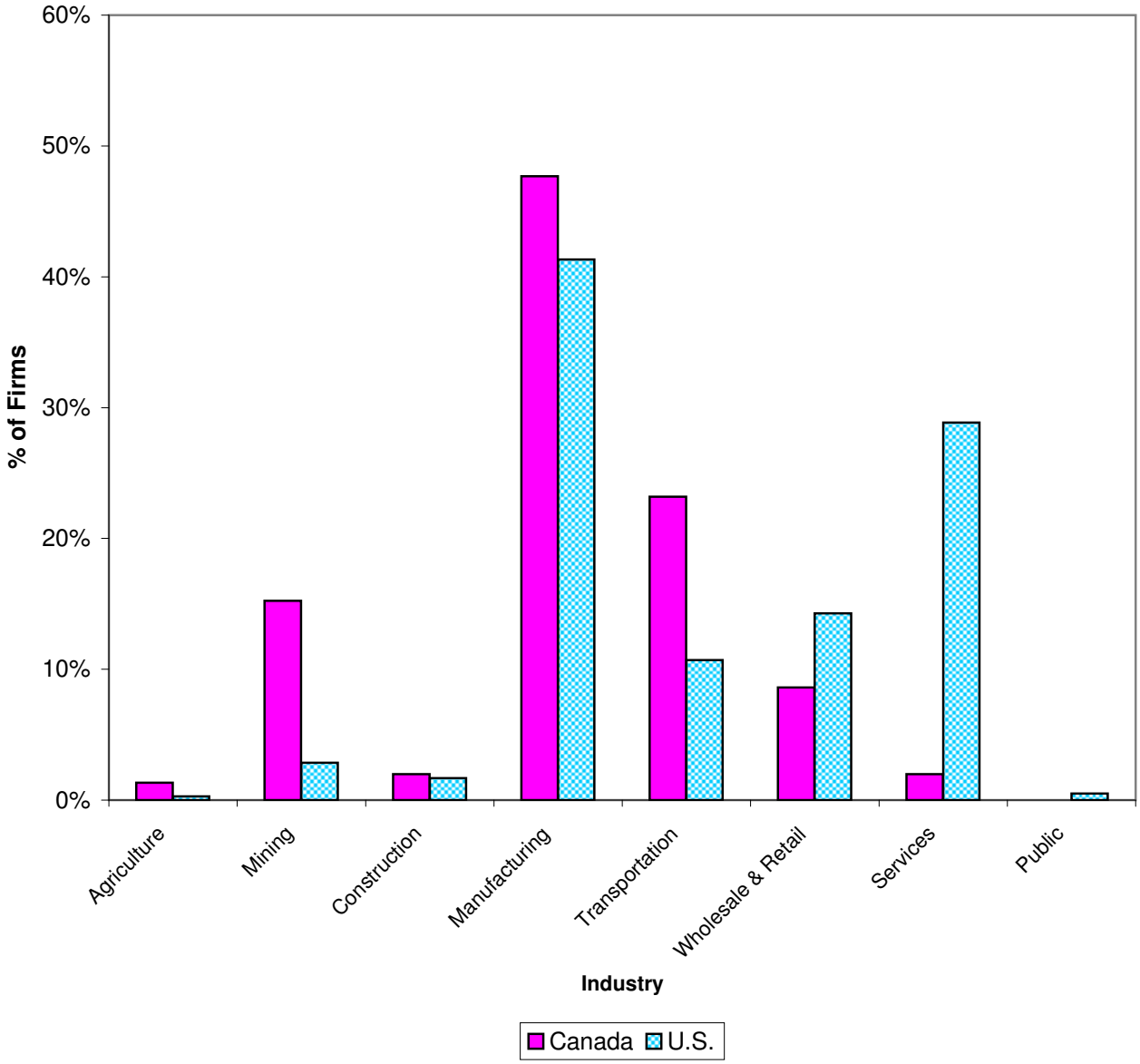

Figure 3: Industry distribution of firms in the sample.

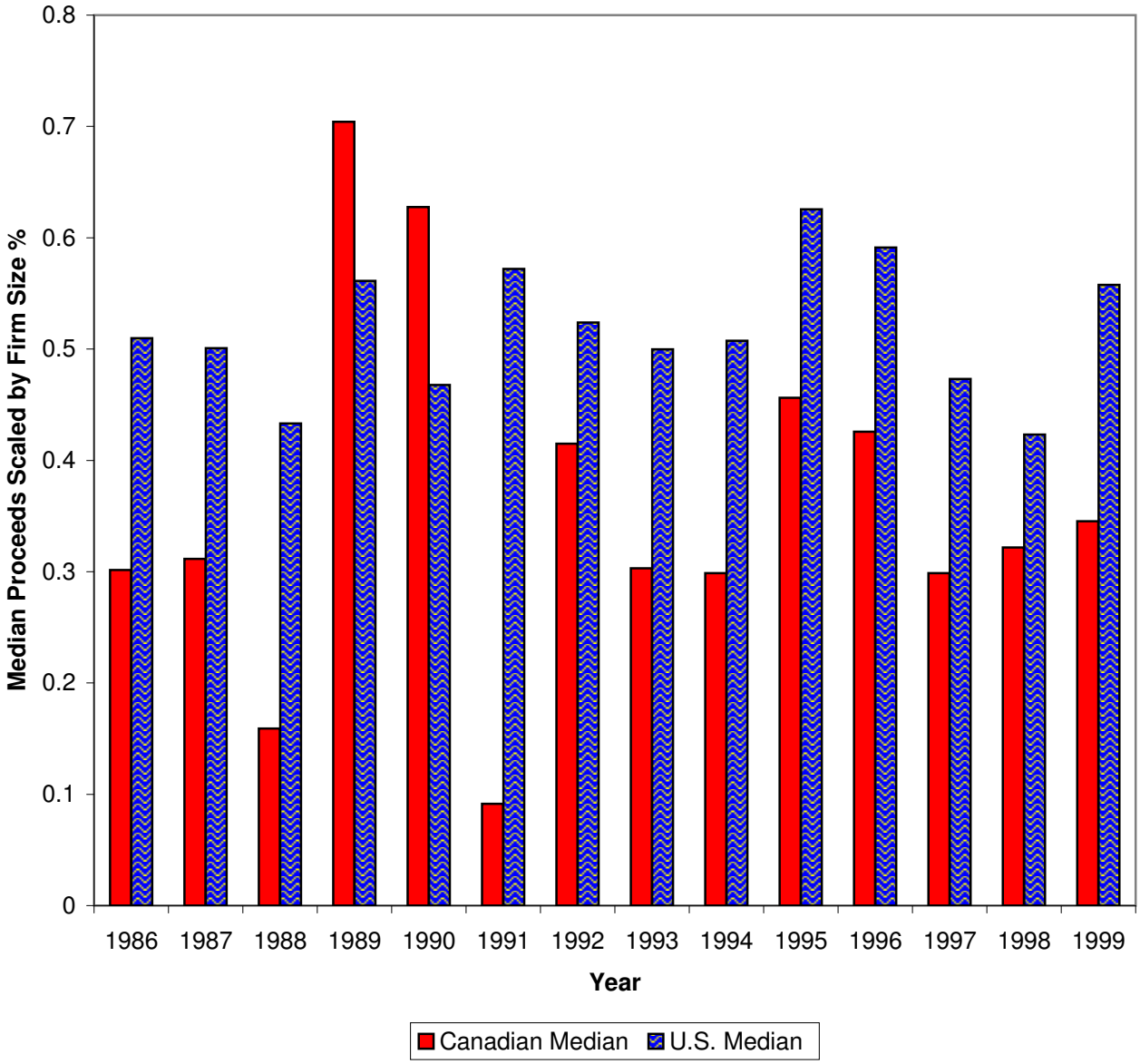

Figure 4: Annual median proceeds from IPO scaled by firm size 1986-1999.

Appendix: Definitions of Variables

D(book debt)	Definition 3: Debt in current liabilities (Compustat Annual Item 34) +long term debt (Item 9)
E(book equity)	Definition 2: Shareholders' equity (Item 216)+minority interest (Item 38)
Market equity	Common shares outstanding (Item 25)×share price (Item 199)
IC	Invested capital=book debt+book equity
A	Total assets (Item 6)
M	Market value of assets=market equity+book debt
D/IC	Book leverage=book debt/(book debt+book equity)
D/M	Market leverage=book debt/market value of assets
M/B	Market-to-book ratio=market value of equity/book value of equity
EBITDA/A	Earnings before interest, taxes, and depreciation (Item 13)/total assets
log(S)	logarithm of net sales (Item 12)
PPE/A	Net property, plant and equipment (Item 8)/total assets
R&D	Research and development expenditure (Item 46, replaced by zero if missing)
INV/PPE	Capital expenditures (Item 128)/PPE
DIV/E	Common dividends (Item 21)/book equity
CASH/A	Cash and short-term investments (Item 1)/total assets
ΔRE/A	Change in retained earnings (Item 36)/total assets
d	Net debt issues=change in book debt/invested capital
e	Net equity issues=(change in book equity-change in retained earnings) divided by invested capital

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