

IPO Performance and the Size Effect: Evidence for the US and Canada

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A Thesis

in

The John Molson School of Business

Presented in Partial Fulfillment of the Requirements

for the Degree of Master of Science in Administration (Finance) at

Concordia University

Montreal, Quebec, Canada

May 2019

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CONCORDIA UNIVERSITY
School of Graduate Studies

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Entitled: IPO Performance and the Size Effect: Evidence for the US and Canada

and submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN ADMINISTRATION (FINANCE)

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ABSTRACT

This study investigates the interaction between firm size and IPO underpricing in the US and Canadian markets between the years 2007-2016. We find a size effect on IPO underpricing in both Canada and the US, which is larger for Canadian firms. Canadian small firms show more underpricing than US small firms (19.32% vs. 13.87%). Large Canadian firms also exhibit more underpricing than their US counterparts over the sample period (12.83% vs. 10.09%). A size effect on performance is not apparent for holding periods beyond six months from the IPO in both countries, consistent with seasoning effects that reduce information asymmetries across firms over longer investment horizons.

Keyword: IPO performance; size effects; short-term information asymmetries

ACKNOWLEDGMENT

I wish to express my sincere appreciation to my supervisor Dr. Lorne N. Switzer. He provided me with endless help whenever I ran into troubles or had a question about my research. All through the whole process of writing the thesis, he consistently motivated me and helped me with the work. Dr. Lorne not only instructed the paper but also influenced my whole studying of finance. I benefit quite a lot and always feel grateful that I have the supervisor.

I would also love to thank my thesis committee Dr. Alan Hochstein and Dr. Ravi Mateti for their insightful feedback and recommendations. I appreciate that my friends and classmates gave me continuous encouragement and help when it was a particularly hard time at the last stage of writing the thesis. This accomplishment would not have been possible without them.

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1. Introduction

Initial Public Offerings (IPOs) are significant events in the evolution of start-up firms, when shares of the company are sold to institutional and retail investors to be subsequently traded on one or more stock exchanges. They provide new equity capital for investment in firms' projects, allow founders and private equity investors a means to capture some of the returns from their initial stakes in the firm. Furthermore, they facilitate liquidity for current and future investors, which is useful for expanding the firm's investor base, as well as for raising capital as the company grows. IPO's have puzzled researchers for at least half a century.¹ The pioneering studies of Ritter (1984,1987) spotlight the IPO underpricing phenomenon, of high first day returns (from the offer price to the first day closing price) for IPO's. Over the period 1980-2018, Ritter et al. (2018) show significant IPO underpricing in the US, averaging 18.4% returns based on proceeds-weighted portfolio and 17.9% based on equally-weighted portfolio. This suggests that there may be a negative size effect, given that equal weighted portfolios attach more consideration to small firms. Whether this is due to the distribution of IPO's (e.g. micro-caps vs. traditionally defined small caps vs. mid-sized companies) is a largely unexplored question. Indeed, based on pre-IPO sales of the underlying companies, higher first day returns are observed for smaller companies. In particular, over the period, 1980-

¹ See e.g. Stoll and Curley (1970) Logue, Ibbotson (1975), Baron (1982) Ritter (1984,1987) Rock (1986), Beatty and Ritter (1986), Benveniste and Spindt (1989), Alon and Brav (1997), (Mok and Hui, 1998) Loughran and Ritter (1992,2002), Jain and Kini (1994), Benveniste, Ljungqvist, Wilhelm, and Yu (2003), Kooli and Suret (2002), Kryzanowski, Lazrak and Rakita (2005), Chemmanur and Paeglis (2005), Ljungqvist (2007), Lowry, Officer and Schwert (2010), and Switzer and Bourdon (2011), and Bartlett, Rose and Solomon (2017).

2016 first day IPO returns are on average 18.6% (8.6%) for firms with pre-IPO sales less (greater) than \$1 billion.² For Canada, where IPO's are comprised of smaller firms than in the US, IPO underpricing over the period 1987-2017 is found to be more modest, averaging 5.6%.³

This paper provides new evidence for Canada and the US on the phenomenon of *IPO underpricing*, the high returns from the initial offering price to the first day closing price *as it relates to firm size*. Ritter (1984) posits that size should play a role in IPO underpricing, as it proxies for ex ante uncertainty about the firm's prospects. This can explain the high ex post first day returns for small firms based on sales shown in the Ritter data. Ljunquist (2007) suggests that informational effects, especially informational asymmetries are overriding factors in explaining IPO underpricing. More recently, Lowry, Officer and Schwert (2010) buttress this approach. They show that small, young, high-tech, VC-backed, NASDAQ firms experience higher IPO underpricing. In other words, higher IPO underpricing for small firms may be risk related: simply put, small companies have prospects that are difficult to value, and should command higher returns to compensate for this risk.⁴ Fama and French (1993, 2015, 2018) include a size factor in their model for stock returns, as a fundamental factor that is a reasonable proxy for expected cash flows. Indeed, the Fama and French size factor

² <https://site.warrington.ufl.edu/ritter/ipo-data/>

³ Canada's first-day IPO returns are derived from Ritter <https://site.warrington.ufl.edu/ritter/ipo-data/> and extend the series of Kryzanowski, Lazrak and Rakita (2005), Kooli and Suret (2002) show less underpricing in Canada relative to the US for the period 1997-1999.

⁴ See Rock (1986), Beatty and Ritter (1986), Benveniste and Spindt (1989) and Lowry, Officer and Schwert (2010).

(SMB) on Ken French's database, over the period July 1963-January 2019 shows an average annual excess return for small caps of 2.92%. We reexamine the question of higher initial returns for smaller firms using more recent data for the US and provide new evidence on this score for Canada. *We also provide some new evidence on the role of firm size as it relates to the question of longer horizon performance of IPOs in the US and Canada.* In addition to re-examining the role of firm size in short run and longer run IPO performance, we also incorporate uncertainty factors affecting IPO returns as in Lowry, Offer, and Schwert (2010). Furthermore, we consider the role of internal governance mechanisms in explaining IPO initial returns and long-term IPO performance.

We find that on average, smaller firms have higher IPO underpricing in both the US and Canada. We also find that holding constant firm size, CEO dominance and size of top management team are negatively related to IPO underpricing in the US, but not in Canada.

We do not find a differential size effect on the performance of firms beyond a six-month horizon from the IPOs for Canada or the US, consistent with a seasoning effect that reduces the information asymmetries across firms.

The remainder of the paper is organized as follows; Section 2 will provide a brief review of the literature and present the hypotheses for testing. A description of the data and the methodology are provided in section 3. The results follow in section 4. This paper concludes with a summary in section 5.

2. Literature Review and Hypotheses

IPO underpricing has been a fairly well-established empirical regularity in the literature over the years. The recent literature has sought to identify factors associated with this phenomenon. Ljunquist (2007) summarizes the literature into four approaches: a) focusing on the role asymmetric information – in particular where informed investors (e.g. institutions) earn the bulk of the gains at the initial allocations, at the expense of uninformed (e.g. retail) investors; b) looking at the role of institutions: e.g. threats of lawsuits, the effects of investment banks in price stabilization, and tax effects; c) control effects: how underpricing is a means to entrench the positions of founding shareholders; d) behavioral – particularly the role of shareholder irrationality as prices are bid up to levels well above fundamental valuation. He concludes that the bulk of the evidence supports the a), the informational approach. In particular, consistent with Rock (1986) winners' curse, he suggests that

a) most of the underpricing-related gains accrue to informed (or at least institutional) investors; uninformed (or at least retail) investors earn little or no excess returns from investing in IPOs. Furthermore, informed investors affect the investment bank's choice of offer price; and

b) underpricing across firms increases in the ex-ante uncertainty surrounding a firm's valuation.

Our paper focuses on b), the role of ex ante uncertainty across firms. *Our proxy for uncertainty is firm size.*

The “small firm effect,” whereby small cap firms earn higher risk adjusted returns than large cap firms have received considerable attention since Banz (1981), Reinganum (1981), Keim

(1983), Blume and Stambaugh (1983), and more recently Switzer (2010). Switzer (2012, 2013) looks at the time varying nature of the small cap premium and show that it is related to the default risk premium. All of the variants of Fama and French (1993, 2015, 2018) factor models, incorporate the size factor (SMB) to capture market fundamentals, as reflected in long run outperformance of small firms over long periods of time. Ritter (1984) states that size should play a role in IPO underpricing: to the extent that smaller firms are exposed to higher ex ante uncertainty, they should be expected to have greater underpricing/higher first day returns. This result is also shown by Lowry, Officer and Schwert (2010), who show higher average initial returns and variability of initial returns are observed for smaller firms that are more difficult to value.

Hypothesis 1: Smaller firms in Canada and the US will have greater IPO underpricing as reflected in first day returns

While short-term IPO underpricing is fairly well-established phenomenon in most markets, the longer-term performance of IPO's is a matter of some controversy. Ritter (1991) and Loughran and Ritter (1995) provide evidence that IPO's underperform in the long run in the US. Gompers and Lerner (2003) and Schultz (2003) dispute this result on methodological grounds.⁵ Kooli, L'Her and Suret (2003) show that underpriced IPOs in Canada outperform in the long run, especially growth and financial sector IPOs. The role of firm size in longer term IPO performance has not received significant attention in the literature. To the extent that information asymmetries decline over time with seasoning of the IPO's one might expect

⁵ The key point of contention is whether the analyses should be conducted in event time vs. calendar time.

that the gaps in performance between smaller firms and larger firms would decline over longer horizons. In an early study, Stoll and Curley (1970) document a six month return excess return of small IPOs over the S&P index of 42.4%, which might be indicative of a positive size effect for extended horizons. Bartlett, Rose and Solomon (2017) show slightly higher 3-year gross cumulative returns for large IPOs compared to small IPOs held by mutual funds. With the increased speed of information transmission through time, one might expect that seasoning effects might be observed for small IPO's in general, not just those held by mutual funds.

Hypothesis 2 Differential Performance between Small Firms and Large Firms will diminish over longer investor holding periods.

As mentioned above, the long run performance of IPO's in general has been a matter of contention. Our paper will provide new evidence on this issue. Hypothesis 2 focuses on the existence of a size effect, and extends the Bartlett, Rose and Solomon (2017) analysis to a wider sample of US IPO's, and for the first time to a sample of Canadian IPOs.

3. Data and Methodology

3.1 Description of the Data

The sample for the analyses consists of companies that are listed on the Amex-NYSE, NASDAQ, and the Toronto Stock Exchange. The primary source for the IPO data is the SDC Platinum database of Thomson Reuters Financial Securities new issue database and WRDS. And only issuers of common stocks are considered. Data of management quality is taken from the IPO prospectus available on SEDAR, Bloomberg and WRDs database. The Ritter

IPO database is used as a supplemental source for missing observations. The data from SDC's on IPO characteristics are cross-checked with Capital IQ data as well as data from the Ritter IPO Database. The final sample consists of 4628 common stocks of firms with IPOs between 2007 and 2016, which includes 2364 US stocks and 2234 Canadian stocks. In this paper, we use winsorized data⁶ to avoid and mitigate the effects of spurious extreme values.

In this paper, we use two criteria to measure firm size: market capitalization of firms at the end of the first day of the IPO, and gross proceeds from the IPO.

The second criterion used for firm size is gross proceeds of IPOs (Bartlett, Rose and Solomon, 2017). Small IPOs include IPO which received less than \$54.4 million in gross proceeds in Canada and the US adjusted for inflation⁷.

3.2 Modeling the Determinants of IPO Underpricing and Performance over Longer Horizons

In addition to performing univariate analyses to examine differential IPO performance based on size proxies to capture issue uncertainty, we also conduct regression analyses to provide a multivariate perspective that incorporates the interactions between the independent variables.

In particular, we extend the models of Ritter (1984), Megginson and Weiss (1991),

Ljungqvist and Wilhelm (2003) Lowry, Offer, and Schwert (2010) to incorporate

governance/management quality features. The basic regression model used is as follows:

⁶ Winsorization is the transformation of statistics by limiting extreme values in the statistical data to reduce the effect of possibly spurious outliers. It is named after the engineer-turned-biostatistician Charles P. Winsor. In this paper, the winsorized mean is expressed as a weighted average abnormal returns of the truncated mean and the 5th and 95th percentiles.

⁷ The US inflation issues are measured in US inflation adjusted dollars; Canadian issues are measured in Canadian inflation) dollars.

$$Return_t = a_0 + a_1SizeProxy + a_2Gross\ Spread + a_3MVP + a_4VC + a_5MultiClass + a_6HighTech + a_7Lockup + a_8CEODominance + a_9Size\ of\ management\ teams \quad (1)$$

The dependent variable $Return_t$ is measured by abnormal returns for the IPO over 4 subperiods: i) first day returns for the IPO; ii) returns over the 4-week horizon subsequent to the IPO; iii) returns over a horizon of 180 days after the IPO; iv) returns over a 1-year horizon from the IPOs. First day returns measure IPO underpricing. It is the abnormal return between the IPO offer price and the subsequent secondary trading market price. Abnormal returns are measured as $(p_t - p)/p$, where p is the offering price and p_t is the closing bid price on the specific day observed of public trading.

We use three variables to capture size effects: i) gross proceeds in \$MM (natural log) :

Lnproceeds ; ii) small firm vs. large firm : an indicator variable based on firm size by gross proceeds, which equals to 1 if gross proceeds is greater than \$54.4 MM, equals to 0 otherwise: **Size_Dummy** ; iii) Market capitalization in \$MM(natural log), directly reflects market scale of IPO firms: **lnMV**.

We also consider a number of control variables relating to the offerings characteristics that are expected to affect IPO returns aside from firm size. The first is a proxy for valuation uncertainty: the gross spread of the issue: **Gross-spread**. This variable captures to the fees (in \$MM) that underwriters receive for arranging and underwriting the offering. We conjecture that higher gross spread should be associated with poorer performance of the IPO. We also look at the effect of so-called ‘Money left on the table.’ This variable is measured as the difference between the closing price on the first day of trading and the offer price multiplied

by the number of shares sold (in \$MM). This variable is commonly viewed as another measure of underwriter compensation and denoted in the analyses as: **MVP**. Loughran and Ritter (2002) argue that high values of the MVP variable may represent excess compensation for the services of analyst coverage; Hence this variable is expected to have a negative effect on IPO returns. Venture capitalists are financial intermediaries investing in start-up companies which provide capital to young high-technology firms that might have otherwise gone unfunded (Gompers, 2007). Ivanov and Xie (2010) find evidence that venture capitalists add value to start-up companies. Companies backed by venture capitalists tend to be riskier and have higher valuations at the IPO than non-VC-backed ones. Venture capitalists of issuing firms are frequently co-opted through the allocation of hot IPOs to their personal brokerage accounts Ivanov and Xie (2010). Venture capitalists may thus have incentives to work with the firms' managers and key decision makers to choose lead underwriters with reputations or leaving money on the table in IPOs. (Loughran, Ritter, 2004). Hence, venture capital-backed IPOs are expected to have higher abnormal returns/ better performance across investment horizons. A dummy variable that captures venture capitalists in the analyses is **VC** which is set equal to 1 for IPOs backed by venture capitalists and is equal to 0 otherwise. Benveniste and Spindt (1989) show that asymmetric information between the issuer and institutional investors may lead to IPO underpricing and strategic rationing, when firms issue more than one class of shares. Extending their argument, we expect that IPOs with multiple-class share structures are more likely to be underpriced. Firms' share structures are identified

with a dummy variable **Multi-class** that is set equal to 1 if the firm has more than one class of shares and 0 otherwise.

We also examine the effects of the technological sector of the IPO using a dummy variable **High-tech** which equals one if the firm is in a high-tech industry (as defined by SDC), and zero otherwise. Kim, Pukthuanthong- Le and Walker (2007) find that high-tech firms have higher risk and uncertainty as reflected by higher price revisions and greater underpricing. Lowry, Officer and Schwert (2010) also find greater underpricing for high tech firms consistent with the hypothesis that the value of such firms is much more difficult to estimate, since it is directly dependent on [uncertain] growth options. They also show that the dispersion of returns is higher in IPO markets when High tech firms are more prevalent. One might argue that over the longer term (horizons beyond one month), the greater risks of default for high tech firms might be reflected in poorer performance.

Another control variable that we consider in the analyses of IPO performance is the Lockup period. The Lockup period captures the time frame following the IPO in which insiders are proscribed from selling stocks from their allotments. The most common Lockup periods are 90 days, 180 days, and 360 days. The Lockup period variable, Lockup is measured in days. Aggarwal, Krigman and Womack (2002) develop a model in which managers strategically underprice IPOs to maximize personal wealth from selling shares at lockup expiration. They find that IPO underpricing is positively correlated with stock returns and insider selling at the lockup expiration. Brav and Gompers (2003) note that Lockups serve several roles: a) to prevent moral hazard problems: e.g. to commit managers to refrain from schemes such as

“pump and dump” whereby shares are sold after promoters have artificially bid up prices to unsustainable levels; b) to signal of firm quality ; c) to permit underwriters to extract additional compensation from firms. The empirical evidence on their effects is mixed.

Bradley, Jordan, Roten, and Yi (2001), Field and Hanka (2001) and Ofek and Richardson (2003) find that lockup expirations result in a permanent increase in trading volume, and statistically significant stock price declines of about 1.5%. Cao, Field and Hanka (2004) suggest that lockup expirations improve market liquidity. The Lockup period variable,

Lockup is measured in days. On balance, we expect that lockup period has a positive effect on IPO underpricing, but a negative effect on longer term performance, as insiders dispose of their shares after the lockup period.

In addition, proxies for management quality are considered in our model for the determinants of IPO returns. Switzer and Bourdon (2011) look at the effects of management quality on the operating performance and Tobin’s Q of Canadian firms first in the first year from their IPO.

We focus on two variables from that study: a) **CEO dominance** over other team members measured by the ratio of the CEO salary to the average salary of other members of the management team and b) **Size of top management team**, defined as the number of managers with the rank of vice-president or higher in the management team. Based on Fama and Jensen (1983), the degree of CEO dominance is expected to have a negative relationship with the stock market performance of the IPO’s. Team size effects might be less clear: while larger teams might be deemed beneficial to the extent that they provide more diverse ideas to members, they may suffer from problems of coordination. These effects might be country

specific, reflecting differences in industry distributions (see e.g. Chemmanur and Paeglis (2005)).

4. Empirical Results

Table 1 and Figure 1 show the distribution of IPOs and average IPO underpricing of large firms and small firms in the US and Canada for the period 2007-2016. In sharp contrast with the US, most IPO's in Canada are small (classification of gross proceeds), throughout the sample period. However, with the exception of the financial crisis period (years of 2008-2009), the proportion of small IPO's increases in the U.S. over time. On average, IPO underpricing is higher for small firms than large firms in the US and Canada. IPO underpricing tends to peak in the years 2011-2014. After 2014, there is slight decline of IPO underpricing in both the US and Canada. On average Canadian small firms exhibit more underpricing than their US counterparts. IPO underpricing is fairly similar in both countries. Large firms in Canada on average exhibit higher underpricing than their US counterparts over the sample period (12.83% vs. 10.09%). Canadian small firms also show more underpricing than US small firms (19.32% vs. 13.87%).

[Insert Table 1 Here]

Table 2 shows the distribution of abnormal returns for IPO's in the US and Canada classified by firm size (measured by gross proceeds) over the sample period 2007-2016 for alternative investment horizons (one day, 30 days, 180 days, and one year). In the US, larger IPO's are more prevalent than small IPO's (1407 vs. 987), although the average returns for smaller firms is higher for one day and 1-month horizons. In Canada, in contrast, small firms IPOs

predominate ((2145 vs. 121). and small firms have comparably larger abnormal returns than large firms across all investment horizons.

[Insert Table 2 Here]

4.1 Issue Characteristics of Small Firm IPOs vs. Large Firms IPOs

Table 3 shows the distribution of IPO issue characteristics classified by firm size groupings (large vs. small based on gross proceeds) for US and Canadian firms over the period 2007-2016. The columns tabulate IPO underpricing, Money on the table, Offer price, Gross spread and Total assets. Money on the table is the difference of market value between the offer date and the first day after offering. Gross spread is the total fees that underwriters receive for arranging and underwriting an offering of equity securities. As might be expected, in both countries, large firms have comparably higher offer prices, money left on the table, higher gross spread and higher total assets. On the contrast, large firms have comparably lower excess returns than small firms both in the US and Canada. On average, US small and large firms leave money on the table than their Canadian counterparts.

[Insert Table 3 Here]

Table 4 provides descriptive statistic of returns across different return horizons and firm/issue size characteristics for Canadian and US IPOs over the period 2007-2016. Panel A (B) looks at all Canadian (US) firms together. Panels C and E look at Canadian and US small firms, respectively. Panels D and F look at Canadian and US large firms, respectively. Compared Panel A with Panel B, Canadian firms have averagely higher excess returns in one day, 30-

day, 180-day than US firms. On average, small firms have better return performance than large firms for all investment horizons (1-day, 30-day, 180-day, 1-year) for Canadian firms. Large firms in the US have better returns after 180 days. For Canadian firms, the differential initial IPO excess return between small firms and large firms is $18.96\% - 13.09\% = 5.87\%$; The differential of excess return for a 30-day horizon is $22.13\% - 12.54\% = 9.59\%$; Over a 180-day horizon, the differential of excess return is $18.38\% - 10.12\% = 8.26\%$; Over a one year the differential is $17.91\% - 7.73\% = 10.18\%$. For US firms, the one-day differential of excess return is $14.64\% - 11.35\% = 3.29\%$; differential for 30-days is $14.29\% - 13.08\% = 1.21\%$; differential for 180-day is $13.36\% - 13.96\% = -0.6\%$; differential for one year is $11.74\% - 12.67\% = -0.93\%$. Compared with Canadian firms, the average differential of excess return of US firms is smaller than for Canadian firms, and the average excess return of large firms exceeds small firms in the longer period.

Furthermore, large firms have higher gross spreads than small firms in the US and Canada, which means underwriters receive more fees for arranging and underwriting the offering.

Money left on the table are higher for large firms than small firms both in the US and Canada. US small firms leave more money on the table than Canadian small firms (9.84M vs 3.03M), and US large firms leave 203.63M money on the table compared with 162.05M of Canadian large firms.

[Insert Table 4 Here]

Table 5 provides summary statistics for IPO's returns across alternative investment horizons according to firm and issue characteristics. Panel A shows results for US firms, while Panel B

reports the estimates for Canadian firms. On average, Canadian small firms that are in high tech, VC-backed, with multi-class share structures, and have longer lockup periods have better returns than their large counterparts for all investment horizons. US small firms that are in high-tech and multi-share structures show better performance than US large firms only on the first day of trading. With a 30-day holding period, US small firms in high-tech do not perform better than US large firms in high-tech. US small firms with VC-backing and long lockup periods do not show an obvious difference in returns with US large counterparts. In both the US and Canada, firms that are in high-tech, VC-backed, with long lockup periods outperform firms that are in non-high-tech, non-VC-backed, with short lockup period, while there is no big gap between companies with multi-class shares vs. their single share class counterparts.

[Insert Table 5 Here]

4.2 Multivariate Analysis

Table 6 shows the Pearson Correlation statistics table for the US sample and Canadian sample. Panel A shows the results for US sample, and Panel B shows the results for Canadian sample. Multivariate variables in the OLS regressions have compared each other.

Correlations and directions among variables are quite similar for US and Canadian firms.

There is no strong linear relationship (correlation coefficient > 0.5 or < -0.5) among the independent variables in the regressions.

[Insert Table 6 here]

Table 7 shows the OLS regression results for the models of IPO performance given by equation (1) for the US and Canada separately. In this regression, we use $\ln(\text{proceeds})$ as a size proxy measuring firm size by natural logarithm of gross proceeds. We find some interesting country differences in the analyses. Consistent with our hypotheses, US firms, $\ln(\text{proceeds})$ has a significantly negative effect on 1-day and 30-day returns: in other words, smaller firms provide better performance based on initial returns (consistent with Lowry, Officer and Schwert (2010)), and 30-day cumulative abnormal returns than large firms; for the longer holding period of 180 days there is no significant relationship between $\ln(\text{proceeds})$ and IPO returns. For Canadian firms, a negative size effect is observed across all holding periods, but it is not significant. Venture Capital backing is positive and significant across all investment horizons in the US consistent Ivanov and Xie (2010). VC backing in Canada is positive across all horizons, but not significant. For US firms, consistent with Aggarwal, Krigman and Womack (2002), longer lockup periods are positively and significantly related to short horizon returns (one day and one month). The lockup period does not appear significant for Canadian firms. However, CEO dominance, as reflected by the differential compensation to CEOs relative to other members of the management team is significantly negatively associated with performance across all holding periods, only for Canadian IPOs. Large management teams are detrimental to one month and 180-day performance measures for US firms, but not Canadian firms. Finally, 'money on the table' (MVP) has a significantly negative effect on initial day performance for US firms, consistent with Loughran and Ritter

(2002). This effect is not observed for Canadian firms. Gross Spread has a positive effect for one day returns in the US and Canada, although it is not significant at conventional levels.

[Insert Table 7 Here]

Table 8 reports the results of the multivariate regressions using the Size_dummy variable as a firm size proxy (which equals to 1 for large firms (more than \$54.4 million) and equals to 0 for small firms (less than \$54.4 million). Most of the results are consistent with those reported in Table 7, although the negative size effect is only significant for the one day returns horizon. Interestingly, the CEO dominance variable is significantly negative for the one day returns of US firms. For Canadian firms, CEO dominance has a significantly negative effect across all horizons.

[Insert Table 8 Here]

In Table 9, we report the results of the the multivariate regression, using the market capitalization variable: use lnMV as firm size proxy variable. On the whole, the results are qualitatively similar to those obtained using the other firm size proxies, although the CEO dominance variable for US firms is not significant. In Canada, CEO dominance continues to have a detrimental effect on stock returns, as in Tables 7 and 8.

[Insert Table 9 Here]

5. Conclusion

The paper provides evidences in support of a size effect for IPO performance in both Canada and the US. Two benchmark criteria are used to distinguish large firms vs. small firms: gross proceeds (Bartlett, Rose, and Solomon, 2017) and market capitalization (Switzer, 2010). We

find support for a significant size effect: for short investment horizons: in both Canada and the US, smaller firms have greater IPO underpricing, suggesting that this may be due to greater uncertainty in the valuation of smaller firms. It is also consistent with Lowry, Officer and Schwert (2010). We do not find a differential size effect on the performance of firms beyond a six-month horizon from the IPOs for Canada or the US, consistent with a seasoning effect that reduces the information asymmetries across firms. Some clear country differences are observed in the analyses. Venture Capital backing and lockup periods have significant effects for the US firms, but not Canadian firms. Evidence shows that in Canada, venture capitalists cannot eliminate adverse selection and moral hazard. Furthermore, these problems are more acute for younger and start-up firms which assets are less and firm scales are small. Venture capitalists are better at dealing with informational problems than are other investors, but this advantage shows up most in later stage entrepreneurial firms rather than at the start-up stage (Amit, Brander and Zott, 1998). In addition, they also predict a negative relationship between the extent of venture capital ownership and firm performance in Canada. CEO dominance appears to have a larger detrimental effect on Canadian firms. Whether these are due to differential behavioral or institutional factors between countries remains a topic for future research.

Figure 1. This figure shows the number of IPOs and IPO underpricing in the US and Canada for small firms and large firms separately in 2007-2016.

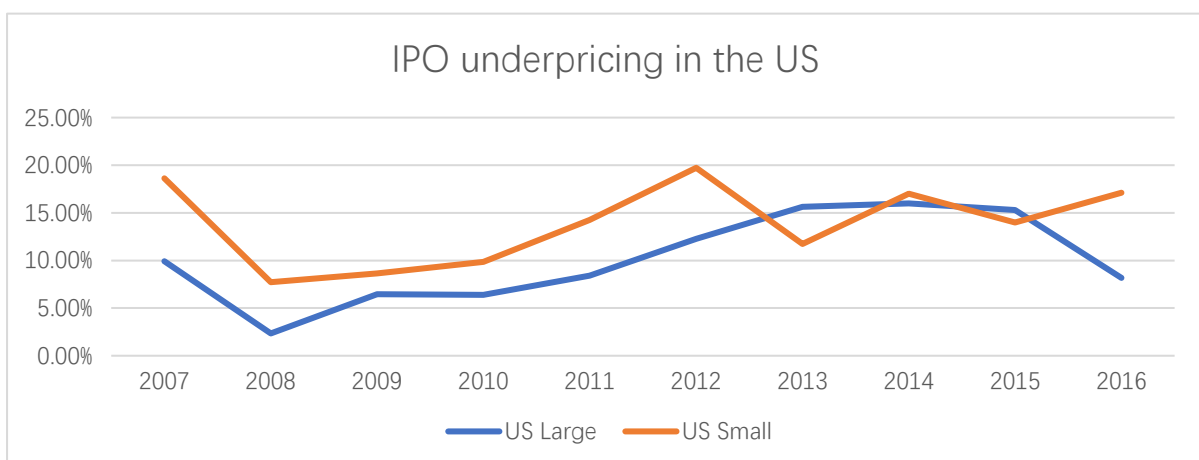
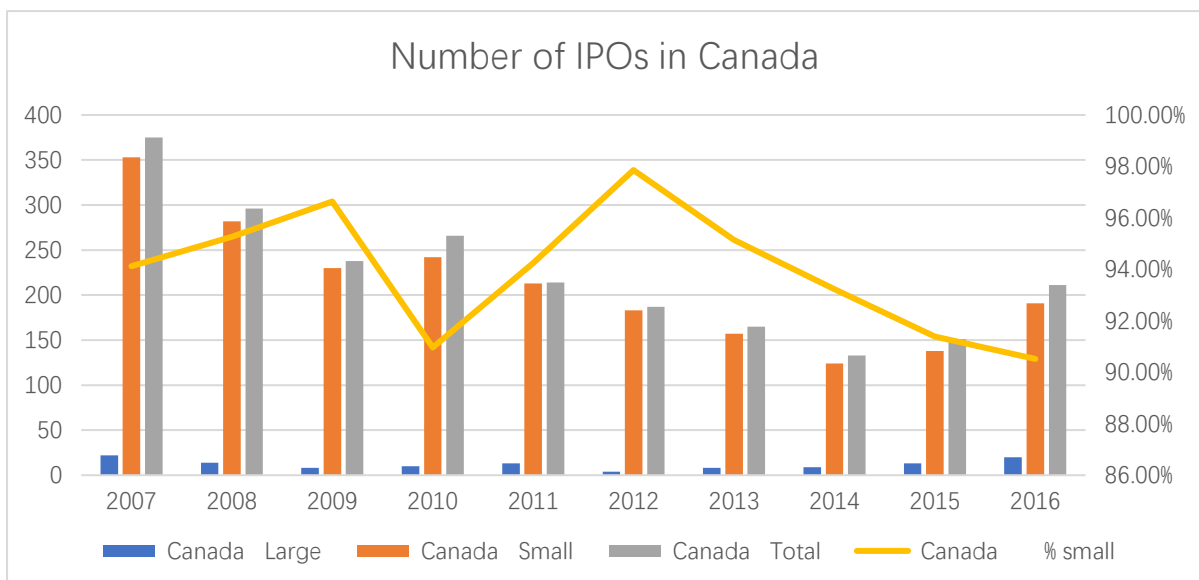
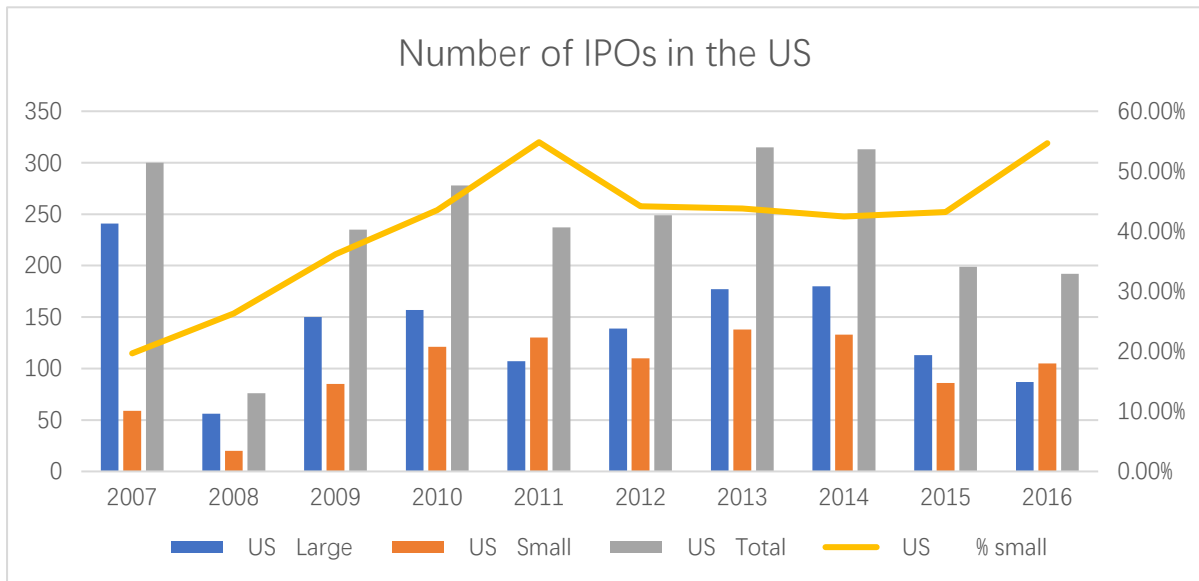


Figure 1 continued

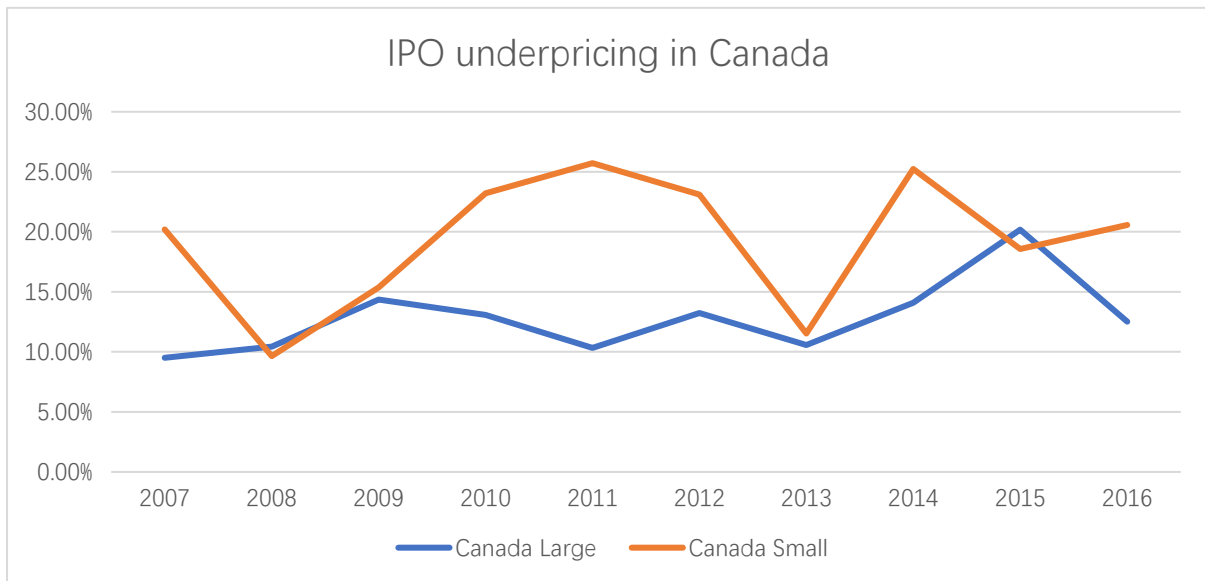


Table 1

Table 1 shows the distribution IPOs and underpricing over the sample period (2007-2016) Panel A shows the number of IPOs in US and Canada categorized by firm size. Panel B looks at the distribution based on underpricing and firm size. Firm size is measured by (the inflation adjusted) gross proceeds.

<i>Panel A Number of IPOs</i>								
Year	US				Canada			
	Large	Small	Total	% small	Large	Small	Total	% small
2007	241	59	300	19.67%	22	353	375	94.13%
2008	56	20	76	26.32%	14	282	296	95.27%
2009	150	85	235	36.17%	8	230	238	96.64%
2010	157	121	278	43.53%	10	242	266	90.97%
2011	107	130	237	54.85%	13	213	214	94.25%
2012	139	110	249	44.18%	4	183	187	97.86%
2013	177	138	315	43.81%	8	157	165	95.15%
2014	180	133	313	42.49%	9	124	133	93.23%
2015	113	86	199	43.22%	13	138	151	91.39%
2016	87	105	192	54.69%	20	191	211	90.52%
Avg	N/A	N/A	N/A	40.89%	N/A	N/A	N/A	94.49%
Total	1407	987	2394	N/A	121	2113	2234	N/A

<i>Panel B IPO underpricing</i>					
Year	US		Canada		
	Large	Small	Large	Small	
2007	9.92%	18.62%	9.51%	20.20%	
2008	2.34%	7.72%	10.44%	9.65%	
2009	6.45%	8.65%	14.35%	15.36%	
2010	6.38%	9.84%	13.07%	23.20%	
2011	8.41%	14.24%	10.32%	25.72%	
2012	12.26%	19.73%	13.24%	23.10%	
2013	15.63%	11.75%	10.56%	11.54%	
2014	15.99%	17.02%	14.09%	25.25%	
2015	15.31%	13.97%	20.18%	18.57%	
2016	8.16%	17.11%	12.52%	20.56%	
Avg	10.09%	13.87%	12.83%	19.32%	

Table 2 Distribution of IPO abnormal returns

Table 2 provides summary statistics of IPO abnormal returns for US and Canadian large firms and small firms for the period 2007-2016. Abnormal returns are shown for holding periods of 1 day, 30 days, 180 days and 1 year after the IPOs issue date. Firm size categories are based on the gross proceeds (in MM) of the issue.

<i>US Large firm</i>							
Year	Total of IPOs	Mean Size	Median size	Abnormal Return 1 day	Abnormal return 30 days	Abnormal return 180 days	Abnormal return 1 year
2007	241	243.10	70.31	9.92%	7.98%	10.42%	7.35%
2008	56	987.06	76.22	2.34%	0.02%	-24.31%	-23.70%
2009	150	289.39	70.01	6.45%	9.70%	25.03%	31.82%
2010	157	373.88	72.00	6.38%	7.72%	16.14%	14.62%
2011	107	344.55	80.76	8.41%	8.12%	2.54%	3.01%
2012	139	224.57	75.02	12.26%	15.65%	24.02%	19.45%
2013	177	317.04	72.00	15.63%	19.67%	28.45%	21.49%
2014	180	297.40	72.00	15.99%	19.64%	23.28%	25.68%
2015	113	217.27	70.02	15.31%	19.71%	16.64%	12.35%
2016	87	304.85	75.00	8.16%	13.94%	24.35%	25.06%
Total	1407	377.56	73.33	11.35%	13.08%	13.96%	12.67%
<i>US Small firm</i>							
2007	59	25.61	72.28	18.62%	14.26%	7.47%	5.96%
2008	20	18.75	65.58	7.72%	7.19%	-14.15%	-12.40%
2009	85	16.34	65.80	8.65%	11.82%	22.92%	18.60%
2010	121	15.40	67.75	9.84%	19.94%	15.78%	11.84%
2011	130	12.20	66.00	14.24%	2.97%	10.73%	0.63%
2012	110	13.90	66.93	19.73%	21.77%	17.37%	29.36%
2013	138	18.74	68.83	11.75%	12.29%	19.67%	12.57%
2014	133	20.60	66.24	17.02%	18.71%	2.88%	5.53%
2015	86	18.96	65.00	13.97%	7.95%	11.58%	17.46%
2016	105	20.27	68.50	17.11%	19.14%	12.74%	14.79%
Total	987	17.62	67.29	14.64%	14.29%	13.36%	11.74%
Total US	2394	196.30	70.31	12.73%	13.04%	13.54%	11.98%
<i>Canadian Large firm</i>							
2007	22	171.14	64.58	9.51%	15.87%	1.38%	-7.87%
2008	14	63.32	57.96	10.44%	-6.77%	-31.07%	-18.64%
2009	8	108.23	93.74	14.35%	14.38%	15.94%	14.60%
2010	10	202.29	136.99	13.07%	14.55%	21.35%	6.14%
2011	13	73.19	53.51	10.32%	11.60%	11.52%	17.59%
2012	4	82.80	84.15	13.24%	15.65%	5.21%	9.19%
2013	8	134.27	43.47	10.56%	6.73%	10.02%	4.99%
2014	9	98.26	95.40	14.09%	11.98%	12.02%	15.74%
2015	13	245.76	124.44	20.18%	18.40%	19.62%	20.53%
2016	20	211.83	138.69	12.52%	9.75%	18.18%	-3.17%
Total	121	139.11	89.29	13.09%	12.54%	10.12%	7.73%
<i>Canadian Small firm</i>							
2007	353	1.83	0.51	20.20%	25.10%	25.30%	19.99%
2008	282	1.17	0.50	9.65%	17.54%	-3.85%	-7.40%
2009	230	1.61	0.50	15.36%	20.12%	22.16%	19.61%
2010	274	1.79	0.52	23.20%	23.47%	20.19%	22.46%
2011	213	1.95	0.53	25.72%	18.72%	24.57%	26.19%
2012	183	2.05	0.49	23.10%	27.44%	19.92%	15.46%
2013	157	1.54	0.54	11.54%	23.23%	17.40%	26.05%
2014	120	1.30	0.50	25.25%	18.80%	21.06%	26.96%
2015	130	2.21	0.51	18.57%	11.88%	18.57%	21.87%
2016	191	1.94	0.52	20.56%	23.64%	25.71%	19.42%
Total	2133	1.74	0.51	18.96%	22.13%	18.38%	17.91%
Total CA	2234	70.42	44.90	15.94%	16.77%	15.20%	13.06%

Table 3 Distribution of IPO issue characteristics classified by firm size groupings (large vs. small based on gross proceeds)

This table shows the distribution of the IPO issue characteristics for US and Canadian firms over the period 2007-2016.

The data are collected from SDC Platinum, WRDS, and Thomson Reuters. IPO underpricing is the first-day return after IPOs.

Money on the table is the difference of market value between the offer date and the first day after offering. Gross spread refers to the fees that underwriters receive for arranging and underwriting an offering of debt or equity securities.

Panel A. Means of Canadian firms

Year	Number of IPOs	IPO underpricing		Money on the Table		Offer Price		Gross Spread		Total Assets	
		Large	Small	Large	Small	Large	Small	Large	Small	Large	Small
2007	375	9.51%	19.18%	205.11	7.27	7.62	0.53	0.28	0.09	2421.51	15.91
2008	296	10.44%	9.74%	63.34	2.11	5.11	0.37	0.34	0.03	352.38	11.20
2009	238	14.35%	15.27%	60.15	5.64	2.55	4.64	0.19	0.04	471.38	20.42
2010	272	13.07%	18.63%	183.50	1.22	6.91	7.74	0.24	0.07	1031.34	12.45
2011	221	10.32%	22.10%	241.84	0.65	9.21	4.98	0.36	0.35	492.12	14.58
2012	187	13.24%	17.37%	89.40	0.77	10.12	0.54	0.53	0.24	1705.77	47.53
2013	150	10.56%	10.08%	143.33	1.85	7.55	0.72	0.38	0.31	2898.95	30.37
2014	133	14.09%	18.81%	43.50	1.02	9.14	0.24	0.75	0.18	588.56	29.64
2015	151	20.18%	19.70%	134.15	3.50	15.71	0.86	1.04	0.27	4876.05	58.68
2016	211	12.52%	17.94%	208.74	3.62	12.98	0.69	0.68	0.14	1574.83	64.01
Total	2234	12.83%	19.32%	162.05	3.03	11.29	2.48	0.31	0.06	2498.63	38.87

Panel B. Means of US firms

Year	Number of IPOs	IPO underpricing		Money on the Table		Offer Price		Gross Spread		Total Assets	
		Large	Small	Large	Small	Large	Small	Large	Small	Large	Small
2007	300	17.26%	17.43%	132.94	26.74	16.06	9.00	0.94	0.53	2067.89	165.35
2008	76	9.34%	2.57%	817.94	7.11	21.03	8.81	0.98	0.60	6875.21	446.44
2009	235	5.83%	2.88%	181.41	5.39	16.01	5.93	0.78	0.37	23676.3	462.31
2010	278	10.33%	15.44%	150.96	13.22	16.74	6.13	0.88	0.42	3962.41	444.45
2011	237	17.59%	12.36%	253.08	34.92	17.68	4.79	0.96	0.38	1991.85	307.03
2012	249	19.46%	17.89%	118.61	8.32	17.92	4.61	0.96	0.35	1279.18	313.61
2013	315	15.55%	17.53%	210.32	4.90	22.90	6.58	1.11	0.52	3980.44	167.98
2014	313	18.64%	15.30%	176.51	13.81	17.78	6.70	0.98	0.50	3544.70	156.30
2015	199	14.69%	15.36%	147.63	14.72	21.39	6.47	1.04	0.50	1921.49	258.74
2016	192	19.30%	13.24%	169.16	6.91	23.02	6.11	1.04	0.46	5702.91	264.85
Total	2394	11.35%	13.87%	203.63	9.84	18.57	6.18	0.96	0.48	6985.24	287.37

Table 4 Descriptive Statistics for Returns and Firm/Issue Size Characteristics across different return horizons for Canadian and US IPO firms

This table provides descriptive statistics for cumulative abnormal returns and various firm/issue characteristic for Canadian and the US IPOs over the period 2007-2016. The data provided are collected from SDC Platinum, WRDS, and Thomson Reuters. IPO underpricing is the first-day return after IPOs. The variables are defined as Offer price, Rsp1day, Rsp30days, Rsp180days, Rsp1year, Gross Spread, MVP, Total Assets, Market Value_{after offer}. Rsp are abnormal returns in different investment horizons. Gross spread (in MM) refers to the fees that underwriters receive for arranging and underwriting an offering of debt or equity securities. MVP (in MM) is the difference of market value between the offer date and the first day after offering. This table represents the descriptive statistics of each variable for Canada, US, and small firms and large firms separately. Results of number, means, maximum, minimum, range, and standard deviation are shown in the table. Data is derived from SDC Platinum, WRDS.

<i>Panel A Canadian firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	2247	3.23	199.00	0.01	198.99	47.40
Rsp1day	2247	15.94%	1125%	-96.00%	12.21	94.37
Rsp30days	2247	16.77%	990%	-91.67%	19.07	117.34
Rsp180days	2146	15.20%	757.14%	-92.67%	8.50	125.58
Rsp1year	2050	13.06%	766.67%	-90.91%	8.58	156.01
Gross Spread	2083	0.33	3.40	0.01	3.39	1.52
MVP	1463	113.28	1643.40	-2794.70	4438.10	29783.24
Total Assets	2132	391.92	38462.70	0.10	38462.80	8289.54
Market Value _{after offer}	2186	624.74	74829.10	14.80	74814.30	30537.41
VC	33	1.46%	N/A	N/A	N/A	N/A
Multi-calss	26	1.62%	N/A	N/A	N/A	N/A
High-tech	211	9.43%	N/A	N/A	N/A	N/A
Lockup	1058	120.94	365	30	335	19.52
CEO dominance	1045	8.14	200	0.01	199.99	10.13
Size of management team	564	6.35	19	2	17	2.60
<i>Panel B US firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	2380	13.47	265.00	0.01	264.99	14.51
Rsp1day	2380	12.73%	750.00%	-77.05%	8.27	64.74
Rsp30days	2380	13.47%	910.00%	-80.19%	9.90	53.41
Rsp180days	2159	13.54%	1400.00%	-87.92%	1.49	81.69
Rsp1year	2307	11.98%	1900.00%	-96.73%	2.00	106.95
Gross Spread	2274	0.80	8.88	0.01	8.87	0.69
MVP	2235	162.40	10432.70	-4116.60	14539.30	3653.05
Total Assets	2305	6912.62	2251469	0.10	2251469	81379.47
Market Value _{after offer}	2361	1299.20	159636.20	0.10	159636.30	6144.20
VC	450	18.94%	N/A	N/A	N/A	N/A
Multi-calss	80	3.93%	N/A	N/A	N/A	N/A
High-tech	872	36.62%	N/A	N/A	N/A	N/A
Lockup	1761	148.13	730	17	713	58.48
CEO dominance	735	8.08	212	0.04	211.96	11.03
Size of management team	1909	6.74	20	3	17	2.86

Table 4 continued

<i>Panel C Canadian Small firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	2135	2.35	41.88	0.01	41.87	42.28
Rsp1day	2135	18.96%	1125%	-96.00%	12.21	120.45
Rsp30days	2135	22.13%	990%	-91.67%	19.07	132.03
Rsp180days	2042	18.38%	757.14%	-92.67%	8.50	101.40
Rsp1year	1964	17.91%	766.67%	-90.91%	8.58	137.96
Gross Spread	1992	0.16	2.09	0.01	2.08	1.56
MVP	1356	3.03	4194.70	-429.80	4624.50	29479.51
Total Assets	2037	192.53	7976.39	0.10	7976.29	7182.61
Market Value _{after offer}	2096	132.24	2115.20	0.10	2115.10	31487.09
VC	22	1.03%	N/A	N/A	N/A	N/A
Multi-calss	25	1.65%	N/A	N/A	N/A	N/A
High-tech	200	9.01%	N/A	N/A	N/A	N/A
Lockup	998	118.95	365	30	335	15.13
CEO dominance	980	8.33	200	0.01	199.99	8.18
Size of management team	511	6.30	19	2	17	2.07
<i>Panel D Canadian Large firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	112	20.16	199.00	0.15	198.85	42.71
Rsp1day	112	13.09%	142.85%	-44.34%	1.87	148.53
Rsp30days	112	12.54%	100.00%	-74.63%	1.75	205.71
Rsp180days	104	10.12%	186.50%	-89.85%	2.77	62.68
Rsp1year	86	7.73%	332.85%	-88.71%	4.22	283.87
Gross Spread	91	0.65	3.40	0.02	3.38	0.35
MVP	107	162.05	1239.60	-2794.70	4034.30	8104.20
Total Assets	95	2101.99	38462.70	14.80	38447.90	8087.52
Market Value _{after offer}	90	2484.20	74829.10	28.80	74800.30	18276.25
VC	11	10.08%	N/A	N/A	N/A	N/A
Multi-calss	2	0.84%	N/A	N/A	N/A	N/A
High-tech	11	10.21%	N/A	N/A	N/A	N/A
Lockup	60	121.01	180	50	130	15.40
CEO dominance	65	5.20	20.82	0.47	20.35	6.69
Size of management team	53	6.81	16	3	13	1.37

Table 4 continued

<i>Panel E US Small firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	977	6.15	69.46	0.01	69.45	13.10
Rsp1day	977	14.64%	750.00%	-77.05%	8.27	101.32
Rsp30days	932	14.29%	910.00%	-80.19%	9.90	198.24
Rsp180days	909	13.36%	1400.00%	-87.92%	1.49	132.47
Rsp1year	926	11.74%	1900.00%	-90.26%	2.00	193.08
Gross Spread	906	0.46	2.70	0.01	2.69	0.96
MVP	934	9.84	6500.00	-2637.7	9137.70	3379.16
Total Assets	960	287.37	8274.10	0.10	8274.00	15374.22
Market Value _{after offer}	965	177.06	41436.90	0.10	41436.80	6144.20
VC	191	36.95%	N/A	N/A	N/A	N/A
Multi-calss	40	4.66%	N/A	N/A	N/A	N/A
High-tech	380	36.99%	N/A	N/A	N/A	N/A
Lockup	697	151.01	730	30	700	42.64
CEO dominance	345	7.22	212	0.13	211.87	6.77
Size of management team	764	7.62	20	3	17	1.36
<i>Panel F US Large firms</i>						
Variable	Number	Mean	Maximum	Minimum	Range	Std Dev
Offer Price	1403	18.57	265.00	0.20	264.80	21.08
Rsp1day	1403	11.35%	206.67%	-68.54%	2.76	86.41
Rsp30days	1403	13.08%	246.67%	-72.40%	3.19	137.33
Rsp180days	1182	13.96%	334.36%	-79.03%	4.13	156.46
Rsp1year	1381	12.67%	815.60%	-96.73%	9.12	127.62
Gross Spread	1368	0.96	8.88	0.03	8.85	0.56
MVP	1301	203.63	10432.70	-4116.60	14549.30	4127.04
Total Assets	1345	11239.60	2251469	1.40	2251469	65385.47
Market Value _{after offer}	1396	2109.47	159636.20	45.00	159591.20	6857.76
VC	259	19.17%	N/A	N/A	N/A	N/A
Multi-calss	40	3.45%	N/A	N/A	N/A	N/A
High-tech	492	36.49%	N/A	N/A	N/A	N/A
Lockup	1064	146.24	390	17	373	35.05
CEO dominance	390	6.31	96	0.04	95.96	7.23
Size of management team	1145	8.96	18	3	15	2.01

Table 5 summary statistics for IPO's returns across alternative investment horizons according to issue feature and industry characteristics

Table 5 shows summary statistic for different IPO. It also shows average IPO returns for small vs large firms across industry and issuer characteristics. Data comes from SDC Platinum, Thomson Financial Securities Data and other resources. The sample is from 2007 – 2016. Further description of how country, size, industry, VC-backed, Lockup, and multi-class shares are defined. The returns are performed by US and Canada, and by large firms and small firms separately. Firms descriptions of how high-tech, VC-backed, and multi-class are defined by SDC platinum database. Firms are classified by lockup period on the basis of whether the lockup periods are higher or lower than the median period. T-statistics (P-value) are reported for two-sided tests on whether estimates are different from zero. Statistical significance is indicated at the 10%, 5%, and 1% (***) levels.

Firm/Issue Characteristics	US Large firm				US Small firm			
	Return _{1 day after}	Return _{30days after}	Return _{180 day after}	Return _{1 year after}	Return _{1 day after}	Return _{30days after}	Return _{180 day after}	Return _{1 year after}
Industry								
High-Tech	13.86%	17.15%	18.32%	10.08%	15.13%	13.75%	10.88%	9.26%
Non-High-Tech	9.31%	8.38%	10.26%	11.47%	12.09%	14.69%	11.96%	10.72%
P-value (T-stats.)	0.035**	0.012**	0.08*	0.061*	0.4506	0.0574*	0.3683	0.6805
VC -Backed								
VC-backed	16.28%	14.11%	15.30%	12.27%	14.74%	16.39%	12.60%	15.37%
Non-VC-backed	8.54%	11.45%	10.01%	10.38%	13.13%	12.54%	11.41%	7.88%
P-value (T-stats.)	0.0018**	0.1947*	0.0003**	0.0852*	<0.0001***	0.0003**	0.0025**	0.0016**
Lockup Period								
Long	15.22%	14.50%	13.08%	15.19%	13.35%	16.02%	11.54%	12.54%
Short	9.36%	12.71%	15.33%	9.36%	15.18%	12.35%	13.69%	10.06%
P-value (T-stats.)	0.0054**	0.0814*	0.1721	0.2314	0.0055**	0.013*	0.341	0.084*
Multi-Class Shares								
Multi-class	9.11%	13.24%	10.52%	11.37%	12.20%	16.80%	10.32%	12.33%
Non-multi-class	12.05%	12.90%	15.50%	14.61%	13.94%	10.05%	14.29%	11.28%
P-value (T-stats.)	0.0004**	0.0127**	0.1303	0.193	0.051*	0.004*	0.142	0.0244**

Panel B Canada comparisons

Categories	Canadian Large firm				Canadian Small firm			
	Return _{1 day after}	Return _{30days after}	Return _{180 day after}	Return _{1 year after}	Returns _{1 day after}	Return _{30days after}	Return _{180 day after}	Return _{1 year after}
Industry								
High-Tech	15.09%	16.71%	10.26%	11.70%	20.58%	22.86%	20.30%	24.45%
Non-High-Tech	10.86%	9.87%	11.25%	7.32%	18.60%	16.12%	15.09%	18.43%
P-value (T-stats.)	0.054*	0.0962*	0.238	0.7157	0.0077**	0.1024	0.0538*	0.753
VC -Backed								
VC-backed	13.36%	14.90%	10.25%	8.90%	20.11%	18.25%	21.36%	17.44%
Non-VC-backed	12.17%	10.34%	6.67%	6.39%	17.64%	21.30%	18.93%	22.06%
P-value (T-stats.)	0.0824**	0.093*	0.0224**	0.0816**	0.116	0.045**	0.7687	0.0604*
Lockup Period								
Long	16.15%	15.42%	10.33%	9.84%	23.08%	24.93%	17.17%	16.53%
Short	9.82%	6.23%	7.76%	5.22*	17.64%	18.20%	20.91%	22.58%
P-value (T-stats.)	0.1016	0.067*	0.3055	0.2359	0.0052**	0.0037**	0.0636*	0.255
Multi-Class Shares								
Multi-class	12.59%	10.95%	9.73%	9.01%	14.63%	18.08%	21.55%	17.40%
Non-multi-class	10.32%	14.20%	12.38%	13.64%	22.85%	24.24%	19.13%	21.49%
P-value (T-stats.)	0.0745*	0.184	0.035**	0.1743	0.2337	0.116	0.0319**	0.692

Table 6 Correlation Matrix

This table is correlation matrix table for explanatory variables. Variables includes Lnproceeds, Size_dummy, LnMV, gross spread, MVP, VC, Multi-Class, High-tech, Lockup, CEO dominance and Size of management team. Panel A and Panel B represent correlations of US firms and Canadian firm separately. Statistical significance of correlations is indicated as P-value in the second row of each correlation.

Panel A US firms											
	Lnproceeds	Size_dummy	LnMV	Gross Spread	MVP	VC	Multi-Class	High-tech	Lockup	CEO dominance	Size of management team
Lnproceeds	1.00000										
Size_dummy	0.75630 <0.001	1.00000									
LnMV	0.28647 <.0001	0.16618 <.0001	1.00000								
Gross Spread	-0.01677 0.4590	-0.00468 0.8362	0.43468 <.0001	1.00000							
MVP	0.01295 0.5595	0.00835 0.7068	0.03559 0.1087	0.06161 0.0117	1.00000						
VC	-0.04014 0.0503	-0.02819 0.1692	0.11033 <.0001	0.10819 <.0001	0.01158 0.6019	1.00000					
Multi-Class	0.03275 0.1371	0.05623 0.0106	0.13916 <.0001	0.04513 0.0616	-0.00059 0.9795	-0.08098 0.0002	1.00000				
High-tech	-0.02378 0.2462	-0.00971 0.6359	-0.04356 0.0416	-0.08259 0.0003	0.01119 0.6139	0.47465 <.0001	-0.04466 0.0426	1.00000			
Lockup	-0.08598 0.0003	-0.05809 0.0148	-0.08565 0.0004	0.12791 <.0001	0.04187 0.0984	0.32694 <.0001	-0.11243 <.0001	0.11637 <.0001	1.00000		
CEO dominance	-0.09077 0.0138	-0.04479 0.2249	-0.12529 0.0009	-0.03307 0.4319	0.00610 0.8757	-0.04971 0.1779	0.05425 0.1585	-0.04720 0.2009	0.03803 0.3837	1.00000	
Size of management team	0.02607 0.2550	0.02696 0.2392	0.36550 <.0001	0.13450 <.0001	-0.00568 0.8112	0.06521 0.0044	0.05410 0.0225	-0.01895 0.4081	-0.00566 0.8229	-0.01512 0.7136	1.00000

Panel B Canadian firms											
	Lnproceeds	Size_dummy	LnMV	Gross Spread	MVP	VC	Multi-Class	High-tech	Lockup	CEO dominance	Size of management team
Lnproceeds	1.00000										
Size_dummy	0.78941 <.0001	1.00000									
LnMV	0.39363 <.0001	0.29601 <.0001	1.00000								
Gross Spread	-0.01862 0.3802	-0.00811 0.7024	0.12288 <.0001	1.00000							
MVP	-0.01187 0.6281	-0.01365 0.5775	0.13997 <.0001	-0.00087 0.9718	1.00000						
VC	0.03386 0.1086	-0.00019 0.9929	0.05991 0.0097	0.02059 0.3317	-0.00123 0.9599	1.00000					
Multi-Class	0.06227 0.0110	0.04885 0.0461	0.20453 <.0001	0.00174 0.9436	-0.00296 0.9084	-0.00690 0.7783	1.00000				
High-tech	0.02888 0.1712	0.00556 0.7922	0.09948 <.0001	0.00040 0.9849	-0.00767 0.7542	0.08194 0.0001	-0.00694 0.7771	1.00000			
Lockup	0.03979 0.1961	-0.00234 0.9393	0.09960 0.0034	0.00366 0.9054	0.03412 0.3309	0.18647 <.0001	0.24977 <.0001	-0.00256 0.9337	1.00000		
CEO dominance	-0.17290 <.0001	-0.08603 0.0054	-0.09836 0.0035	-0.02400 0.4409	0.02731 0.4446	-0.02138 0.4900	0.00283 0.9368	-0.02881 0.3522	-0.06570 0.1404	1.00000	
Size of management team	0.07170 0.0892	0.06955 0.0992	0.50166 <.0001	0.08649 0.0413	0.14187 0.0009	0.03745 0.3752	0.14777 0.0006	0.00992 0.8143	0.11782 0.0332	-0.13365 0.0452	1.00000

Table 7

Table 7 shows results of OLS regressions showing the relationship between IPO performance and firm size of US and Canada firms. The regression equation is $Return_t = a_0 + a_1 Lnproceeds + a_2 Gross\ Spread + a_3 MVP + a_4 VC + a_5 MultiClass + a_6 HighTech + a_7 Lockups + a_8 lnAssets + a_9 CEODominance + a_{10} Size\ of\ management\ teams$. Return is abnormal return at subperiods after IPOs, measured from the first aftermarket closing price to the earlier date. Lnproceeds measure the firm size by natural logarithm of gross proceeds, which is the natural logarithm of gross proceeds. Gross proceeds are measured in millions of dollars. Gross Spread represents underwriter fees, and MVP refers to Money on the Table. VC refers whether firms are backed by venture capital or not. MultiClass represents a term of voting in board by using dummy variable. HighTech is a dummy variable verifying a firm belonging to high-tech or not. Lockups is a contractual restriction that prevents insiders who are holding a company's stock. CEO Dominance is the dominance of the CEO over the other team members. It is calculated as the ratio of salary of the CEO to that of the other members of the management team. Size of management teams is defined as the number of managers with the rank of vice-president or higher in the management team. P-values are in parentheses. Significance is indicated at the 10%(*), 5%(**), and 1%(***) levels.

Variables	Intercept	Lnproceeds	Gross Spread	MVP	VC	Multi-Class	High-Tech	Lockup	CEO Dominance	Size of management team	F-value
Return_t											
US firms											
Return_{one day} after	13.08** (2.70)	-2.86*** (-6.83)	3.47* (1.77)	-0.002** (3.27)	6.51** (2.30)	1.56 (0.24)	2.72 (1.20)	0.08** (3.27)	-0.09 (-0.81)	-0.13 (-0.35)	15.99
Return_{1 month} after	27.59*** (4.13)	-2.63*** (-4.59)	3.23 (1.20)	-0.002 (-0.96)	8.39** (2.21)	-5.28 (-0.59)	0.21 (0.07)	0.07* (1.86)	-0.15 (-0.98)	-1.01* (-2.03)	7.36
Return_{180 days} after	54.23*** (5.67)	-1.55 (-1.49)	0.56 (0.11)	-0.003 (-0.85)	18.53** (2.84)	-16.40 (-1.01)	-3.51 (-0.62)	-0.05 (-0.94)	-0.38 (-1.35)	-2.30** (-2.55)	2.56
Return_{1 year} after	67.04*** (3.87)	0.02 (0.01)	-3.98 (-0.54)	-0.001 (-0.17)	22.34** (2.27)	-23.67 (-0.97)	-3.14 (-0.37)	-0.12 (-1.62)	-0.65 (-1.59)	-2.01 (-1.50)	1.41
Canadian Firms											
Return_{one day} after	33.39** (2.44)	-0.29 (-0.29)	29.35 (1.19)	0.001 (0.37)	13.73 (0.51)	10.61 (0.34)	-17.64 (-1.65)	0.03 (0.40)	-2.82*** (-5.22)	-1.11 (-0.79)	3.81
Return_{1 month} after	51.24** (2.62)	-1.72 (-1.20)	8.84 (0.26)	-0.006 (-1.34)	27.80 (0.76)	17.08 (0.40)	-14.74 (-0.94)	-0.002 (-0.01)	-3.61*** (-4.80)	-1.82 (-0.96)	2.96
Return_{180 days} after	40.67 (1.14)	-0.11 (-0.04)	-24.53 (-0.38)	-0.007 (-0.90)	27.88 (0.40)	23.95 (0.30)	-12.17 (-0.44)	-0.04 (-0.20)	-3.44** (-2.46)	-2.04 (-0.55)	0.87
Return_{1 year} after	40.93 (0.82)	-0.45 (-0.13)	-53.88 (-0.63)	-0.007 (-0.64)	8.70 (0.09)	42.31 (0.38)	2.22 (0.06)	0.21 (0.71)	-3.55* (-1.85)	-7.34 (-1.36)	0.67

Table 8

Table 8 shows results of the OLS regressions for the relationship between IPO performance and firm size of US and Canada firms. The regression equation is $Return_t = a_0 + a_1 Size_dummy + a_2 Gross\ Spread + a_3 MVP + a_4 VC + a_5 MultiClass + a_6 HighTech + a_7 Lockups + a_8 CEODominance + a_9 Size\ of\ management\ teams$. Return is abnormal returns at subperiods after IPOs, measured by the first aftermarket closing price to the earlier date. Size_dummy is dummy variable defined by gross proceeds, which equals to 1 for large firms and equals to 0 for small firms. Gross Spread measures firm costs when going public in terms of underwriter fees. MVP measures Money on the Table. VC refers whether firms are backed by venture capital or not. MultiClass represents a term of voting in board by using dummy variable. HighTech is a dummy variable verifying a firm belonging to high-tech or not. Lockups is a contractual restriction that prevents insiders who are holding a company's stock. CEO Dominance is the dominance of the CEO over the other team members. It is calculated as the ratio of salary of the CEO to that of the other members of the management team. Size of management teams is defined as the number of managers with the rank of vice-president or higher in the management team. P-values are in parentheses. Significance is indicated at the 10%(*), 5%(**), and 1%(***) levels.

Variables	Intercept	Size_dummy	Gross Spread	MVP	VC	Multi-Class	High-Tech	Lockup	CEO Dominance	Size of management team	F-value
Return_t											
US firms											
Return_{one day} after	3.50 (0.63)	-3.65* (-1.86)	3.65 (1.64)	-0.001 (-0.60)	8.02** (2.66)	-0.04 (-0.01)	2.81 (1.15)	0.10** (3.71)	-0.06* (-2.18)	-0.27 (-0.69)	9.90
Return_{1 month} after	18.15** (2.85)	-3.26 (-1.01)	2.85 (1.12)	-0.001 (-0.80)	8.02** (2.38)	-5.20 (-0.67)	0.13 (0.05)	0.07** (2.32)	-0.18 (-1.33)	-0.96 (-2.15)	5.30
Return_{180 days} after	57.90*** (4.63)	-10.81 (-1.62)	-2.29 (-0.43)	-0.004 (-0.94)	16.96** (2.53)	-17.47 (-1.08)	-2.10 (-0.36)	-0.05 (-0.94)	-0.37 (-1.31)	-2.62** (-2.81)	2.60
Return_{1 year} after	71.72*** (4.50)	-11.10 (-1.31)	-3.74 (-0.56)	-0.0006 (-0.11)	17.27** (2.03)	-21.40 (-1.04)	-3.22 (-0.44)	-0.12* (-1.83)	-0.63* (-1.82)	-2.54** (-2.17)	1.81
Canadian firms											
Return_{one day} after	34.00 (1.65)	-1.59 (-0.12)	27.73 (1.08)	0.001 (0.40)	12.30 (0.46)	7.61 (0.23)	-16.41 (-1.56)	0.03 (0.31)	-2.75*** (-5.30)	-0.96 (-0.70)	3.83
Return_{1 month} after	51.63* (1.75)	-5.42 (-0.28)	4.40 (0.12)	-0.005 (-1.26)	25.48 (0.68)	8.22 (0.18)	-13.43 (-0.86)	-0.02 (-0.19)	-3.34*** (-4.57)	-1.53 (-0.81)	2.77
Return_{180 days} after	38.97 (0.73)	1.27 (0.04)	-23.82 (-0.36)	-0.008 (-0.92)	27.98 (0.41)	25.22 (0.29)	-11.50 (-0.42)	-0.04 (-0.19)	-3.36** (-2.54)	-2.11 (-0.59)	0.88
Return_{1 year} after	-7.96 (-0.12)	37.29 (0.85)	-30.03 (-0.36)	-0.007 (-0.69)	21.12 (0.25)	79.00 (0.73)	4.24 (0.13)	0.28 (1.00)	-3.44** (-2.04)	-7.20 (-1.49)	0.84

Table 9

Table 9 shows results of the OLS regression for the relationship between IPO performance and firm size of US and Canada firms. The regression equation is $Return_t = a_0 + a_1 LnMV + a_2 Gross\ Spread + a_3 MVP + a_4 VC + a_5 MultiClass + a_6 HighTech + a_7 Lockups + a_8 CEODominance + a_9 Size\ of\ management\ teams$. Return is abnormal returns at subperiods after IPOs, measured by the first aftermarket closing price to the earlier date. LnMV is natural logarithm of market values when firms going IPOs, which measures firm size based on market capitalization. Market value is measured in millions of dollars. Gross Spread measures firm costs when going public in terms of underwriter fees. MVP measures Money on the Table. VC refers whether firms are backed by venture capital or not. MultiClass represents a term of voting in board by using dummy variable. HighTech is a dummy variable verifying a firm belonging to high-tech or not. Lockups is a contractual restriction that prevents insiders who are holding a company's stock. CEO Dominance is the dominance of the CEO over the other team members. It is calculated as the ratio of salary of the CEO to that of the other members of the management team. Size of management teams is defined as the number of managers with the rank of vice-president or higher in the management team. P-values are in parentheses. Significance is indicated at the 10%(*), 5%(**), and 1%(***) levels.

Variables	Intercept	LnMV	Gross Spread	MVP	VC	Multi-Class	High-Tech	Lockup	CEO Dominance	Size of management team	F-value
Return_t											
US firms											
Return_{one day} after	2.43 (0.78)	-1.43* (-1.85)	3.13* (1.88)	-0.0009 (-0.74)	8.71** (3.52)	0.52 (0.54)	2.47 (1.14)	0.09*** (4.08)	-0.26 (-1.60)	-0.50 (-0.85)	10.86
Return_{1 month} after	14.47** (2.96)	0.41 (0.67)	2.54 (1.03)	-0.002 (-1.13)	7.50** (2.80)	-5.40 (-0.69)	-1.33 (-0.23)	0.08* (2.01)	-0.30 (-1.42)	-0.79* (-2.23)	6.69
Return_{180 days} after	23.84* (2.30)	-2.24 (-1.03)	-2.01 (-0.25)	-0.004 (-1.01)	10.07** (3.05)	-15.34 (-1.06)	-3.07 (-0.67)	0.35 (0.73)	-0.52 (-1.12)	-1.73** (-3.35)	3.47
Return_{1 year} after	32.05** (3.21)	4.37 (1.26)	-5.21 (-0.58)	-0.015 (-0.58)	18.83* (2.10)	-20.91 (-1.44)	-5.60 (-0.40)	-0.12* (-1.85)	-0.87* (-1.79)	-2.40* (-1.83)	3.08
Canadian firms											
Return_{one day} after	25.39* (1.90)	-1.43 (-0.74)	26.64 (1.20)	0.03 (0.42)	8.97 (0.37)	9.14 (0.32)	-9.64 (-0.99)	0.03 (0.42)	-2.53*** (-5.35)	-0.32 (-0.25)	3.94
Return_{1 month} after	44.99** (2.33)	0.62 (0.22)	2.60 (0.08)	-0.005 (-1.30)	23.59 (0.69)	8.58 (0.57)	-6.74 (-0.89)	-0.05 (-0.61)	-2.13* (-1.80)	-1.58 (-0.98)	2.85
Return_{180 days} after	29.05 (0.95)	-1.37 (-0.32)	-24.95 (-0.49)	-0.008 (-1.22)	25.57 (0.47)	24.96 (0.39)	-5.12 (-0.40)	-0.15 (-0.74)	-2.68 (-0.93)	-1.55 (-0.36)	1.52
Return_{1 year} after	5.42 (0.11)	-9.03 (-1.36)	-46.26 (-0.60)	-0.009 (-0.89)	4.02 (0.05)	58.21 (0.59)	12.50 (0.37)	0.25 (0.93)	-3.25* (-1.95)	-4.71 (-0.92)	0.98

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Appendix

Variables Description

This table describes variables used in the paper, including dependent variables and independent variables.

Variable	Description
Rsp1d	Abnormal returns 1 day after IPOs, which represent IPO underpricing.
Rsp30day	Abnormal returns 30 days after IPOs
Rsp180d	Abnormal returns 180 days after IPOs
Rsp1y	Abnormal returns 1 year after IPOs
Gross spread	The difference (in MM) between the underwriting price received by the issuing company and the actual price offered to the investing public
Total Assets	Total assets (in MM) of companies at the end of the first IPO day
MV _{after offer}	Market values (in MM) of companies at the end of the first IPO day
MVP	The difference (in MM) between market value after and between IPOs. That difference is described as “Money left on table”
Size_dummy	Dummy variable of firm size classified by gross proceeds. If Size equals to 1, firms are classified as large firms (gross proceeds >54.4M); if Size equals to 0, firms are classified as small firms (gross proceeds <54.4M)
LnMV	Natural logarithm of market value (in MM) when firms going IPOs.
High-tech	Dummy variable of whether a company is high tech or not. If High-tech equals to 1, firms are high-tech firms. Otherwise, firms are non-high-tech firms.
Lnproceeds	Natural logarithm of IPO gross proceeds (in MM) of firms when going IPOs
VC	Dummy variable of whether a company is backed by venture capitals. VC equals to 1, VC-backed firms; otherwise, 0
Lockup	A predetermined time following an IPO where large shareholders are restricted from selling their shares.
CEO Dominance	Ratio of salary of the CEO to that of the other members of the management team.
Size of management team	The number of managers with the rank of vice-president or higher in the management team.