BI Norwegian Business School - campus Oslo

GRA 19702

Master Thesis

Preliminary thesis report

Preliminary Thesis Report - Internet IPOs Before and After the DotCom Bubble: how firm characteristics have affected the short-term and long-term performance?

Navn:	Frieder Michael Vollmer, Gianpietro Di Vincenzo

Start:	19.08.2019 09.00
Finish:	17.02.2020 12.00

Preliminary Thesis Report

- Internet IPOs Before and After the DotCom Bubble: how firm characteristics have affected the short-term and long-term performance?-

Hand-in date:
15.01.2020

Campus:
BI Oslo

Supervisor: Tatyana Marchuk

Program:
Master of Science in Finance

Table of Contents

1. Introduction and Motivation

1.1 Introduction

The current technological context has been responsible for attracting a great number of investments and attention to what is known as Unicorn companies. History says it was Aileen Lee - the founder of Cowboy Ventures, a venture capital-focused on seed-stage technology companies - who first used the term in 2013, to talk about start-ups that had a valuation of more than $1 billion. The term was used to address the "rarity and specialness" of 39 technology companies (consumer e-commerce, consumer audience, software-as-a-service, and enterprise software), founded after 2003 and based in the US.

During the past 50 years, the markets have witnessed an enormous shift from the tangible-asset-heavy companies of the 19th and 20th centuries to intangible-asset-intensive firms such as Google, Facebook and Uber. Even though "Unicorn" is a recent terminology, the Internet Industry has been growing since the late 1980s, which lead us to understand that since that period there were companies that could fit the contemporary label. Looking back at financial history, one important event marked the late 1990s, which was named the "DotCom Bubble".

Even though some investors worry that a "Unicorn Bubble" is rising, due to the alarming amount they have been receiving from Venture Capitals before going public, it seems that these startups are no exception to previous research which shows that IPOs are mostly underpriced, on average (e.g., Ritter & Welch, 2002; Ljungqvist and Wilhelm, 2003).

Scholars argue that uncertainty related to the IPO could explain why some firms experience the underpricing of their initial offering (e.g., Ritter, 1984; Rock, 1986; Beatty & Ritter, 1986) and for unicorn companies the risks may be even higher. Moreover, other characteristics may influence the pricing of these IPOs,

such as the underwriters' reputation and size of their syndicate, the offer size, being Venture Capital backed, among others.

Empirical evidence shows that there are two main patterns associated with IPOs: short-run underpricing, and long-run underperformance. From 1980 to 2001, the number of companies going public in the United States exceeded one per business day. These IPOs raised $488 billion (in 2001 dollars) in gross proceeds, an average of $78 million per deal. At the end of the first day of trading, their shares traded on average at 18.8 percent above the price at which the company sold them. For an investor buying shares at the first-day closing price and holding them for three years, IPOs returned 22.6 percent. Still, over three years, the average IPO underperformed the CRSP value-weighted market index by 23.4 percent and underperformed seasoned companies with the same market capitalization a book-to-market ratio by 5.1 percent (Ritter & Welch, 2002).

Therefore, throughout the development of our study, we first plan to discuss what are the main corporate characteristics which may influence Internet unicorns IPO's underpricing. Second, we estimate the extent of underpricing and the long-run returns of our sample of IPOs Third, we assess which features are the most significant relative to long-run performance. The analysis will be carried out for three different time intervals concerning before, during and after the Bubble, that will allow us to assess if there are similarities between our periods of interest.

1.2 Motivation

An enthusiastic wave of investments in internet stocks culminated in what is widely known as the DotCom bubble. Since then, some internet companies resisted through the period and many others have entered the market. Even though such event brought significant losses to investors, recently we seem to be living in a similar era of investment craze in tech startups. The first two companies to receive huge infusions of funding from Venture Capital firms were Uber, with an estimated value exceeding $62 billion, and Airbnb, worth around $25.5 billion.

Subsequently, other types of investors, such as mutual funds and sovereign funds, also started to bet on these firm's success.

Even though the industry appears to be much more stable than it was by the end of the 1990s, it is still relevant to understand if companies going through an IPO in the more recent years share similarities with the ones that went public during the bubble. Moreover, we aim to investigate how the market reacts to IPOs from these companies, both in the short and long-run. Nonetheless, we wish to contribute to the financial industry with a deeper understanding of the Unicorn phenomenon and its particularities.

2. Literature Review

There have been many studies related to the IPO topic. In the following paragraphs, we will introduce the relevant literature regarding 'Internet companies', following Ritter and Welch's (2002) categorization, and the relative period of the DotCom bubble. The determinants of IPOs underestimation and eventually, the long-term performance of IPOs.

2.1 Internet Stocks and The DotCom Bubble

During the early 1990s, government incentives and private excitement joined to build the path to a digital and utopian future. With the rise of the Internet, the whole world would be in one marketplace and it would bring revolutionary changes to communication, education, gaming and trade software.

Netscape began to transform these ideas into reality when they developed Mosaic, the first web browser, which allowed to create a link between consumers and commercialization of the Internet. In 1995, Netscape went public, setting a brand new investment logic, where traditional valuation metrics were replaced by discounting expected cash flows. The IPO served as a model for other internet companies, such as Yahoo! that had its first-day return equal 152%.

The scenario started changing after NASDAQ Composite index peaked on March 10, 2000 - which is pointed as the day the DotCom bubble reached its highest level. By that time, 74% of the internet companies listed had negative cash flows. In April, the Internet Index dropped 19% and the market value of those companies from $1 trillion in March 2000 to $572 billion in December. Approximately 800 Internet companies disappeared (Goodnight and Green, 2010).

2.2 IPOs Underpricing

Some of the first studies about first-day returns were conducted during the 1970s (i.e., Stoll and Curley, 1970; Logue, 1973; Reilly, 1973). Ibbostson (1975) found important empirical evidence of IPO's underpricing during the 1960s and conducted a further investigation on the reasons why this has become a normal practice. This topic became especially *in vogue* after the Internet Bubble, which was responsible for astonishingly high first-day returns on IPOs.

Ritter and Welch (2002) conducted a review on the theory and evidence of IPO activity between 1980-2001. They initially found that at the end of the first day of trading, shares of newly publicly issued firms traded on average at 18.8% above the price at which the company offered them. This same result had already been found by Ritter (1984) for the period between 1960-1982.

Ljungqvist and Wilhelm (2003) focused on IPO pricing during the DotCom bubble. They found that in 1996, the period prior to the Bubble, first-day returns of IPOs averaged 17%. Underpricing rose to 73% in 1999 and 58% in 2000. However, Internet companies had an even more surprising rise, when it reached the average underpricing of 89% during 1999 and 2000.

Karlis (2008) focus on the underpricing of internet companies and argues that they are usually more underpriced than more established companies, primarily because investment bankers face higher uncertainty while pricing the initial offers. On the other hand, Demers and Lewellen (2002) argued that internet companies received a great amount of attention from the media, which would generate a larger demand for their offering, therefore, resulting in larger initial returns.

In the following chapter, we will present a summary of the theories related to underpricing activity.

2.2.1 Information Asymmetry

Information asymmetry is the most prominent theory used to explain IPO underpricing. It is explained by the inequality of information held by each key participant in an IPO process, those being the issuing firm, the investors and the underwriters of the IPO.

Using Rock (1986)'s model, Beatty and Ritter (1986) were able to prove that the higher the investor's uncertainty about an IPO's value once the shares start publicly trading, the more he expects the offering to be underpriced. Hence, for a high-risk IPO, the uninformed investor would require a greater underpricing to compensate for this scenario where the asymmetry of information is even larger.

It is possible to believe that Internet IPO's would fit this high-risk group, especially if we consider that these companies are in a highly competitive environment, and in order to mitigate the asymmetry of information it would be necessary to disclose details that could put the business success in danger.

2.2.2 Underwriters Reputation

The second most relevant theory for models of IPO underpricing concerns the role of the underwriter on reducing the amount of money left on the table. (e.g., Logue, 1973; Beatty and Ritter, 1986; Benveniste and Spindt, 1989).

Although the theory can differ depending on how the companies choose to go public (e.g, bookbuilding, auction, best-effort, direct listing), bookbuilding is the most popular choice and it entitles the underwriter of both setting the price at which the shares will be offered and controlling the allocation to investors of their choice.

Benveniste and Spindt (1989) developed a model where they included the information advantage of the market participants. During the bookbuilding, if investors value the firm higher than the valuation initially done by the company, then the underwriter would be able to adjust the offering price and to raise more funds for the client. However, investors are not compelled to share their higher valuations, as they would prefer to buy the shares at the lower price.

Benveniste and Spindt (1989) note that, since underwriters conduct several IPOs throughout the years, negotiations of this kind will repeat and develop a reputation for themselves. Hence, in order to reach equilibrium among the three parties, investors will share the positive information and underwriters will incorporate only a part of it into the valuation, this will allow the investor to subscribe to an IPO that is still underpriced. In exchange for the information, these investors are allocated more underpriced shares. All agents benefit from this interaction and the underwriter grows their relevance in the market.

2.2.3 Syndicate Size

IPOs either have one underwriter (sole managed) or a group of different ones (multiple managers).. Because these underwriters have different incentives when working on the issue offer, Corwin and Schultz (2002) argue that the ratio of underwriters to managers could reduce the level of underpricing, because when the syndicate size increases, so does the accuracy of the offer price compared to actual market value, since a higher number of valuations and more diverse underwriters might be more representable of the market.

2.2.4 VC-Backed IPOs

The pioneers to carry a study on VC-backed IPO were Megginson and Weiss (1991). They compare Venture Capital-backed IPOs to non-Venture Capital-backed IPOs classified by industry and offering size between January 1983 and September 1987 and found that the first-day returns of VC backed IPOs are significantly lower than those of non-VC backed IPOs.

This is consistent with the belief that venture capitalists guarantee the true value of the firm by participating in the screening, monitoring, and advising processes, which should decrease the level of information asymmetry and, consequently, decrease the level of underpricing.

However, Lee and Wahal (2004) found the underpricing trend to be 5-10% higher among the VC-backed firms, with the difference being more pronounced during the “bubble period”. They argue that the results may be attributed to endogeneity: companies backed by venture capital tend to belong to riskier

industries and to be more difficult to value, therefore increasing the amount of money left on the table.

2.3 Long-Run Performance of IPOs

The underpricing phenomenon seems to be correlated with the long-run performance of IPOs. Carter and Dark (1998) investigated the relationship between initial returns and 18-month after-market returns and found that firms with higher initial returns tend to provide slightly lower long-run returns than firms with lower initial returns.

The subsequent study conducted by Loughran and Ritter (1995) corroborates this anomaly. They show how IPOs have been poor long-run investments, delivering to investors a return of only 5% during the five years after the issue. The following paragraphs are meant to present empirical findings on the long-run anomaly.

The following sections present an introduction of theories linked to empirical findings that explain the relationship between long-run performance and underpricing.

2.3.1 Underwriter Reputation

Chang et al. (2010) discuss how the long-run return of IPOs handled by more reputable underwriters is less severe. They argue that prestigious underwriters, concerned with their own reputation, will ensure the veracity of the financial statement of the firm going public, therefore limiting any potential earnings manipulation. On the opposite hand, there is evidence of a negative relationship between earnings management and the long-term performance of an IPO firm's stocks only for those firms associated with less-prestigious underwriters.

Moreover, Dong, Michel, and Pandes (2011) argue that an IPO syndicate with a higher number of unique underwriters are more representative of the diverse actual market, and thus perform better in the long-run.

2.3.2 VC-Backed IPOs

Jain and Kini (1995), in a US study of 177 VC-backed IPOs between 1976 and 1988, find that VC-backed IPOs experience better-operating performance compared to non-VC backed IPO. Similarly, Brav and Gompers (1997) find evidence of higher long-run performance for VC- backed IPOs, compared to non-sponsored IPOs between 1972 and 1992. They assert that although the VC-backed IPOs underperform market benchmarks slightly, around 5% they outperform non-sponsored IPOs by about 10 to 15 percentage points. However, since the literature on the topic is limited and ambiguous, deeper research should be conducted to investigate the long-run return of VC-backed and non-sponsored IPOs.

3. Research Question and Hypotheses

The purpose of this research intends to examine whether Internet IPOs before, during and after the DotCom share similarities. Consequently, we aim to conduct an analysis of their pricing characteristics and their performance in the long-run. Therefore, our main research question will be:

"What characteristics have influenced Internet IPOs' short-term and long-term performance?"

To develop this study various hypotheses will be investigated:

3.1 Underpricing Hypotheses

Even though the level of underpricing seems to vary among different industries, the conclusion has been that IPOs as a group are underpriced on average (Ritter & Welch, 2002). Therefore, the first hypothesis is:

Hypothesis 1:

H0: All IPOs in total experience no underpricing.

H1: All IPOs in total experience a significant positive level of underpricing.

Berger (2002) testifies that there are discrepancies in the value drivers belonging to Internet and non-Internet firms, these divergences become even

more accentuated when it comes to offering prices and the day one ending prices. We will then generate the following hypothesis which is meant to control for differences among these two groups: internet and non-internet firms.

Hypothesis 2:

H0: On average, internet IPOs exhibit the same level of underpricing as general IPOs.

H1: On average, internet IPOs are less mispriced than general IPOs.

The reputation of the lead underwriter is one of the main factors which can cause mispricing. From the theory, we expect that a higher underwriter reputation has a negative effect on underpricing. Therefore, we generate our third hypothesis:

Hypothesis 3:

H0: A higher level of underwriter reputation has no effect on the underpricing of internet IPOs.

H1: A higher level of underwriter reputation has a significant negative effect on the underpricing of internet IPOs.

Jog and Riding (1987) found that underpricing of Canadian IPOs was significantly related to the proceeds from the offer. Therefore, we will test:

Hypothesis 4:

H0: A company's offer size has no effect on the degree of underpricing.

H1: A company's offer size has a negative effect on the degree of underpricing.

In addition, we will further analyze whether the average VC-backed IPO is systematically less mispriced than the average non-VC-backed IPO. Based on this, we will generate our fourth hypothesis:

Hypothesis 5:

H0: On average, VC-backed IPOs exhibit the same level of underpricing as non-VC-backed IPOs.

H1: On average, VC-backed IPOs are less mispriced than non-VC-backed IPOs.

Most evidence on the underpricing of technology IPOs is related to the DotCom bubble (e.g., Ritter & Welch, 2002). To explore if there are significant differences between underpricing in IPOs history, before, during and after the bubble we would then create three subsamples from the previous one. This will allow us to generate our fifth and sixth hypothesis:

Hypothesis 6:

H0: IPOs during the DotCom bubble exhibit the same degree of underpricing than the ones before the DotCom bubble.

H1: IPOs during the DotCom bubble exhibit a higher degree of underpricing than the ones before the DotCom bubble.

Hypothesis 7:

H0: IPOs during the DotCom bubble exhibit the same degree of underpricing than the ones after the DotCom bubble.

H1: IPOs during the dot DotCom exhibit a higher degree of underpricing than the ones after the DotCom bubble.

3.2 Long-Run Hypotheses

In the long-run perspective, the research points towards underperformance, and the pattern is most significant for junior growing companies (Ritter, 1991). As internet companies often are classified as young growth companies, our seventh hypothesis is meant to test whether these IPOs experiences this anomaly:

Hypothesis 8:

H0: Internet IPOs do not experience a significant underperformance in the long-run.

H1: Internet IPOs experience a significant underperformance in the long-run.

Some studies say that an issuing firm backed by a larger syndicate performs better in the long-run, as they could be more representative of the diverse actual market (Dong et al., 2011). Our next hypothesis is, therefore:

Hypothesis 9:

H0: A higher number of underwriters has no effect on the long-run performance of IPOs.

H1: A higher number of underwriters has a significant positive effect on the long-run performance of IPOs.

The above-mentioned hypothesis will be central in the analysis carried out in the dissertation. We will develop the paper in the following way: there will be a section covering theory and literature review, describing the nature of "unicorns", the dot com bubble and initial public offerings. To this, the data and methodology part will follow. The dataset will be constructed in Excel, and then modelled in R or Python which will allow us to generate variables of interest and statistical tables used to make inference on the research question. Finally, we provide the results of the empirical analysis, which will then lead to the conclusions of our thesis.

4. Methodology

In the following paragraphs we present the methodology used when answering our research question and testing the aforementioned hypothesis. Our sample will consist of Internet companies that went public on the US Stock Exchanges between 1 January 1996 and 1 January 2015.

4.1 Underpricing Hypotheses

Initial Returns

In order to compute initial returns, we will follow Loughran and Ritter (2004) methodology. Hence, we calculate initial returns as follows:

$$IR_i = \frac{P_{i,t+1}}{P i,t} - P_{i,t} \qquad (1)$$

Where IR_i is the first-day return of firm i, $P_{i,t+1}$ is the closing price of the issue at time t+1, and $P_{i,t}$ is the offer price of the issue at time t

When calculating the average first-day return of all IPOs, we also need to equally-weight the firms.

$$R_s^{ew} = \frac{1}{n_s} \sum_{i=1}^{n_s} R_i \qquad (2)$$

Where R_s^{ew} the equally weighted first-day return of sample s, n_s is the number of IPOs in sample s and R_i is the first-day return of firm i.

Next to the initial returns previously computed for each stock, we will then compute the return on the market index during the same time period. This will allow building the market-adjusted abnormal return (MAAR) for each IPO on the first day of trading.

Statistical Hypothesis Testing

To test Hypotheses 1 and 2, mean difference t-tests will be used. In specific, hypothesis 1 will be tested by using a one-sample t-test of whether the first-day returns are statistically significantly different from zero, while hypothesis 2 will be tested using a two-sample t-test of whether the difference between the two samples is statistically significantly different from zero.

Multivariate Regression Model

From the previous sample, three subsamples will be then generated in the following way. The first sample will collect companies belonging to a period that goes from 1996-1999; the second refers to 1999-2000; the last sample from 2001-2016. As before, a two-sample t-test of whether the difference between the two samples is statistically significantly different from zero will be used to test hypothesis 6 and 7.

A multivariate OLS regression analysis will be used to test Hypothesis 3,4 and 5. First, these two hypotheses will be tested throughout the whole sample. Then, on the basis of the previous classification, three regressions will be run, to address the 3 different periods of this study. This will allow us to see if there are similarities among the different periods of interest.

To conduct the study relative to the short term the following regression will be enforced:

$$FirstDayReturn_i = \alpha_i + \beta_1 UnderwriterReputation_i + \beta_2 OfferingSize_i$$

$$+ \beta_4 VCBackedDummy + \beta_3 NumberofUnderwriters_i + \varepsilon_i$$

4.2 *Long-Run Hypotheses*

Abnormal returns in event time

Prior investigations related to long-run IPO performance contribute to diverse debates on which models are intended to measure the true abnormal returns. Two are the most common methods used to calculate them. The cumulative abnormal return (CAR) and buy-and-hold abnormal returns (BHAR) (Barber & Lyon, 1997).

We plan to follow Chi and Padgett (2005) methodology and initially calculate the market-adjusted long-run returns for a period of 36 months following the first trading month. The market-adjusted return for stock *i* in *t*th month is defined as

$$ar_{it} = r_{it} - r_{mt} \qquad (3)$$

where r_{it} is the return for stock *i* in the *t*th trading month and r_{mt} is the return on the market during the corresponding time period.

The average market-adjusted return on a sample of n stocks for the *t*th month is the equally weighted arithmetic average of the market-adjusted returns:

$$AR_t = \frac{1}{n}\sum_{i=1}^{n} ar_{it} \qquad (4)$$

The cumulative market-adjusted long-run performance (CAR) from event month q to event month s is the summation of the average monthly market-adjusted returns:

$$CAR_{q,s} = \sum_{t=q}^{s} AR_{it} \qquad (4)$$

The second measure we are going to use is the three-year buy-and-hold market-adjusted returns following the first trading month (BHAR), defined as:

$$BHAR_i = \prod_{t=1}^{T}(1 + r_{i,t}) - \prod_{t=1}^{T}(1 + r_{b,t}) \qquad (4)$$

The mean three-year market-adjusted buy-and-hold return is defined as:

$$\overline{BHAR} = \frac{1}{n}\sum_{i=1}^{n} BHAR_i \qquad (4)$$

Following Ritter (1991), we plan to use 21 trading days per month and calculate the performance following the first-day closing price, which, to some extent, it does not depend on the offering price.

Statistical hypothesis testing

When testing whether internet IPOs experience significant underperformance in the long-run, we will use two different statistical tests. Because the BHARs are not assumed to be normally distributed, relying solely on a t-test when testing this distribution can be insufficient. Thus, we also perform a one-sample sign test on BHARs, which tests whether the distribution has a median of zero. CARs, on the other hand, are assumed to be normally distributed. Hence, we perform mean difference t-tests to test whether the CARs are significantly different from zero for each seasoning month. However, to test its effect on

long-run performance, we will also include first-day returns (FirstDayReturn) as an independent variable.

Multivariate regression model

To test Hypothesis 8 and 9 two separate regression frameworks will be tested. The two regressions will have the 3-year CAR and BHAR as dependent variables. The same explanatory variables as in the underpricing model are used. However, to test its effect on long-run performance, we will also include first-day returns ($FirstDayReturn_i$) as an independent variable.

$$3yearCAR_i = \alpha_i + \beta_1 UnderwriterReputation_i + \beta_2 OfferingSize_i$$

$$+ \beta_4 VCBackedDummy + \beta_3 NumberofUnderwriters_i + \beta_5 FirstDayReturn_i + \varepsilon_i$$

$$3yearBHAR_i = \alpha_i + \beta_1 UnderwriterReputation_i + \beta_2 OfferingSize_i$$

$$+ \beta_4 VCBackedDummy + \beta_3 NumberofUnderwriters_i + \beta_5 FirstDayReturn_i + \varepsilon_i$$

5. Plan for Data Collection

In order to develop a structured analysis to answer the thesis question, the study will be conducted following Ritter (2018)'s classification for Internet companies in the US, from 1996 to 2016. From this data set, we have an initial sample of 692 companies, however it is possible that we have a decrease in this number in case we lack other information needed to conduct the full analysis.

Ritter also provides a ranking of underwriters, which we will use to build our Underwriters' Reputation independent variable. In addition, we plan to gather the remaining data from Thomson Financial Securities Data, Bloomberg, Wharton Research Data Services and SEC.

We believe such data sources will be sufficient to extract the information we need on its totality and we predict to conclude the gathering by mid-March.

6. Bibliography

Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*, 43(3), 341-372.

Beatty, R. P., & Ritter., J. R. (1986). Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics*, 15(1-2), 213-232.

Brav, A., & Gompers, P. A. (1997). Myth or reality? The long‐run underperformance of initial public offerings: Evidence from venture and non-venture capital‐backed companies. *The Journal of Finance,* 52(5), 1791-1821.

Berger, P. (2002). Discussion of Valuation of Internet Stocks: An IPO Perspective. *Journal of Accounting Research*, 40(2), 347-358.

Carter, R.B. (1992), `Underwriter Reputation and Repetitive Public Offerings', *Journal of Financial Research*, Vol. 15, No. 4, pp. 341±54.

Carter, R. B., Dark, F. H., & Singh, A. K. (1998). Underwriter reputation, initial returns, and the long‐run performance of IPO stocks. *The Journal of Finance*, 53(1), 285-311.

Chang, S.‐C., Chung, T.‐Y. and Lin, W.‐C. (2010), Underwriter reputation, earnings management and the long‐run performance of initial public offerings. *Accounting & Finance*, 50: 53-78. doi:10.1111/j.1467-629X.2009.00329.x

Chen, C.R. and Mohan, N.J. (2002), Underwriter Spread, Underwriter Reputation, and IPO Underpricing: A Simultaneous Equation Analysis. *Journal of Business Finance & Accounting*, 29: 521-540. doi:10.1111/1468-5957.00441

Chi, J. Padgett, C. (2005). The performance and long-run characteristics of the Chinese IPO market. *Pacific Economic Review,* 10:4, 451-469

Demers, Elizabeth A., and Katharina Lewellen, 2002, The marketing role of IPOs: Evidence from internet stocks, *Journal of Financial Economics*, forthcoming.

Fong, W., Lean, H. and Wong, W. (2008). Stochastic dominance and behavior towards risk: The market for Internet stocks. *Journal of Economic Behavior & Organization,* 68(1), pp.194-208.

Gornall, W. Strebulaev, I. (2017, July 11). Squaring Venture Capital Valuations with Reality. *National Bureau of Economic Research*, Inc. Retrieved from URL: http://www.nber.org/papers/w23895.pdf

Jain, B. A. and Kini, O. 1995. Venture Capitalist Participation and the Post-Issue Operating Performance of IPO Firms. *Managerial and Decision Economics* 16 (6): 593-606.

Ibbotson, R. G. (1975). Price performance of common stock new issues. *Journal of Financial Economics*, 2(3), 235-272

Lee, P. M., & Wahal, S. (2004). Grandstanding, certification and the underpricing of venture capital backed IPOs. *Journal of Financial Economics*, 73(2), 375-407.

Ljungqvist, A. J. Wilhelm, W. (2003, April). IPO Pricing in the Dot-com Bubble. *The Journal of Finance*. Retrieved from URL: https://doi-org.ezproxy.library.bi.no/10.1111/1540-6261.00543

Loughran, T. Ritter, J. (2004). Why has IPO underpricing changed over time. *Financial Management*.
Loughran, T., & Ritter, J. R. (1995). The new issues puzzle. *The Journal of Finance*, 50(1), 23-51.

Miloud, T. Aspelund, A. Cabrol, M. (2012). Startup valuation by venture capitalists: an empirical study,Venture Capital.DOI: 10.1080/13691066.2012.667907

Ritter, J. R., & Welch, I. (2002). A review of IPO activity, pricing, and allocations. *The Journal of Finance*, 57(4), 1795-1828.

Ritter, J. R. (2015). Growth Capital‐Backed IPOs. *Financial Review,* 50(4), 481-515.

Schultz, P. (2003). Pseudo market timing and the long‐run underperformance of IPOs. *The Journal of Finance,* 58(2), 483-517.

Lowry, M., & Schwert, G. W. (2002). IPO Market Cycles: Bubbles or Sequential Learning? *The Journal of Finance*, 57(3), 1171–1200. doi:10.1111/1540-6261.00458

Ibbotson, R. G. (1975). Price performance of common stock new issues. *Journal of Financial Economics,* 2(3), 235–272. doi:10.1016/0304-405x(75)90015-x

Ibbotson, R. G., Sindelar, J. L., & Ritter, J. R. (1988). INITIAL PUBLIC OFFERINGS. *Journal of Applied Corporate Finance*, 1(2), 37–45. doi:10.1111/j.1745-6622.1988.tb00164.x

Jay R. Ritter (1984), "The 'Hot Issue' Market of 1980," *Journal of Business*, pp. 215-240.

Jog, V.M., & Riding, A.L. (1987). Underpricing in Canadian IPOs. Financial Analysts Journal, November-December, 48-55