THE EQUITY UNDERPRICING PUZZLE: A CASE OF UNTOWARD/WEIRD DATA SELECTION.

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Abstract

Investors and other financial economists are interested in how the stock market values a firms equity (i.e. shares). In the fundamental sense, the value of a firm's shares should reflect investor's expectations of the firm's future profitability and sustainability. However, data on expected future profitability is non existent and uncertain. One has to rely on the past performances of the firm to determine them. There is a conflict between earlier researches and the recent ones regarding the undervaluation of IPOs of companies in comparison with their FPOs/SEOs. In this paper we make an attempt to empirically establish the overvaluation of IPOs with respect to the FPOs and provide appropriate reasoning for that.

Keywords:

IPOs, FPOs/SEOs, Overvalued/Undervalued, Multiple regression, Data selection.

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Introduction:

With the increase the level of awareness of a common investor, and a rise in financial literacy in general, investors in recent times, now wishes to avail all the financial avenues open to them, rather than restricting to a numbered few (bank savings and low risk govt. bonds etc).

The corporate sector, has leveraged upon this growing attitude of the investors by providing them investment avenues in the form of IPOs (Initial Public Offers) and FPOs (Follow on Public Offers). Investors and other financial economists are interested in how the stock market values a firms equity (i.e. shares). In the fundamental sense, the value of a firm's shares should reflect investor's expectations of the firm's future profitability and sustainability. However, data on expected future profitability is non existent and uncertain. Instead, empirical financial studies must use measures such as, current income, sales, value of assets possessed, and debt of the firm as explanatory variance (independent variables).

In addition to the general question of how a stock market's value firms, a second question is also considerable attention by financial economists in recent years. By motivating this problem, note that most of the shares traded on the stock market are old shares in existing firms. However, many old firms will issue some new shares in addition to those already trading which is referred to as "seasoned equity offerings" or (SEO) or "follow on public offering" or (FPO).

Further more some firms that have not traded shares on the stock market in the past may decide to now issue such shares (for eg. a bank may have an ambitious plan of comprehensive computerization in order to be competitive in the market may decide to "go public" and sell shares in order to raise public money for its above purpose or for future investment and expansion). Such shares are called "initial public offerings" or (IPO).

Some researchers in previous literatures have argued on the basis of empirical evidence that IPOs are undervalued relative to SEOs or FPOs, although, some of the recent works of researchers suggests that the IPOs are over priced.

In this paper I would try to empirically investigate these questions.

Definitions:

For a comprehensive definition and the activities associated with the primary public issue, please refer Appendix 1.

Difference between follow on Public offering and initial public offering:

- IPO is made when company seeks to raise capital via public investment while FPO is subsequent public contribution.

- First issue of shares by the company is made through IPO when company first becoming a publicly traded company on a national exchange while Follow on Public Offering is the public issue of shares for an already listed company.

Data Collection:

This is fundamentally a replication and extension study suggested by the book "Gary Koop, "Analysis of the Economic Data" 2nd Edition, Pub-John Willey & Sons Ltd. 2005. There is a list of 309 firms which sold new shares in the year 1996. Some of them were the IPOs and the rest were FPOs. The data was obtained from the following website http://www.wileyeurope.com/go/koopdata2ed.

Defining the variables -

Data on the following variables are :

1. <u>Value</u> = total value of all shares outstanding just after the firm issued the new shares. This is calculated as price per share times the number of shares outstanding.

2. <u>Debt</u> = the amount of long term debt held by the firm

3. <u>Sales</u> = total sales of the firm

4. <u>Income</u> = net income of the firm

5. <u>Assets</u> = book value of the assets of the firm i.e. what an accountant consider the asset of the firm worth of

6. <u>SEO / FPO</u> = a dummy variable that is equal to 1 if the new share issue is an FPO and equals 0 if it is an IPO.

   However the above mentioned variables were chosen to obtain the answers to research question but because these variables were not able to explain the variation of Y(dependent variable) based on X(independent variables) to a great extent (25% of the variation is explained). Hence we transformed the variables as under to get a better fit of

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the regression line (the goodness of fit increases by 100 %. (50% of the variation is explained).

Ln value = natural logarithm of value.

Ln debt = natural logarithm of debt

Ln sales = natural logarithm of sales

Income /4 = income divided by 4 or quarter of the income

(assets)^0.25 = assets raised to the power 0.25

SEO/FPO = a dummy variable that is equal to 1 if the new share issue is an FPO and equals 0 if it is an IPO.

Methodology:

In order to find out the answer of the research question I have employed the multiple regression technique to build a relevant model of equity pricing based on the variables –

1. Predictor variable = value
2. Explanatory variable = debt , sales, income, assets, SEO / FPO.

Literature Review :

There had been a established view, by the virtue of previously existing literature regarding the IPOs of firms being underpriced (J. Lee Philip, L. Taylor Stephen, S. Walter Terry, 1999), (A. Habib Michel, P. Lungqvest Alexander, 2001), (L. Riding Allan, M. Jog Vijay, 1987) etc. However with the recent publications, disregarding the old established idea (K. Purnanandam Amiyatosh, S. Bhakaran, 2004) has led the academe to have another look over the issue.

1. Amiyatosh K. Purnanandam and Bhaskaran Swaminathan, "Are IPOs Really Underpriced? Oxford University Press. IPO's have been underpriced during the last twenty years by more than 10 %. In a sample of more than 2000 IPOs ranging from the year 1980 to 1997theuy found out that the median IPO was over valued at the offer price. This overvaluation ranges from 40% to 50%. There results suggest that IPO investors are deceived by optimistic growth forecasts and pay in adequate attention to profitability in valuing IPOs.

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The overvaluation results is in conflict with the under pricing notion. with respect to the fair value prediction by most rational models of IPO pricing.

Over valued IPOs are characterized by lower initial sales and EBITDA profit margins, higher filing date to offer date returns, higher first day share turnover, higher over allotment.

2. Vijay M. Jog & Allen L. Riding, "Under pricing in Canadian IPOs.

Between the year 1971 to 1983 initial public offerings that went public in Canada and were subsequently traded on the Toronto stock exchange(TSE) indicated that similar to the US IPOs these IPOs were also on an average under priced. The under pricing ranged form 9% to 11%.

However the level of under pricing varied significantly across firms. Approx 40% of the sample issues were found to be over priced.

This article reported on the degree of under pricing of the IPOs in the Canadian markets during the period of 1971 to 1983.

There have been several hypothesis propounded to explain the under pricing of new issues. One of which named as 'naïve hypothesis' which states that under pricing represents a risk premium that the investors demand because of lack of performance history.

Beatty and Ritter have argued that the investment bankers deliberately try to maintain an "under pricing equilibrium". They suggest that these agents would loose their share of investors if underpricing were too little, but would loose their market share of issuers if the underpricing were too high.

The IPOs must be under priced on average if relatively uninformed potential investors are induced to submit their bids.

The level of underpricing is consistent with levels reported in studies using US data. This indicates that Canadian markets are not as inefficient as the earlier Canadian pricing study implies.

3. Michael A. Habib, Alexander P. Ljungqvist, "Underpricing and Entrepreneurial Wealth Loses in IPO: Theory and Evidence". They have some IPOs more underpriced than others because there is a larger asymmetry of information , more valuation uncertainty , greater risk of law suits. Some IPOs are more underpriced than others because their

owners have less reason to care abut under pricing. Owners who sell very few shares suffer only marginally from under pricing. Conversely the more shares they sell the greater their incentive to decrease under pricing. Controlling the owner's incentive to decrease under pricing helps us to understand the choices companies make when they go public. In the US and Canada, issuers can choose between

    (a) Best efforts (cheap in terms of cash expense but leads to high under pricing)

    (b) Firm commitment book building (which is expensive in terms of fees but leads to lower under pricing)

There are two main premises to their analysis. The first one is that; owners care about under pricing only to the extent that they stand to loose money and the second one is that; issuers can affect the level of underpricing by promoting their issues.(target investment audience, under writer, auditor, and lawyer reputation, extent of road shows, multiple listing and so on).

4. Philip J. Lee, Stephen L. Taylor, Terry S. Walter, "IPO Under pricing Explanations:; Implication from investor application and allocation schedules. The book building approach of the US under writers means that there should be a close correspondence between the final application of the share in an IPO and the allocation of these shares. Final applications however may differ substantially from the underlying demand from an issue, reflecting potential investors perceptions of biased in underwriters decisions and the futility of an application of shares when not on the favoured client list.

Objective of the Study:

The primary motive of the paper is to find out, whether the corresponding data set is in conflict or conciliation with the a priori knowledge and the existing literature, the IPOs are really under valued with respect to the SEOs /FPOs. After consummating the above exercise, we would try to provide suitable and appropriate reasons for the obtained conclusion.

Hypothesis:

To test whether there is any significant difference between tem means of the Model Ln value (Regressand) of SEOs and IPOs over the corresponding data , t test has been applied.

The hypothesis which we have formed to test the similarity/ dissimilarity of the means of IPOs /FPOs are as follows:

H_o : SEO (µ1)>= IPO(µ2) [the mean of the SEOs are greater than or equal to the mean of the IPOs]

H_a : SEO (µ2)<IPO(µ2) [the mean of SEOs are less than the mean of the IPOs]

The null hypothesis would be rejected against the alternative hypothesis at the significance level α (0.05) if computed t statistics in the following form is less than the critical value of t at the level α.

The t statistic to test whether the population means are different can be calculated as follows:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{s_{\overline{X}_1 - \overline{X}_2}}$$

where

$$s_{\overline{X}_1 - \overline{X}_2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}.$$

$$d.f. = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{(s_1^2/n_1)^2/(n_1 - 1) + (s_2^2/n_2)^2/(n_2 - 1)}.$$

Where,

X1 = sample mean of SEO

X2 =sample mean of IPO

n1 = no. of observation regarding SEO

n2 = no. of observation regarding IPO

S_{X1}^2 = sample variance of SEO

S_{X2}^2 = sample variance of IPO

The tabular form of the calculation,

	Mean	Std. Dev.
IPO	5.27	1.05

SEO	6.89	2.8

t test of unequal sample size and variance.

After plugging the values in the above formula in the **t** test we got the t calculated value :

(-) 7.472 and the degree of freedom comes out to be 294

(the t tabulated value at 0.05 level of significance and degrees of freedom 200 comes out to be (-) 1.653)

Since 200 is very close to 294 in terms of degrees of freedom as the values vary very less at such large degrees of freedom we consider the degree of freedom to be 200 for our purpose.

Diagram of t distribution's confidence interval :

The view of the pictorial representation in the Appendix 3, displayed below makes it evident that the students t distribution that the mean calculated value for t i.e. t_{calc} lies in the rejection region of the left tail (it is a one tail test). Similarly the median calculated value for t i.e. t_{calc} also lies in the rejection region of the left tail (it is a one tail test). The critical value for t test is (-)1.653 and the calculated value for mean comes out to be (-)7.47 and the calculated value for median comes out to be (-)6.27.

In both the central tendency forms the null hypotheses of SEO being overvalued than IPO falls in rejection region and subsequently gets rejected significantly, and the alternative hypotheses holds good.

Result/Conclusions:

We see that the result is in sharp contrast with earlier literatures substantiating that the IPOs are undervalued with respect to SEOs. However, there are explanations corroborating the result obtained in the test.

Firstly, the data is of US companies issuing IPOs and SEOs in the year 1996. This was a period characterized by great economic boom in the US. There was prevalence of an extremely positive market sentiment which led many companies to time their issues to public during this period.

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This was one period when the dot com bubble creation also started, which ultimately met its climax during 2000s. Taking advantage of the investor's perception that any company which has "e" prefixed or "dot com" suffixed to its name was a great investment avenue as their future is very bright. A lot of company took free ride on this wave and issued IPOs which was overvalued even without having any significant performance history. There are instances where people became overnight millionaires by issuing overvalued IPOs taking advantage of public perception about their future performance.

However when companies issued their SEOs/IPOs, their performance was already under the public microscope and hence they cannot overprice their issues, risking undersubscription of their issues.

This phenomenon helps us imply to a great extent as to why IPOs got overvalued with respect to the SEOs.

The dataset incorporated in this paper, was deliberately chosen from a anomalous period, to emphasize that the selection of a wrong dataset (not a true representative of the generally persistent trend) can lead to the reversal of the established proposition.

In the Appendix 2 (given below), there are names of some companies which were important in creating this pseudo boom.

APPENDIX 1:

IPO: An Initial Public Offer (acronym IPO) is the initial offer of securities by a company to the public, since its establishment. The main purpose of issuing an IPO is to raise capital for the corporation. Raising money through IPOs is advantageous for a company, which apart from getting capital wants its securities to trade in the secondary market. IPO involves one or more investment banks engaged in the underwriting process. The issuing company enters into a contract with the lead underwriter to sell its shares to the public.

The underwriter can sell these securities by using various methods:

- ✓ Best effort
- ✓ Bought out deal
- ✓ Firm commitment
- ✓ Dutch Auction

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If a company fulfills the eligibility criteria for the issuance of IPO, then it can proceed forward with the issue in the following order:

1) Selecting the type of security (shares or debentures)
2) Holding of General Meeting
3) Intimation to Stock Exchanges
4) Appointment of Merchant Bankers
5) Appointment of other agencies (Registrar to the issue, Collecting bankers, Brokers, Advertising agencies, Printers for issue related materials etc.)
6) Agreement with depository
7) Drafting of the prospectus
8) Filing of Documents
9) Application for listing
10) Printing and distribution of prospectus and application forms to public
11) Opening Bank account
12) Allotment of shares and issue of share certificates.

FPO: An issuing of shares to investors by a public company that is already listed on an exchange. An FPO is essentially a stock issue of supplementary shares made by a company that is already publicly listed and has gone through the IPO process.

Appendix 2:

LIST OF COMPANIES SIGNIFICANT TO THE BUBBLE:

- Boo.com, spent $188 million in just six months in an attempt to create a global online fashion store. Went bankrupt in May 2000.
- Startups.com was the "ultimate dot-com startup." Went out of business in 2002.
- e.Digital Corporation (EDIG): Long term unprofitable OTCBB traded company founded in 1988 previously named Norris Communications. Changed its name to e.Digital in January 1999 when stock was at $0.06 level. The stock rose rapidly in 1999 and went from closing price of $2.91 on December 31, 1999 to intraday high of $24.50 on January 24, 2000. It quickly retraced and has traded between $0.07 and $0.165 in 2010 .

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- Freeinternet.com – Filed for bankruptcy in October 2000, soon after canceling its IPO. At the time Freeinternet.com was the fifth largest ISP in the United States, with 3.2 million users. Famous for its mascot Baby Bob, the company lost $19 million in 1999 on revenues of less than $1 million.

- GeoCities, purchased by Yahoo! for $3.57 billion in January 1999. Yahoo! closed GeoCities on October 26, 2009.

- theGlobe.com – Was a social networking service, that went live in April 1995 and made headlines by going public on November 1998 and posting the largest first day gain of any IPO in history up to that date. The CEO became in 1999 a visible symbol of the excesses of dot-com millionaires.

- GovWorks.com – the doomed dot-com featured in the documentary film Startup.com.

- pets.com - a former dot-com enterprise that sold pet supplies to retail customers before entering bankruptcy in 2000.

- open.com - Was a big software security producer, reseller and distributor, declared in bankruptcy in 2001.

- InfoSpace – In March 2000 this stock reached a price $1,305 per share, but by April 2001 its price had crashed down to $22 a share.

- lastminute.com, whose IPO in the UK coincided with the bursting of the bubble.

- The Learning Company, bought by Mattel in 1999 for $3.5 billion, sold for $27.3 million in 2000.

- Think Tools AG, one of the most extreme symptoms of the bubble in Europe: market valuation of CHF 2.5 billion in March 2000, no prospects of having a substantial product (investor deception), followed by a collapse.

- Webvan, an online grocer that operated on a "credit and delivery" system; the original company went bankrupt in 2001. It was later resurrected by Amazon.

- WorldCom, a long-distance telephone and internet-services provider that became notorious for using fraudulent accounting practices to increase their stock price. The company filed for bankruptcy in 2002 and former CEO Bernard Ebbers was convicted of fraud and conspiracy.

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- Xcelera.com, a Swedish investor in start-up technology firms. "Greatest one-year rise of any exchange-listed stock in the history of Wall Street."

- Broadcast.com was acquired by Yahoo! for $5.9 billion in stock, making Mark Cuban a multi-billionaire. The site is now defunct and redirects to Yahoo's home page.

Appendix 3:

95% acceptance region

mean
- 7.47

median
- 6.27

critical region
- 1.653
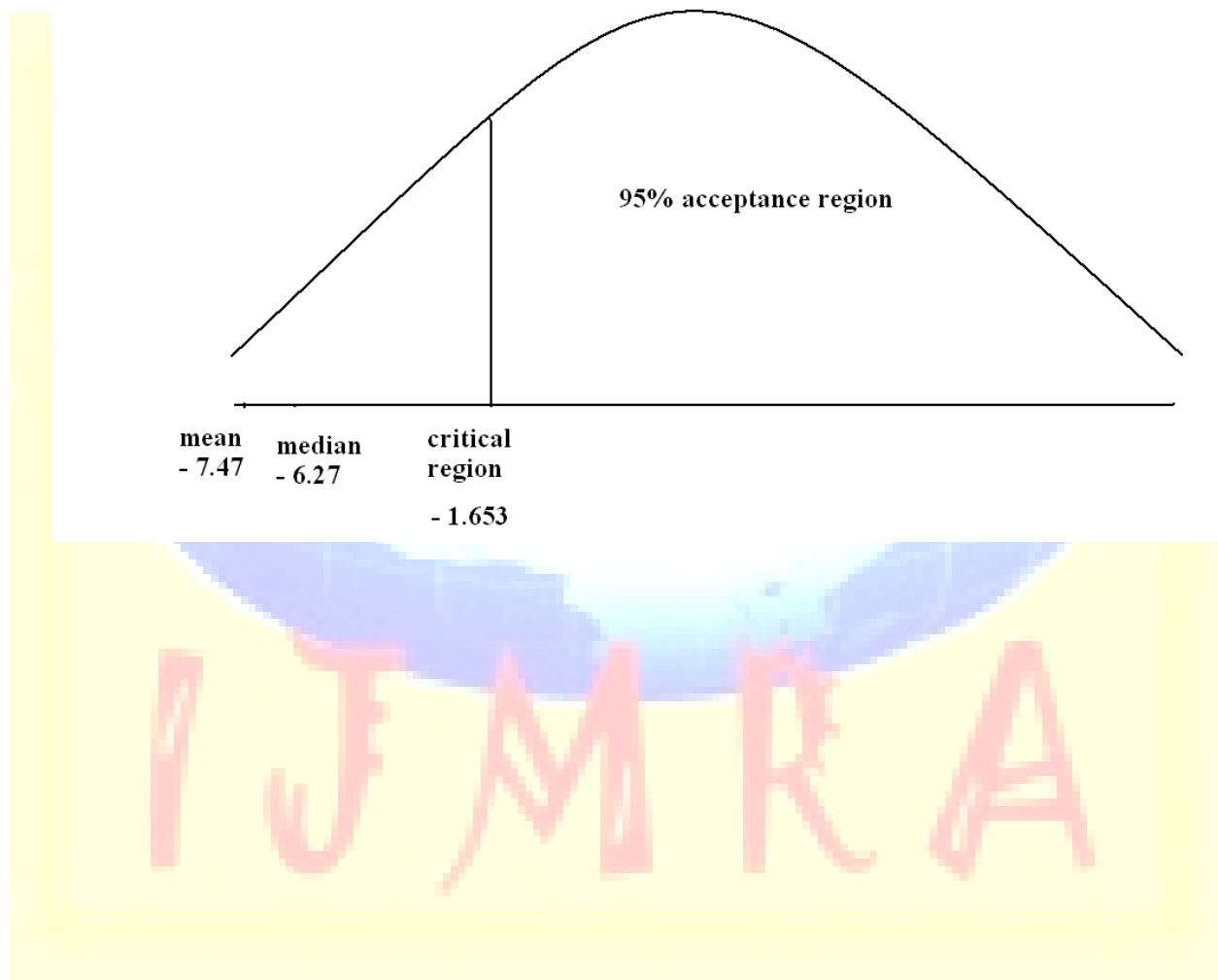
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