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Determinants of IPO Short Run and Long Run Performance: A Case Study on the Listed Firm of Pakistan Stock Exchange

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ABSTRACT

The purpose of this study was to empirically investigate initial public offering underpricing and to investigate the determinants of IPOs listed at Pakistan stock exchange during the period from January 2000 to December 2010. The study found that underpricing phenomenon exists in KSE 100 index to reduce the level of uncertainty between the informed and uninformed investors at the time of IPO. The sample data on 59 IPO firms was collected and Market Adjusted Abnormal Returns Model (MAAR) has been employed to measure the post-IPO performances of the new issues. The results of this study are in line with the literature on IPO anomalies stating that underwriters deliberately underpriced the IPOs to a degree of 46% on average.

Keywords: Initial Public Offering (IPO), Underpricing, Pre-IPO characteristics

INTRODUCTION

An Initial Public Offering (IPO) is a procedure, when a firm issues its shares to the general public for the very first time. In the IPO process, a number of anomalies have been identified related to the pricing behavior of the equities. Among these anomalies, most important are IPO underpricing and IPO underperformance. Underpricing is a phenomenon that is often detected upon the issue of new offerings by the firms where the offering price in the market is usually lower than the closing price on the first day of listing while, On the other side underperformance occurs when the offering price in the market is usually lower than the closing price in the long run (Ritter & Welch, 2002; Loughran & McDonald, 2013; Afza, Yousaf, & Alam, 2013).

The short run underpricing and the long run underperformance of IPOs exist in both developed and emerging markets (Loughran, Ritter, & Rvdqvist, 1994). It is concluded from the literature that one of the participants of IPO transactions knows more than the others that results in informational asymmetry that gives rise to underpricing of IPO (Beatty & Ritter, 1986; Tian & Megginson, 2011). IPO underpricing and under performance are attributed to the number of factors. Among other factors, important factors that contribute to IPO underpricing are size of the firm and age of the firm, timming of the IPO, reputation of the underwriter. Moreover, large IPOs tend to be less underpriced than smaller offerings. The smaller the size of the offering, the more it is underpriced (Michael & Thornton, 2008). Furthermore, the initial returns are much greater during bull markets than in normal times (Michael & Thornton, 2008). It is predicted through previous researches that initial excess return gained in IPO, relates negatively to the reputation of the underwriter.

Most of the studies were conducted in developed as well as in developing countries, have focused on investigating the IPO's long run performance, instead of examining the short-term initial excess return (underpricing). Little attention is paid to the study of Pre-IPO Characteristics that influence the underpricing of these IPOs. Furthermore, not much work of this nature has been carried out in Pakistan.

The present study is conducted to determine whether IPO underpricing exist in Pakistan and what are factors that contribute in this underpricing of IPOs.

In financial economics, the stock market evolvement and its role in economic growth is a significant area of research. The special insight of pricing behavior of IPOs in terms of initial returns helps the top management of financial institutes in anticipating the pricing of IPOs. Besides, the study also develops a profound knowledge and conceptual understanding for academic interest in the area of corporate finance. Managers of unlisted and listed firms will be able to determine the significant factors that influence the underpricing. The present study seeks to fill this research gap by investigating the phenomena of underpricing of IPO and factors influencing on it in an emerging market with reference to Pakistan Stock Exchange. This research, therefore contribute to the literature in this area, especially the area of factors that affect and relate to underpricing phenomena.

LITERATURE REVIEW

Firstly, we have explained initial public offering and its procedure. Under this heading, we have documented the empirical literature on the behavior of IPO in the short run. After presenting these studies, we have developed hypothesis on the basis of these studies.

Many public listed companies around the world have offered their shares to the general public through primary markets. An initial public offering is a procedure whereby a firm sells its

shares to the general public for the first time through different methods like, balloting or book building system. It is a very complicated process because the market is uncertain about the worth of the IPO firm and issuer also does not have any idea of market demand for firm's shares. The issuer passes on the IPO offer price decision to the underwriter who acts as a valuation expert and certify as financial advisor to raise money for corporate firms and set preliminary offer price. The literature has empirically documented two dimensions of aftermarket price performance of IPOs. Firstly, the IPOs are listed with significant premium to the issue price that is the large-scale underpricing.

The investors, as a result earn abnormally high returns as compared to the benchmark market and index on the day of listing (Kuklinski 2003; Ritter 1984; Ibboston 1975). Whereas, Peristiani, Stavros, Hong and Gijoon, (2004) and Agarwal, Liu, and Rhee (2008) pointed out that at the time of going public, firm's characteristics have an impact on the aftermarket price performance of the IPOs which can be predicted beforehand. Jay R. Ritter (1991) investigated the initial returns (1st trading day) by using a sample of 1,526 IPOs from 1975 to 1984 and estimated 16.7% first trading day average returns.

Some of the theories explaining underpricing are, Theory of Asymmetric Information (proposed by Akerlof, (1970), Signaling Hypothesis (Leland & Pyle, 1977), Theory of Prestigious Underwriter, Window of Opportunity Hypothesis (McDonald & Fisher, 1972), Prospect Theory (Loughran & Ritter, 2002). In the light of these theories there is adequate empirical evidence available supporting that new issues are underpriced on the first day of listing.

One of the risk factor for the company is its financial leverage and it adds uncertainty to the stock price of the new issue. Financial leverage of a company signposts the capacity of a company to pay off its debts. If the liability of a company is high the future price anticipation of the newly issues stock would be griming. In a study of the Indian IPO market, it was seen that IPOs with high leverage ratios underperformed as compared to the IPOs with low leverage ratio (Sahoo & Rajib, 2010). Higher the level of leverage of a company so is risk and uncertainty faced by the company (Roybark, 2009).

Another factor that suggests correlation between firm size and its IPO performance is that larger firms tend to attract more prestigious underwriters for underwriting their IPOs (Carter, Dark, & Singh, 1997). This may be due to the fact that smaller firms are perceived as having low performance potential that leads prestigious underwriters not to go for such new issues. The prestigious underwriters do not directly bear any loss through undersubscribed issues. They also will be concerned about passing on a riskier issue to their clients, hence compromising their future business.

Another important factor that influence IPO's after-market short run performances is the age of the firm at the time of issuing shares to the public for the first time. Ritter (Initial public offerings: International insights, 1991) has stated that the age effects both long as well as short run IPO performance with reference to industry volatility. This indicates investors' behavior which is more varied among young companies and in volatile industries. Another researcher found statistically significant relationship between ages of the firm at the time of IPO. Age of the firm exhibited a positive relationship with IPO underpricing (Afza, Yousaf, & Alam, 2013). However, Goergen, Khurshed, and Mudambi (2007) did not find any significant relationship between the two. Along with these variables offer size was also found to be an important determinant of IPO underpricing in various studies, but Afza, Yousaf, and Alam (2013) proposed that offer size showed an insignificant negative impact on the level of underpricing.

Hypothese

Based on the previous literature, following hypothesis are established:

H1: *Ex-ante uncertainty relates with IPO underpricing.*

H2: *Favorable IPO timings have impact on IPO underpricing*.

H3: *The underwriter reputation negatively relates to IPO underpricing.*

H4: *There is a negative relationship between firm's age and its IPO underpricing.*

H5: *There is an association between firm size and its IPO's underpricing.*

H6: *The offer size has an impact on the IPO underpricing.*

RESEARCH METHODOLOGY

The methodology is described in terms of after-market price performance analysis. Further, the independent variables are measured by methods described below in 3.2 methodology section of this chapter.

Population and Sample Size

For research purpose, we have studied the firms listed at Karachi Stock exchange by initial public offerings from January 2001 to December 2010, covering 10 years period. Total number of firms that floated their IPOs at Karachi Stock Exchange (KSE) during this period were 92. Out of those 92 firms, 80 firms were selected initially as these were listed by initial public offering to the general public during the selected study period. Thus, our population is 80 IPOs and our sample are 59 firms for the first set of models, sample of 53 firms for our second set of models after removing the outliers and third set of data includes the observation of 44 firms due to non-availability of data of one of the important variable "Leverage". The sample of 59 IPOs covers 74% of the population. Our sample set of 59 IPOs that were listed are currently traded on Pakistan Stock Exchange but some of the firms have changes their names. This sample consists only the common stocks and exclude Modaraba firms, Close-end Mutual Funds, Venture Capitalist firms, Preferred stock firms because of their different reporting environments.

Table 1

Year Wise IPO Listing Detail

Sr. No	Year	No of IPOs	Sample	Deselected
1	2001	3	2	1
2	2002	4	4	0
3	2003	6	3	3
4	2004	17	8	9
5	2005	19	13	6
6	2006	9	2	7
7	2007	14	9	5
8	2008	10	9	1
9	2009	4	3	1
10	2010	6	6	0
Total		**92**	**59**	**33**

The table 1 presents the year wise list of IPOs that were issued in the period of 2000-2010 at KSE-100 index. Out of 80 IPOs,

59 IPOs were selected for the study whereas, 21 IPOs were deselected because of the different reporting system.

Variables and their Measures

Underpricing is measured as difference of offered share price by a company to the closing price of shares at the end of the first listing day. Firm size**;** The size of the firm is calculated by taking natural logarithm of total assets of latest year financial statement in the prospectus or offer for sale document before going to public. Firm age**;** Age of the firm is estimated as the difference between the date of incorporation and the date at which the company went public. The natural logarithm of IPO firm age plus one (*Ln* (1+AGE)) is used as ex-ante proxy for risk. Offer size**;** Offer size is estimated as the product of offer price with the number of shares offered through IPO. Offer size is the amount of capital the company wants to raise through IPO. Timing of issue**;** Timing of IPO determines the level of market activity. Dummy variable 1 is used as a proxy for IPO issued during hot IPO period, and 0 is used for cold IPOs. Ex-ante uncertainty**;** A measure of the ex-ante uncertainty is calculated as the standard deviation of IPO firm returns over a period of one month from the first trading date. Leverage**;** Leverage at IPO date is a measure of Leverage ratio. Leverage (LEV) is calculated as the book value of long-term debt to the paid up equity capital of the firm at the IPO date. Underwriter reputation**;** Underwriter reputation is calculated by adding up the frequency of IPOs an underwriter carried out and dividing this by the total number of IPOs took place in the sample period. IPO underpricing**;** IPO underpricing is the difference between the IPO offer price set by underwriter and fair value or market value. Underpricing is measured:

$$\text{Underpricing} = \frac{1^{st}\text{ day closing price} - \text{Offer price}}{\text{Offer price}} \times 100 \quad \text{.....Equation 1}$$

The market adjusted returns for each IPO is measured as the difference between initial raw return and corresponding return on the market index (KSE-100 Index) over different time intervals and is measured as:

$$MAAR_{id} = 100 \times \{[(1+Ri) / (1+Rm)]-1\} \quad \text{.....Equation 2}$$

Where, Ri is the return in equity.
Rm is the return on Index.

Since the degree of underpricing is influenced by the volatility of the market so the percentage change in the KSE 100-index on the listing day has been included as the control variable.

$$MAAR\ (Underpricing) = \alpha + \beta 1\ SIZE\ F + \beta 2\ SIZE\ O + \beta 3\ AGE + \beta 4\ TIMING + \beta 5\ Ex\text{-}ante + \beta 6\ Underwriter\ Reputation + \epsilon \quad \text{.....Equation 3}$$

Where, β1, β2, β3, β4, β5 and β6 are the parameters and ϵ is an error-term.

RESULTS AND DISCUSSIONS

Firstly, we have analyzed the descriptive statistics of the variables used in the study. Thereafter, we have described the results in terms of, individual IPO performances, year wise analysis, firm's nature wise analysis and underwriter wise analysis. Then regression assumptions are discussed as normality of data, box plot and Q-Q graph. This is followed by correlation matrix explanation and cross-sectional regression analysis of the variables.

Descriptive Statistics

The average size of the firm taking part in IPO during the period from 2000-2010 is 83 billion. Mean value of firm's age is 12.8 Years, while the average results of the offer size of whole data is 6.1 billion and the average of uncertainty variable at the time of IPO of the entire sample is 2.66. The mean value of Leverage variable is 0.28. The MAAR returns (initial returns) on average for whole sample is 46% and for three years buy and hold returns is -15.8% which is consistent with other studies conducted in reference with Karachi Stock Exchange (Rizwan & Khan, 2007; Sadaqat, Akhtar, & Ali, 2011).

In the Tables No. 4.1.2, IPO firms' data has been categorized as 1) Financial firms and, 2) Non-Financial firms. Financial firms which were listed first time at Karachi Stock Exchange during the sample time period, had first day returns of 16% higher than the IPOs of non-financial firms. On average, the first day's average returns of financial firms came out to be 50 percent whereas, the mean returns of non-financial firms is 35 percent on average. It concludes that on average, IPOs of financial firms are more underpriced as compared to the IPOs of non-financial firms.

Table 2

Descriptive Statistics

Mean	Financial Firms	Non-Financial Firms
Mean	0.504	0.348
Maximum	2.27	3.16
Minimum	-0.361	-0.485
Standard Deviation	0.639	0.756

On the other hand, highest first day returns earned by non-financial firm is 316% by Sitara Peroxide in 2007 and 267% by Attock petroleum Ltd in 2005. The results are consistent with the previous literature and underpricing has been observed in the IPO market.

Market Adjusted Abnormal Return (MAAR)

The correlation between the variables ranges from 0.0131 to 0.389 in either direction. The correlation between independent variables is minimum hence assumption of collinarity exist and there is no problem of multi-collinarity and the data is suitable for regression.

There is positive correlation between the dependent variable MAAR and the uncertainty up to 0.51. It suggests that the level of underpricing increases with increase in uncertainty about the IPO. Underwriter reputation is negatively correlated with underpricing and suggests that lesser the underwriter's reputation higher is the underpricing which is again consistent with other researches on IPOs. Firm's size and age both display negative correlation with underpricing however their relationship is not significant. Issue Timing and offer size are positively correlated with the underpricing.

In the correlation table, firm's size and age both have positive correlation with the offer size suggesting, larger and older firms tend to upsurge share capital through the issuing of shares to the general public. This may be due to the fact that these are stable firms and looking for large amount of money for their big projects. Moreover, uncertainty has a negative correlation with the firm's age suggesting that older the firm, lower is the level of uncertainty among the investors.

Cross-Sectional Regression Analysis of MAAR

We employed the Ordinary Least Square (OLS) regression in E views software to explain the cross-sectional variation in the Market Adjusted Abnormal Returns (MAAR).

Regression Models

Three Regression models have been run in the study due to different reasons. Firstly, because the collected 10 years sample size was already scarce, so outliers were not removed from the observations and the first set of models was run on the primary data. Secondly, the Leverage variable has been considered an important variable for determining the post-IPO performance in the literature (Eckbo & Norli, 2005) (Kim, Pukthuanthong-Le, & Walker, 2008). Due to non-availability of the leverage data of 9 firms we had further divided our Regression models in two categories. One model in which leverage variable was not included therefore, the observations were 53 and the other model in which leverage variable was included and those 9 firms had to be removed whose data on leverage was not made available, thus observations of that model became 44.

Regression Results

Table given below describes the information of our regression model taking market adjusted abnormal return as dependent variable. The above table shows the determinants of IPO underpricing. Firstly, we'll discuss the performance of the model. F-statistics is 5.803783

Table 3

Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.603352	1.051230	0.573949	0.5685
FIRM AGE	0.268667	0.219700	1.222878	0.2269
FIRM SIZE	-0.071042	0.091032	-3.780413	0.04
ISSUE TIMING	0.468624	0.160400	2.921601	*0.0051
OFFER SIZE	-0.001018	0.126501	-0.008044	0.9936
REPUT	-0.251632	0.148947	-1.689408	**0.0971
UNCERTAINTY	0.081156	0.017847	4.547250	*0.0000
R-squared	0.401078	Adjusted R-squared		0.33197
F-statistic	5.803783	Durbin-Watson stat		2.21732
Prob (F-statistic)	0.000111			

***** Significance at 1% (.01) ****** Significance at 10%

Which is indicating that our created model is significant. The Probability of F- Statistics is 0.0001 and it is less than 5% indicating that our constructed model is highly significant. In the model, we can see that the Ex-Ante Uncertainty is highly significant variable for underpricing. The "t" value of Ex-Ante Uncertainty is 4.547250 and its "P-Value is 0.0000. The P-Value is far less than α so this a significant independent variable in our model of underpricing that explains the dependent variable "underpricing" more comprehensively and in greater detail. The relationship between the two happens to be a positive one as the coefficient of Ex-Ante uncertainty is 0.081156. It states that if there is one-unit increase in Ex-Ante uncertainty there will be 0.081156 increase in underpricing. This is consistence with the previous literature (Beatty & Ritter, 1986; Brennan & Franks, 1997; and Kayani & Amjad, 2011). Asymmetry of information projects the idea of unequal distribution of information among the concerned parties in the market. Three parties are involved in the IPO transaction, the issuer firm, underwriter and investors. Therefore, some parties may have better information regarding the valuation of firms as compared to others and thus, are able to act according to their informational advantage (Allen & Faulhaber, 1989).

The Asymmetric information theory assumes that one of them knows more than the others which results in informational imbalance ultimately giving rise to underpricing (Akerlof, 1970). The asymmetry of information between informed and uninformed investors results in a diverse valuation of the intrinsic value of the stock. This diversity leads to uncertainty about what would be the value of the offer when it will start its trading in the market. Such uncertainty is called Ex-Ante Uncertainty and is measured by proxy. Standard Deviation of the first month returns was calculated for each IPO and set as proxy for Ex-Ante Uncertainty. Thus, our postulated hypothesis H1 is true.

H1: *Ex-ante uncertainty relates positively with IPO underpricing.*

Another variable, Timing of the Issue is also a highly significant variable in the model according to the table given above. This variable stand for condition of the market at the time of IPO that is the market was "Bullish" or "Bearish". In other words, market was "Hot" or "Cold" at the time of placement of IPO. This variable "Timing of Issue" is a statistically significant variable for underpricing as its "t" value 2.921601 and its "P-Value is 0.0051. The P-Value is less than α so this a significant independent variable in our model of underpricing that explains the dependent variable "underpricing" comprehensively. The relationship between the two is positive as the coefficient of Timing of Issue is 0.468624. It states that if there is one unit increase in Timing of Issue there will be 0.468624 increase in underpricing. This is again consistence with the literature which is explained by the theory of "window of opportunity". The IPOs introduced in the period of high returns automatically gain excess returns. Although it was adjusted to market but still this variable significantly and positively relates to underpricing. Thus, our hypothesis H2 is true.

H2: *Favorable IPO timings have a positive impact on IPO underpricing.*

It might be due to the fact that our results are market adjusted. IPOs issued during the hot timings do gain positive first day returns but these returns can also be gained by the investors if they have invested in any other issue in the secondary market. In short, favorable IPO timings have a positive impact on IPO underpricing.

As stated above, theory of the prestigious underwriter (Fisher, 1972) states that higher the prestige of underwriter, lower the level of underpricing and lower the prestige of underwriting results the higher level of underpricing. Under the condition of asymmetric information between issuers and investors, Beatty & Ritter, 1986 argue that the underwriters care about their reputation and therefore do not underprice their IPOs too much. Moreover, investors also are expecting from the IPO firm to appoint an experienced and knowledgeable underwriter for the process because they believe that by doing this, their investments will be safe. The reputation of an underwriter affects the level of underpricing of an IPO (Kooli & Suret, 2001). The researcher documented that in Canada, level of underpricing seen is 31.11 percent of those IPOs that were underwritten by less reputable underwriters. Whereas, underpricing noted was 9.37% of those IPOs that were underwritten by more reputable underwriters. Hence the

underwriter's reputation is negatively related with underpricing.

As in the literature it has been documented that underwriter reputation is a significant variable for explaining the underpricing and in our model this variable also showed the same. Its t-statistics is -1.689408 and its probability is 0.0971 which means it is affecting underpricing but at significant level of 10%. It also documents a negative relationship with first day return. With every unit increase in underwriter reputation there will be 0.251632 decrease in first day return. It was also stated that due to asymmetric information between the issuers and investors the underwriters care about their reputation in the market hence, do not underprice the IPOs to a greater extent. So, our hypothesis (H3) is true.

H3: *The underwriter reputation negatively relates to IPO underpricing*.

Age of the firm at the time of going public is another variable which in literature documented as significant. In our model, its P-value is 0.2269 that is 22% probability which is not a significant level. But it documents a positive relationship with first day returns. With every unit increase in firm's age there will be 0.268667 increase in first day returns. If we say in terms of underpricing, more is the age of the firm greater will be the underpricing of an IPO. Therefore, our hypothesis H4 is false which states.

H4: *There is a negative relationship between firm's age and its IPO underpricing.*

Size of the firm at the time of issuing its share to the general public is documented in literature as a significant variable. In our model, its P-value is 0.4387 that is about 38% probability which is not a significant level. But it documents a negative relationship with first day returns. With every unit increase in firm's size there will be 0.071042 decrease in first day returns. If we say in terms of underpricing, more is the size of the firm lesser will be underpricing of the IPO. Therefore, our hypothesis H5 is true, which states.

H5: *There is a negative relationship between firm size and its IPO's underpricing.*

The final variable in the Market adjusted abnormal first day returns model is the Offer size. The P-value for this variable is 0.9936 which is around 99% probability and is not significant in our regression model. The model further shows a negative relationship between offer size and the first day returns. This is however consistent with the literature which states that offer size showed an insignificant negative impact on the level of underpricing (Afza, Yousaf, & Alam, 2013). Therefore, the hypothesis H6 is true.

H6: *The offer size is negatively related with IPO underpricing.*

The model is overall highly significant with F-statistics of 5.803 and Prob. (F) of 0.000111. In the regression model, the value of R^2 is 0.401078. It shows that the independent variables selected in the model for the purpose of the study explain 40% the dependent variable. Which is not up to the required percentage which is at least 50%. There may be some important variables missing in the study of underpricing. The adjusted R^2value is 0.331972, which means that only 33% the independent variables are explaining the dependent variable.

CONCLUSIONS

This study attempts to determine if the phenomenon of underpricing exists in the context of Pakistan Stock market and to test the relationship between IPO underpricing and the pre-IPO characteristics by using sample data of 59 firms listed at Karachi Stock Exchange during the period 2001 to 2010. Consistent with the existing literature, IPO underpricing of 46% on average, was observed in the Pakistani market, so it has been concluded from the study that IPO underpricing exist in KSE-100 index. This is primarily due to the fact that there exist an imbalance of information between the three parties involved in the process of IPO. These are 1) the IPO firm, 2) the underwriter and 3) the investor. One party knows more than the other hence, creating a level of uncertainty and concern about the liquidity of the IPO in the secondary market.

In our cross-sectional OLS model **MAAR** A, we found that Ex-ante 'Uncertainty' and 'Issue Timings' are highly significant variables at 1% and underwriter reputation is significant at 10% for describing underpricing, whereas firm size, firm age and offer size although are not significant variables in our proposed model but these affect the underpricing in the directions which are consistent with the previous studies. Issue timing and ex-ante uncertainty are positively related with underpricing whereas firm size, underwriter reputation and offer size are negatively related with underpricing. One variable, firm age, has shown positive relationship with underpricing while our postulated hypothesis was a negative relative relationship with underpricing. In one study in the context of Pakistani market this relationship between firm age and underpricing has been proved positive like our study (Afza, Yousaf, & Alam, 2013). The R^2 value is 0.38 indicating that independent variables selected for the study explained 38 percent variability of underpricing. When the model of MAAR was extended by including "Leverage" variable in MAAR B Only Ex Ante 'Uncertainty' variable remained significant at 5%. The empirical evidence has suggested that those investors who invest in the IPOs through direct subscription earn a positive market adjusted return.

The studies on IPOs showed quite varied results because different studies have been conducted over time and with different models. Therefore, the results can be contradictory. The study period is only for 36 months which should be increased but it was not possible due to the data unavailability from KSE. Data gathering is difficult for the firms and this causes hindrance in analyzing the results properly. For instance, data on leverage variable for 9 firms was not available for this study, hence it was analyzed according to that limitation.

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