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How Companies Value Stock Prices After Going Public: Evidence from Emerging Pakistan Economy

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ABSTRACT

The purpose of this study is to estimate the accuracy and authenticity of valuation methods used by underwriters to set preliminary offer price. This study uses complete universe of all newly listed companies during 2000 to 2015 on Pakistan Stock Exchange. We analyzed the determinants of the Initial Public Offering (IPOs) by comparing the ex-ante and ex-post characteristics of IPOs firms. Binary logistic model was used for evaluation of variables. Results revealed that underwriters use four different valuation methods to set IPO preliminary offer price namely as dividend discount model (DDM), discounted cash flow method (DCF), peer groups multiple (MULT) and economic valuation method (EVA). This study used Binary Logistic Regression model to estimate the accuracy and authenticity of these valuation methods. Results of this study can help the portfolio managers for constructing their effective portfolio strategies. This study also helps to highly levered firms to get cheaper long term capital by going public. This study is also important for underwriters to counter check their valuation patterns for IPO firms.

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1. Introduction

It is said that an initial public offering constitutes hurdles relating price discovery (Engelen & Van Essen, 2010). It is not sure in market relating quality of initial public offering of firms while the firms that issue shares unaware about demand of their shares. Issuer firms therefore entrust the decision of offer price for investors that underwrites the initial public offering (Bancel & Mittoo, 2009). Underwriters have muscular incentives to build their repute as expertise of valuation and endorse that offer price reflects

basic value. In our empirical analysis, we will elaborate how underwriters can make more authenticated valuation through specific valuation methods.

Dividend discount model is usually used in so many cases. The contemporary research elaborates that underwriters select the valuation method on the basis of firm characteristics. Modern literature usually give the priority to dividend discount model to check the values of those firms which go public when overall previous market returns are so low and when companies take a decision about their future earnings large portion as dividend. The weights which were assigned by the underwriters to the value estimates to their fair values also depend on the different factors of the firm and overall stock market position.

Penman (2001) described that investment is considered as loss in dividend discounted cash flow method and freely cash flows totally fail to recognize the value that does not include the cash flows. In addition, highly growing firms keep their profits as savings rather than paying dividend. It is difficult for large firms to value firms because large part of their profit comes from growth options. Dividend discount model and discounted cash flow methods cannot incorporate the value of these growth opportunities. Bancel & Mittoo (2009) elaborate that many financial analysis view dividend discount model more useful to value stable, high dividend paying stock. They predict that underwriters most likely to use dividend discount model when setting the fair value estimates for firm.

2. Literature Review

Deloof *et al* (2009) revealed that although the underwriters use different methods to value an IPO but DCF is the most appropriate method for IPO valuation. Their findings suggest that use of dividend discount model would result in underestimating the value of an IPO, while DCF produced unbiased results. The results also demonstrated that final offer price of an IPO set by an underwriter is closer to the stock market price as compared to pre IPO value estimates. They concluded that most appropriate valuations can be obtained by using multiples valuation based on post-IPO forecasted earnings and cash flows as compared to multiple valuations in the IPO year.

IPO firm's valuation obtains limited attention in the literature. Kim and Ritter (1999) elaborated how U.S firms offer prices are set in the market by using the multiples among recent IPOs from the same industry. They described that in valuation accuracy forward multiples of price earnings dominates the current price earnings multiples. The multiples valuation and discounted cash flow method also falls in the same field of accuracy of the valuation. Lie & Lie (2002) described that discounted cash flow method perform at least as well as the multiples method in valuing leverage buyouts. They further elaborated that discounted cash flow valuation method and other valuation techniques are the similar results in the field of bankruptcy court cases.

Theoretical properties of several valuation frameworks have been studied by the valuation theorists. Penman (1998) elaborated the accuracy of the dividend, cash flow and accrual earnings equity value estimates. They described that values estimates focus on accrual earnings is more reliable than the estimates calculated from free cash flows.

2.2.1 Valuation Model Choice

It was argued by lot of authors that multi period valuation models based on discounted cash flows or residual income are best for single time period multiple valuation approaches, which shows less accuracy in valuation (Copeland, 2000). Empirical evidence on valuation models used by professional investors and financial analysts stands in contrast to the theoretical superiority of multi period valuation method.

2.2.2 The Accuracy of Valuation Method

Lot of studies examined the accuracy of valuation models. Few studies focused on multiple valuation method and provided the different results but multiple valuation method is the best for valuation accuracy

It was compared by different researchers that choice of firms affects the accuracy of the valuation multiples. Profitability, growth and risk are the most important factors in peer group of selection and harmonic mean provides the best results (Kaplan and Ruback, 1995).

3. Methodology

3.1 Selection of Valuation Method

This section will develop the valuation model which will elaborate the choice for valuation methods regarding IPOs. This study proposes binary logit model to examine the determinants of the valuation methods.

3.1.1 Size of Firms

It is easier for larger firms to value rather than small firms because large firms forecast future cash flows and dividend in a better way as compared to the small firms (Ritter, 1984; Beatty and Ritter, 1986). This makes the possible use of dividend discount model and discounted cash flow method. We will measure the size (LnSIZE) of the firm by taking the natural log of the assets which are reported in the balance sheet of the company in the most recent financial year before taking the decision of going public.

3.1.2 Log (1+age)

The log of this variable (1+age) will be used as a proxy for risk. As it is said how much long the age of firm will lead the risk level as much lower (Ritter, 1984). He further described that calculation of future cash flows are so difficult and dividend for newly firms without preparing the previous track records as most of the time their values are represented by relying on future growth rates which varies from firm to firm. Forecasting of future cash flows and dividends is difficult for small size of firms.

3.1.3 Assets of the Firm

Accounting is a better way to capture the value of the firm's tangible assets as compared to the intangible assets. This increases the value of accounting methods such as the valuation methods. We will measure assets in place through the ratio of property, plant and equipment and all the total assets at the end of year preceding the IPO. In a common sense, accounting is considered to be a better way in capturing the value derived from tangible assets as compared to intangible assets.

3.1.4 Firms Growth

For proxy of growth opportunities, we employ the forecasted sale growth of the recent year. Short term free cash flows are negative for rapidly growing firms due to lower cash flows as compared to their capital investment. In discounted cash flow method, investment is loss of value and free cash flows fail to value the firm. Penman (2001) described that investment is considered as loss in dividend discounted cash flow method and freely cash flows totally fail to recognize the value that does not include the cash flows. In addition, highly growing firms keep their profits as savings rather than paying dividend.

3.1.5 Dividend Payout

Future dividend payouts will be disclosed through this ratio. High quality firms have better credibility as compared to the low quality firms. Bhattacharya (1979) showed that only high quality firms can use the dividend payout to show their quality to the investors. From their theoretical point of view, dividends are very costly and easily observable that low quality firms are unable to reproduce.

3.1.6 Dividend Discount

It is difficult for large firms to value firms because large part of their profit comes from growth options. Dividend discount model and discounted cash flow method cannot incorporate the value of these growth opportunities. Existing literature elaborate that many financial analysis view dividend discount model more useful to value stable, high dividend paying stock. They predict that underwriters most likely to use dividend discount model when setting the fair value estimates for firm.

3.1.7 Standard Deviation

Rising aggregate stock market provides the great opportunities. For this purpose we will include this variable of market index return between 90 to 95 interval trading days five days before the 1st day of IPO. Time period with high stock returns before IPO increases the usage of discounted cash flow method. Roosenboom (2007) included standard deviation of daily market index returns between 90 trading interval from 95 trading days before and 5 trading days before the IPO firms first day of trading into their model. They described that investors are mostly uncertain about the basic value when the overall market volatile. Underwriters may cater the investors demand to get more information about the basic value by valuing the IPO stock using direct valuation methods. Standard deviation of daily market index return will also be used between 90 to 95 days and 5 days before the 1st day of IPO. Investors are unknown about the basic value when market is volatile.

3.1.8 Underwriters Repute

Underwriter reputation will be used as a control variable. Underwriter market share will be used as proxy. Underwriter market share will show the percentage of market share.

Model :

$$Mult_i = \beta_0 + \beta_1 \ln size_i + \beta_2 \ln(1 + Age_i) + \beta_3 AIP_i + \beta_4 PROF_i + \beta_5 GROW_i + \beta_6 DIV_i + \beta_7 TECH_i + \beta_8 MRET_i + \beta_9 SD_i + \beta_{10} UREP_i + \epsilon_i$$

MULT_i=1 if underwriter uses Dividend Discount Model (DDM) and 0 otherwise, and so on for DCF, EVA_i, OTH_i separately as well.

Where

<i>LnSIZE</i>	lnsize has calculated through natural logarithm of total asset in the balance sheet of most recent financial year before going public
<i>Ln(1+age)</i>	this has used as ex-ante proxy for risk.
<i>AIP</i>	AIP has calculated through ratio of property plant and equipment and total asset at the end of the year
<i>PROF</i>	PROF has calculated through price earnings multiples.
<i>GROW</i>	calculated through forecasted sales growth
<i>DIV</i>	calculated through dividend paid / total income
<i>TECH</i>	calculated through technology level of companies
<i>MRET</i>	calculated through discounted cash flow method.
<i>SD</i>	calculated through standard deviation of daily market index return.
<i>UREP</i>	calculated through underwriter market share.

4. Results and Analysis

This section will explain the results and analysis of descriptive statistics and regression models through various econometric techniques. E-views and SPSS software has been used to estimate results of these models.

4.1 Descriptive Statistics

This section will elaborate the descriptive statistics of variables used by the Binary Logit model.

Table 1: Descriptive Statistics of Variables used in Binary Logit Model

	Mean	Median	Maximum	Minimum	St. Dev	Observations
SIZE	39,316 ml	2,283 ml	718,943 ml	64 ml	1194 ml	80

	13.0565	6.5000	66.0000	0.5000	15.6453	
AGE						80
AIP	19.9071	20.0686	25.1137	13.0347	2.6609	80
GROW	63.7366	34.8250	640.7800	-90.4300	104.7067	80
PROF	-3.1088	7.3632	347.0000	-638.0000	114.5484	80
DIV	9.4341	0.0000	89.5448	0.0000	21.6585	80
TECH	0.5750	1.0000	1.0000	0.0000	0.4974	80
MRET	-0.0658	-0.0900	0.7300	-0.8000	0.2336	80
SD	1.2475	1.1000	2.9600	0.5900	0.5224	80
UREP	0.3375	0.0000	1.0000	0.0000	0.4758	80

Table 1 elaborates the descriptive statistics of independent variables used in Binary Logit model. The size of the company plays a vital role for any IPO firm's evaluation. Size is measured through net turnover of IPOs firms before going public. The mean value of size is 39,316 million. The value of standard deviation is 1,194 million which represents the more volatility from their mean values. AGE defines that how much older the firm is. We measure company age as the number of years the firm has been in existence prior to its IPO. The mean value of these firms is 13 years. Property plant and equipment are very much important for any firm to get a high returns in the market. The average of AIP (20%) defines that property plant and equipment are twenty percent of the total assets and it also indicates that firms are less capital intensive. The value of SD is 2.6 which represent the consistency of the Pakistani firms with respect to usages of more labor than automation involved in their business operations. Profitability also defines the firm's good position in the market and for dividend distribution of any firm. The results of descriptive statistics show that the profitability of the firms is in negative and few firms announced the dividend. The average 9% of dividend elaborate that few firms announced the dividend. Technology also plays the vital role for the evaluation of any firm. The mean value of technology is 0.57. Most technological firms gain the higher return in the market as compare to the non technological firms. The value of SD is 0.49 which represents the less volatility of values from their mean values. Underwriter's reputation also plays a vital role to get the better returns in the market. The mean value of the UREP is 0.33. The value of standard deviation is 0.47 which shows less volatility from their mean values. The market index return is measured during a 90 trading interval from 95 trading days before and 5 trading days before IPO firms 1st day of trading. The average MRET is -0.06%. The market index volatility is measured as the standard deviation of daily market index return during the same 90 trading days' interval. The average SD equals 1.24.

4.2 Multivariate Regression Models

This section elaborates the regression results of Binary Logit Model by taking different valuation methods as dependent variable such as Dividend Discount Model (DDM), Discounted Cash flow method (DCF), Market/Peers Multiples (MULT), Economic Value Added (EVA) and OTHERS to estimate the final results of this binary logit regression model. E-views and SPSS have been used to estimate the results.

Table 2: BINARY LOGIT MODEL

Dependent Var: Multiples				Dependent Var: DDM			
	Coefficient	t-statistic	Prob		coefficient	t-statistic	prob
C	0.5344	1.2714	0.2079	C	-0.7453	-1.4991	0.1385
SIZE	0.0281	0.6423	0.5228	SIZE	0.0964	** 2.4616	0.0164
AGE_	0.2471	** 2.1509	0.035	AGE_	-0.0617	-1.1211	0.2662
AIP	-0.0065	-0.3205	0.7496	AIP	0.0005	0.0358	0.9715
GROW	-0.0005	-0.914	0.3639	GROW	-0.0001	-0.3123	0.7558

Dependent Var: DCF				Dependent Var: OTHERS			
	Coefficient	t-statistic	Prob		coefficient	t-statistic	prob
PROF	0.0003	0.5854	0.5602	PROF	5.56	0.231	0.818
DIV	0.0002	0.1563	0.8762	DIV	0.0039	*** 2.8793	0.0053
TECH	0.0389	0.4904	0.6254	TECH	-0.0155	-0.2705	0.7875
MRET	-0.0749	-0.3184	0.7511	MRET	-0.1252	-0.7075	0.4817
SD	0.2795	** 2.4644	0.0163	SD	-0.0091	-0.1098	0.9128
UREP	-0.2454	** -2.0173	0.0476	UREP	0.0138	0.1548	0.8774
R-Square	0.2695	DW	1.8657	R-Square	0.211	DW	1.6846
F-Statistics	2.5092	Pro(F-Statistics)	0.0124	F-Statistics	1.8905	Pro(F-Statistics)	0.0736
C	-0.0482	-0.2455	0.8068	C	0.2369	0.5915	0.5561
SIZE	-0.049	** -2.3406	0.0222	SIZE	0.0517	1.2117	0.2298
AGE_	-0.0044	-0.124	0.9016	AGE_	-0.08	-1.0845	0.2819
AIP	0.0065	0.6684	0.5061	AIP	-0.008	-0.403	0.6882
GROW	-0.0002	-1.0655	0.2904	GROW	0.0014	** 2.5598	0.0127
PROF	0.0002	1.3039	0.1967	PROF	-0.0007	** -2.0719	0.0421
DIV	0.0004	0.4555	0.6502	DIV	-0.0009	-0.5137	0.6091
TECH	-0.0188	-0.4947	0.6224	TECH	-0.0864	-1.1103	0.2708
MRET	0.0581	0.5031	0.6165	MRET	-0.2397	-1.017	0.3127
SD	-0.0411	-0.7599	0.4499	SD	0.1428	** 2.2939	0.0201
UREP	0.1262	** 2.1153	0.0381	UREP	0.0935	0.7689	0.4446
R-Square	0.1462	DW	2.1308	R-Square	0.2848	DW	1.7317
F-Statistics	1.6247	Pro(F-Statistics)	0.6687	F-Statistics	2.779	Pro(F-Statistics)	0.0181

Dependent Var: EVA			
	Coefficient	t-statistic	Prob
C	-0.0327	-0.1655	0.8690
SIZE	-0.0070	-0.3384	0.7361
AGE_	-0.0258	-0.4752	0.6362
AIP	5.9900	0.6290	0.5314
GROW	-3.0100	-1.1192	0.2670
PROF	9.1900	0.3684	0.7137
DIV	-0.0007	-0.8140	0.4184
TECH	0.0856	** 2.2658	0.0266
MRET	-0.0398	-0.3526	0.7254
SD	-0.1138	** -2.0692	0.0423
UREP	0.0332	0.7684	0.4449
R-Square	0.1377	DW	1.9151

F-Statistics	1.9863	Pro(F-Statistics)	0.8849
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* Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level

Table 2 represents the results of Binary Logit regression model. When MULT method used as a dependent variable, results reveal that AGE is significant at 5% level as the value of t-statistics is 2.1509. Results depict that underwriters use peer multiples when firms are mature in age. Our results are consistent with Deloof *et al* (2009). SD is also measured as average returns of 60 days before going to formal listing in capital market. It is also significant at 5% level having t-statistic of 2.4644. Underwriters prefer to use multiples valuation method when market sentiments are bullish and stock prices are overvalued. UREP is also significant at 5% level having the t statistics of -2.0173. No literature supports the significance of UREP by using the multiple methods. Deloof *et al* (2009) explained the results by using the multiple method and described that SIZE is significant but our results are not consistent with them as SIZE is insignificant by using the multiple method. Deloof *et al* (2009) described that AIP is significant by using the MULT approach but our results are not consistent with them as AIP is not significant in our study by using the MULT approach. Deloof *et al* (2009) explained that PAYOUTS are significant by using the MULT approach but our results are showing the contradiction with them as PAYOUTS are not significant by using the MULT approach. Lie & Lie (2002) used the MULT method and resulted that MTB is significant but our results show that MTB is not significant by using the MULT method. Keun (2006) explained that TECH is significant by using the MULT approach and in our results it is insignificant.

When we used DDM method as a depended variable, results show SIZE is significant with the t-value of 2.4616 at 5% level. Results urged that underwriters prefer to use Dividend Discount model for big firms in term of total assets. Our results are consistent with Deloof *et al*, (2009). DIV is significant with the t-value of 2.8793 at 1% level. DIV shows the worth of the firms which regularly issue the dividends. No literature support our results at the significance of DIV. Deloof *et al* (2009) used the DDM model and explained that AGE is significant but our results are not consistent with them as AGE is not significant in our study by using the DDM approach. Deloof *et al* (2009) used the DDM model and revealed that AIP, GROW and PAYOUTS are significant but our results are insignificant. Penman (1998) elaborated that MTB is significant by using the DDM approach but our results are insignificant in our study. SD, MRET and UREP are also insignificant in our study.

In our results SIZE and UREP are significant at 5% level with the t-values of -2.3406 and 2.1153 respectively. Yee (2002) used the DCF method for evaluation and resulted that SIZE is significant and our results are also consistent with them. He also explained the results by using the DCF method and revealed that TECH is significant but our results revealed that TECH is insignificant by using the DCF method. Yee (2002) used the DCF method and resulted that UREP is significant and our results are also consistent with them as UREP is significant at 5% level by using the DCF approach. Remaining variables AIP, GROW, DIV, SD, MRET AGE are insignificant in our study by using the DCF approach. It was also found that underwriters use the discounted cash flow analysis when market index returns (MRET) are high. This market condition offer a window of opportunity in which investors want to get the more stocks and willing to get more cash flow and assumptions of discount rate underlying the discounted cash flow method. Table 2 report that the volatility of market index (SD) is negatively related to use of discounted cash flow model. In this situation of the market the investors are uncertain about the basic value. We do not found that underwriter use the discounted cash flow model mostly when value large firms (size), older companies ($\ln(1+\text{age})$) with lower growth rates (Grow).

In our study GROW; SD and PROF are significant at 5% level with the t-values of 2.5598, 2.2939 and -2.0719 respectively by using the OTHERS approach. By grow we mean at what rate the sales are increasing of the firm. No existing literature supports our results. Bancel (2004) described that MTB and Size are significant by using the OTHERS approach. Other variables SIZE, AGE, TECH, SD, MRET, AIP and UREP are insignificant in our study by using the OTHERS approach. In our study the TECH is

significant at 5% level with the t-value of 2.2658 and SD is significant at 5% level with the t-value of -2.0692.

By using the EVA as a dependent variable TECH and SD are significant at 5% level in our study. No literature support our results at the significance of TECH and SD. Yee (2002) used the EVA approach and resulted that AGE is significant but our results are against them as AGE is insignificant. Other variables AGE, AIP.UREP, MRET and PROF are insignificant in our study by using the EVA approach and results are consistent with them.

5. Summary and Conclusion

The literature about the valuation of firms is particularly shorter to about that how underwriters value the shares of those firms which go public. The major purpose of our study is to fill up this gap. We got the valuation report from different underwriters that give us access to make an analysis for the sample of 80 IPOs from the period of 2000-2015. The purpose of our study is to answer the three research questions. (i) How does underwriter lay down the preliminary offer price by using different valuation methods?. (ii) How underwriters check the accuracy and authenticity of the different valuation methods. (iii) Does underwriter meet the ambition of issuer firm to achieve the highest value while ensuring an optimistic start of secondary trading and short run after market performance?

It was documented that underwriters mostly use the multiple valuation method, dividend discount model, discounted cash flow method to value the IPO firms. Economic value added method has less usage by underwriters to value the equity of the IPO firms. Results depict that underwriters use multiple methods for the valuation of older firms when their firms are underwritten by reputed underwriters. Dividend discount model is suitable to value the firms which are highly profitable and firms which regularly issue the large part of their earnings as dividends. Discounted cash flow method is suitable for the large size firms and highly reputable underwriters. Economic valuation method is used by the underwriters to value the firms which are technologically advanced firms and those firms which have the high returns in the market. Others approach is used by the underwriters for those firms which are highly profitable.

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