INFORMATION ASYMMETRY, CORPORATE GOVERNANCE AND IPO UNDER-PRICING

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ABSTRACT: *As Under-pricing negatively influences firm value due to lower than expected IPO proceeds, corporations therefore, try to minimize the negative effect of underpricing on firm value before going public. Existing literature examined the function of corporate governance as a signalling device in reducing the level of underpricing in both developed and developing countries. However, no evidence has been found regarding the moderating effect of corporate governance tools (ownership structure and board composition) on relationship between informational asymmetry and level of underpricing. Current study therefore, by using sample data of 55 IPOs listed on KSE for the period of 2000 to 2011 examined the moderating effect of corporate governance on the relationship of information asymmetry and level of under-pricing. Empirical findings validated that information asymmetry is a significant determinant of level of under-pricing in Pakistan. The findings also reveal that corporate governance particularly institutional investment and CEO duality have an effect on the level of under-pricing and corporate governance adds value to the firm by reducing the level of under-pricing.*

Key words: Information Asymmetry, Corporate Governance, IPO Under-Pricing, Pakistan

INTRODUCTION

It is generally believed that at the time of Initial Public Offering, mostly corporation's face underpricing. Under-pricing refers to the percentage difference between the price at which the IPO shares are offered to investors and the price at which the shares are traded in the stock market afterwards. It is generally accepted that ex-ante uncertainty is at the core of the IPO process. This uncertainty about the firm value displays itself at varying levels leading to under-pricing. Existing empirical literature provides evidence that Initial public offerings exhibit a high level of Under-pricing on the first day of trading on almost every stock exchange of the world. However, the level of Under-pricing varies to a great extent ranging from 3–14% in France to 127–950% in China [1]. As, under-pricing reduces the capital available to firm to finance its projects hence, it is considered as a direct loss to the issuing firm which negatively affects firm value. Financial theorists have suggested different models to explain Under-pricing phenomenon and its resulting impact on firm value- ranging from "Winner's Curse Model" of [2] to Informational asymmetry problem [3].

Under-pricing is very costly to the issuing firm as the firm gets IPO proceeds much lower than the expectations, if the shares were appropriately priced; therefore, firms tend to alleviate the causes of this loss before going public. Certo, et. al. [4] argued that by signalling firm value, informational asymmetry can be reduced among IPO, underwriters and prospective investors. However, existing literature has failed to provide any clear evidence that the usage of different introduction method or underwriter's reputation reduces the level of under-pricing, while it is evident from the literature that the extent of IPO under-pricing can be reduced by signalling better quality of the firm through governance mechanisms [4].

Despite the growing significance of signalling theory, very few studies have examined the role of corporate governance in reducing the level of informational asymmetry at the time of IPOs, however, these studies mainly focussed on the ownership structure and board composition as the major players of corporate governance [4,5,6,7]. Ownership structure signals the growth potential of the firm as high quality firms will have more prestigious investors resulting in higher block holding or concentrated ownership structure. In addition, higher value firms tend to have an independently structured board and this value should be reflected at the time of an IPO in the offering price. Therefore, firms that are appropriately structured should be evaluated more favourably, leading to lower levels of under-pricing [8], and according to signalling theory, if the firm properly signals its quality at the time of initial public offering, the true value of the firm will be reflected in the offer price and there will be no need of price adjustments in the secondary market, leading to a decrease in the level of Under-pricing.

The role of corporate governance in reducing under-pricing has been empirically investigated for both developed and developing countries and results are inconclusive. However, despite the importance of the relationship between corporate governance and underpricing, to the best of author's knowledge the issue has not been empirically validated in case of Pakistan. Therefore, the current study intends to contribute to the existing literature in following ways: Firstly, The effect of information asymmetry on under-pricing is validated by exploring the determinants of under-pricing. Secondly, by investigating the impact of corporate governance mechanisms such as ownership structure and board composition on IPO under-pricing of Pakistani firms. Lastly, study has also investigated the moderating role of corporate governance on the relationship between information asymmetry and level of under-pricing. The findings of the study are expected to help academicians and policy makers, particularly firms that are considering to go public, in identifying how board structure and ownership structure can add value to the firm at the time of IPO.

The remaining study is structured as follows: section II reviews the prior empirical studies focussing on the determinants and the relationship between corporate governance and under-pricing. Section III comprises of research methodology followed by empirical findings and discussion reported in section IV. Last section concludes the study and put forward the limitations and recommendations for future research.

LITERATURE REVIEW

Theories concerning IPO under-pricing proposed that higher ex-ante uncertainty about firm value create information asymmetry problems which ultimately result in an increase in the level of under-pricing [9, 10,11]. A vast body of literature has examined the firm specific and issue specific determinants of under-pricing at country level whereas, there is also a considerable research in recent years focusing on the variation of under-pricing across countries [12,13, 14].

Existing literature has also focused on the role of corporate governance in reducing information asymmetry and ultimately under-pricing in developed as well as developing countries. However, ownership structure and board composition have been the most influential internal governance mechanisms in determining the level of under-pricing. Certo, *et. al.* [4] examined the relationship between board characteristics and IPO under-pricing and concluded that more outside directors or the separate board leadership structure did not play any role in reducing IPO under-pricing however they found a significant negative role between IPO under-pricing and Board size and board reputation and suggested that IPO firms may benefit by forming larger boards and appointing prestigious directors at the time of IPO. Howton, *et. al.* [15] examined the impact of characteristics and ownership of directors on IPO firm value and concluded that share ownership of insiders and the percentage of independent outsiders were directly related to the initial returns while long-run returns were influenced by insider's share ownership. Filatotchev, I., Bishop, K. [5] in their study of 251 UK, IPO firms examined the impact of board characteristics and share ownership on firm's level of IPO under-pricing.and found that high proportion of non-executive directors and the intensity of their extra organizational links reduced the extent of under-pricing of the share issue. Jay, *et. al.* [16] studied role of corporate governance in initial public offerings in 135 Real Estate Investment Trusts (REITs) for the period of 1991 to 1998. The analysis indicated that REITs' governance structures at the time of the IPO are important determinants of their initial value and future operating performance.

Chahine, S. [17] examined the relationship between CEO duality, strategic ownership and IPO under-pricing in 12 Arab countries and concluded that CEO duality increased the level of under-pricing, however, a negative relationship between CEO duality and under-pricing was found in firms with more strategic shareholder ownership. Moreover, negative relationship was expected between under-pricing and strategic block-holding, however, this relationship was strong for foreign strategic ownership. Roosenboom, P., Goot,T. [6] examined the effect of ownership and control mechanism in IPO valuation in Netherlands and concluded that Management stock ownership, the proportion of independent supervisory directors, and board monitoring by large shareholders were positively related to IPO firm value. Lowry, [18] in their study reported that 58% of top executives got stock options at offer price in an IPO but found no evidence regarding the relationship between IPO options to executives and firm's level of under-pricing. Meoli, M. [19] examined the effect of ownership structure on IPO valuation and expected a negative impact of managerial ownership on IPO firm value. Arthurs, J. D., et. al. [7] focused on multiple agency theory for explaining IPO under-pricing and concluded that there is a negative relationship between percentage of inside directors and under-pricing whereas, the presence of Venture Capitalist and their prior ties with underwriters increased the level of IPO under-pricing.

Hearn, Bruace, [20] by using sample data of 37 IPO firm's across West Africa examined the impact of a range of governance attributes on level of under-pricing and found negative impact of retained director ownership on firm value. Whereas, in family owned firm, higher levels of founder ownership reduced level of under-pricing. Reutzel, *et. al.* [21] investigated the impact of directorships of firm top management and external directors on IPO firm value and depicted that directorship in private firms were of less importance for the market whereas the directorships of outside directors in public companies were of high value to IPO equity markets. Williams, *et. al.* [22] examined the impact of various agency and market signals on offer price in high technology firms. The study concluded that certain pre-market signals including Board characteristics and venture capitalist backing, and primary market signals including number and reputation of underwriters affected the offer price of the stock. However, secondary market signals like previous under-pricing in the sector did not affect offer price at the time of IPO. Boulton, *et. al.* [23] examined how country-level differences in governance systems affect the level of under-pricing and IPO firm value by using 4462 IPOs in 29 countries for the period 2000-2004. The findings of the study quite surprisingly provided evidence that under-pricing was higher in countries with stronger governance systems.

A significant determinant of under-pricing is the reputation of the underwriter, which has an impact on investors' perceptions of IPO firm quality. A well reputed underwriter signals that the issue price is an accurate demonstration of all available inside information thus reducing information asymmetry about the firm. Empirical literature, by using different sample data, reported mixed evidence regarding the role of under-writer's reputation in deriving the level of underpricing [24,25,26,27 and 28]. The effect of market conditions on value of newly issued stock can't be ignored. Studies used different proxies like timing of offer, market volatility and market momentum and market sentiment in order to examine the impact of market conditions on firm's level of underpricing [29].

In the context of Pakistan, researchers have examined the short run and long run performance of IPOs listed on KSE [30,31,32 and 33] and determinants of IPOs [34], however, no study has examined the role of corporate governance in deriving firm's level of under-pricing. Current study, by employing sample data of 55 IPOs for the period of 2000-2011, tests the impact of corporate governance mechanisms on firm's level of under-pricing. Moreover, the study contributes to the existing literature by examining the moderating role of corporate governance on the relationship between informational asymmetry and firm's level of under-pricing.

METHODOLOGY

The study attempts to examine the role of corporate governance in reducing information asymmetry about the firm and ultimately under-pricing by using Sample data of 55 IPOs listed on Karachi Stock Exchange for the period of 2000 to 2011 out of which 27 IPOs are taken from the financial sector and the remaining 28 are non-financial sector companies. The methodology comprises of three steps: Firstly, the effect of information asymmetry on under-pricing is validated by exploring determinants of under-pricing. Secondly, the impact of corporate governance mechanisms such as ownership structure (measured in terms of institutional ownership and director ownership and etc.), and board composition (measured in terms of board size, board independence and board diversity) on IPO underpricing is explored. Thirdly, the moderating role of corporate governance on the relationship between information asymmetry and level of under-pricing has been examined.

A variant of [34] is used to explore the determinants of underpricing.

$$UP = \beta_0 + \beta_1 UNCERT + \beta_2 PS + \beta_3 LOS + \beta_4 OSUB + \beta_5 AOF + \beta_6 SOF \text{------}(1)$$

Where,

UP= Under-pricing refers to difference between the offer price of a share and its first day closing price and is calculated as

$$UP = \{ [(1 + R_I) / (1 + R_m)] - 1\} * 100$$

R_I =First day return

R_m = Market return calculated as $M_1 - M_0 / M_0$

M_1 = KSE index at the end of the first day of Trading

M_0 = KSE index on the day of offering.

UNCERT: uncertainty measured as the standard deviation of daily returns of a particular stock over a period of one month from the date of listing.

PS = percentage of shares offered to the general public measured as shares offered/Total post IPO shares* 100

LOS = Offer size measured as natural log of number of shares offered* offering price

OSUB= Over subscription is measured as times the IPO is over subscribed.

AOF= Age of firm is measured as the difference between the date of incorporation and the date at which the company offers share.

SOF= Size of firm is measured by taking the natural log of net assets of the firm.

Secondly, **model 2** investigates the impact of corporate governance such as ownership structure and board composition on IPO under-pricing.

$$UP = \beta_0 + \beta_1 FIN + \beta_2 IND + \beta_3 DIR + \beta_4 BOS + \beta_5 BOI + \beta_6 Duality + \beta_7 Diversity + \beta_8 REPU + \beta_9 SOI + \beta_{10} MS + \varepsilon \text{ ------- } (2)$$

Where,

FIN= Financial Institutional ownership measured as shares owned by financial institutions divided by total post IPO shares.

IND= Industrial ownership measured as shares owned by industrial institutions (including sponsors and pre-IPO investors) divided by total post IPO shares.

DIR= Director Ownership measured as shares owned by outside directors divided by total post IPO shares.

BOS = Board Size measured as number of directors on the board.

BOI = Board Independence is measured as the number of independent directors divided by the total number of board members.

Duality: Dummy value "1" if the positions of CEO and chairman of the board are held by the same individual and "0" otherwise.

Diversity: Diversity is the number of directorships of independent board members in other public limited companies.

REPU: Underwriter reputation is calculated by adding up the frequency of IPOs an underwriter carry out and dividing this by the total number of IPOs taking place in the sample period.

SOI: Size of issue, percentage of shares issued in an IPO

MS: Market sentiment measured as percentage change in stock price from date of provisional listing to the date of formal listing.

Model 3: adds to the existing literature by estimating whether corporate governance mechanisms moderate the relationship between information asymmetry and under-pricing.

$$UP = \beta_0 + \beta_1 FIN*UNCERT + \beta_2 IND*UNCERT + \beta_3 DIR*UNCERT + \beta_4 BOS*sUNCERT + \beta_5 BOI*UNCERT + \beta_6 Duality*UNCERT + \beta_7 Diversity*UNCERT + \varepsilon \text{ ------- } (3)$$

Model 4 is designed to see the impact of issue specific and corporate governance variables on under-pricing

$$UP = \beta_0 + \beta_1 IND*UNCERT + \beta_2 Duality*UNCERT + \beta_3 Diversity*UNCERT + \beta_4 FIN*UNCERT + \beta_5 IND*UNCERT + \beta_6 DIR*UNCERT + \beta_7 SOI*UNCER + \varepsilon \text{ ------- } (4)$$

ESTIMATED RESULTS

The level of under-pricing varies across industries having highest level of underpricing in financial sector for commercial banks 102.79% as these banks had no operational history therefore, uncertainty about their post IPO performance may be high resulting in an increase in the level of under-pricing. Mutual funds report lower level of Under-pricing -2.01% which may be due to the separation of ownership and management, giving investors more confidence about their performance. In the context of non-financial sector, higher under-pricing is depicted in transport 90.98% and chemical & engineering sector 90.79% which implies that under-pricing is higher for high-technology and growth oriented firms.

The correlation between under-pricing and the independent variables, is reported in panel A of table 4.1, which shows that ex-ante uncertainty is positively correlated with the level of under-pricing at 1% significance level, suggesting that level of under-pricing increases with increase in an ex-ante uncertainty about the firm which is aligned with information asymmetry theories of under-pricing. Consistent with the market absorption capacity, level of under-prancing is found to be significantly positively correlated with over subscription. Size of firm and age reveals negative and positive correlation respectively with under-pricing; however, the relationship is not significant suggesting that these variables do not significantly affect the level of under-pricing in Pakistan. The correlations show that uncertainty and over subscription are positively correlated highlighting the presence of uniformed investors in the market who invest irrationally in the firms having more information asymmetry about their share value. Size of firm and age of firm have negative correlation with percentage of shares issued which shows that larger and older firms tend to offer less percentage of shares to the general public which may suggest that these firms tend to retain the present ownership structure. Moreover, size of firm has a strong positive correlation with log of offer size suggesting that larger firms tend to raise more capital in IPO.

The correlations between under-pricing and corporate governance variables in panel B of table 4.3 depict that the level of under-pricing is negatively correlated with CEO duality. The results also reveal that diversity is negatively correlated with level of under-pricing suggesting that firms having more reputed independent directors measured in terms of other directorships tend to have less under-pricing, consistent with [4] and [21]. The results also reveal that institutional ownership is negatively correlated to the level of under-pricing suggesting that more institutional ownership adds value to the firm by reducing under-pricing consistent with the findings of [35]. Reputation of the underwriters is positively correlated to the level of under-pricing, aligned with the findings of [36] and [37], suggesting that underwriters pursue personal benefits by under-pricing new issues. Market sentiment is found to be negatively correlated to the level of under-pricing suggesting that positive sentiments about company's stock decrease the level of under-pricing.

Board size is positively correlated to the level of under-pricing reflecting that larger boards tend to have more outside directors. Board independence and board diversity has a strong positive correlation. This may be due to the fact that the study has taken diversity of only independent directors and an increase in number of independent directors adds to the directorships held by the board, positive correlation between institutional ownership and percentage of independent directors suggests that higher institutional ownership brings better governance mechanisms in the firm. The directors' equity has a negative correlation of board percentage of independent directors and positive correlation with CEO duality consistent with the findings of [9]. Director equity also has negative correlation with both proxies of institutional ownership i.e. financial institutional ownership and industrial ownership. The findings demonstrate that director ownership is related to poor corporate governance as it reduces the level of institutional ownership and board independence confirming that separation of ownership and control add value to the firm.

Table 4.3: Correlation Analysis

Panel A

	UP	UNCER	PS	LOS	OSUB	AOF	SOF
UP	1						
UNCER	.604**	1					
PS	-.083	.195	1				
LOS	-.010	.149	-.230	1			
OSUB	.695**	.422**	-.099	-.021	1		
AOF	.091	-.118	-.265	.045	-.103	1	
SOF	-.049	.030	-.372**	.486**	.007	.231	1

Panel B

	UP	BOS	BOI	Duality	Diversity	FIN	IND	DIR	REPU	SOI	MS
UP	1										
BOS	-.079	1									
BOI	-.192	.327*	1								
Duality	.381**	.028	.125	1							
Diversity	-.415**	.118	.128	-.330*	1						
FIN	-.272*	.252	.455**	.212	.181	1					
IND	-.267*	.083	.091	.082	.171	-.266*	1				
DIR	.427**	-.080	-.492**	.352**	-.147	-.400**	-.310*	1			
REPU	.291*	-.008	.089	.010	-.162	-.161	.074	.125	1		

SOI	-.150	-.306*	-.003	.173	-.010	.044	-.230	-.200	.048	1	
MS	-.327*	-.082	-.224	.091	.061	-.124	.050	-.026	.171	.029	1

***,** and * are significant at 1%, 5% and 10% respectively.

Estimated results of model 1 in column 2 of table 4.2 reports an adjusted R^2 of .641 and F statistics of 16.789, significant at 1%. Uncertainty depicts significant positive impact on underpricing, which confirms the existing literature that higher the presence of information asymmetry the greater the level of under-pricing, consistent [2, 3]. Regarding the other control variables, study identifies significant negative relationship between the percentage of shares offered and under-pricing, consistent with [38 and 12]. Log of offer size reports insignificant negative impact on level of underpricing which is aligned with the findings of [14]. Confirming "absorption capacity of the market" hypothesis. Oversubscription is found to have a significant positive impact on level of underpricing, alingned with [39]. Results demonstrate significant positive relationship between age of firm and under-pricing as mature firms have longer history of operations and more information disclosure hence they are believed to have lower information asymmetry resulting in a decrease in the level of under-pricing. Negative relationship is observed between size of firm and under-pricing at 5% significance level suggesting that larger firms have lower level of under-pricing, consistent with [40].

Table 4.2: Level of Under-pricing and Informational Asymmetry

Dependent Variable (UP)	**Model 1**	**Model 2**	**Model 3 Excluding BOS*UNCER**	**Model 3 Excluding INDP*UNCER**	**Model 4**
(Constant)	280.794*	76.080	-3.362	-3.057	-2.058
UNCER	14.150***				
PS	-1.095**				
LOS	-4.649				
OSUB	8.256***				
AOF	2.025**				
SOF	-21.387**				
BOS		-2.012			
BOS* UNCER				2.460**	
INDP		-33.839			
INDP* UNCER			22.378**		31.486***
Duality		24.855*			
Duality* UNCER				-7.045	-5.234
Diversity		-.424			
Diversity* UNCER			.261	.051	.177
FIN		-.585*			
FIN* UNCER			-.265***	-.230***	-.274***
IND		-1.087***			
IND* UNCER			.193	.039	.196
DIR		-.189			
DIR* UNCER			1.181***	1.047***	1.153***
REPU		26.072***			
SOI		-1.203*			
SOI*UNCER					-.182
MS		-1.176***			
MS* UNCER					-.097
Adj R-sq	.641	.440	.655	.644	.667
Durbin Watson	1.581	1.511	2.087	2.004	2.038
F Statistics	16.789***	5.242***	18.102***	17.040***	14.545***

***,**,* reports 1%, 5% and 10% significance level respectively.

Column 3 of table 4.2 depicts the regression results of model 2, having adjusted R^2 of .44 and model is significant at 1% level. Empirical findings depict that board size is negatively related to the level of under-pricing; however, the relationship is not significant as large board results in a lack of coordination and communication among board members which adversely affect firm value. Independent director has negative effect on under-pricing but this result is not statistically significant, aligned with [41]. Significant positive relationship between duality and under-pricing suggests that firms can reduce the level of under-pricing by better governance through separating the position of CEO and board chair. Significant negative relationship is found between institutional ownership and under-pricing as firms with more institutional investors are valued more favourably and experience lower levels of under-pricing. Results fail to support any significant relationship between director ownership and under-pricing despite the fact that corporate considerations of under-pricing contend that providing a stake in ownership to outside directors increases the incentive of these directors to closely monitor management activities thus reducing under-pricing. Meanwhile, ownership of outside directors is also considered to increase agency costs as directors having higher ownership in the firm and exerting control may pursue personal benefits. Regarding issue specific variables, size of issue and market sentiment document significant negative and positive impact on level of under-pricing. Underwriter reputation shows a significant positive impact on level of under-pricing depicting that irrespective of their reputation, underwriters seek to Under-price new issues for their own benefits though results are consistent with [36] and [37].

Lastly, the study contributes in existing literature by exploring whether corporate governance helps in reducing the level of under-pricing by minimizing informational asymmetry at the time of IPO by testing the moderating role of corporate governance on the relationship between information asymmetry and under-pricing. The moderating effect of corporate governance is examined by using interaction terms between ex-ante uncertainty and all measures of corporate governance. However, the study uses different models to test the relationship because of high multicollinearity among BOS* uncertainty and INDP* uncertainty. The first model includes percentage of independent directors along with other variables excluding board size. The results of the multiple regression analysis performed to investigate this relationship are presented in column 4 and 5 of table 4.2.

Empirical findings show an adjusted R^2 of 65.5 % and F statistics of 18.102, significant at .000 in column 4, signifying that the model used to check the moderating effect of corporate governance has a good fit and the independent variables used in the model explain much of the variance in the level of under-pricing. Board size is excluded from this model due to high Multicollinearity with board independence. The results demonstrate that financial institutions play a highly significant moderating role on the relationship between uncertainty and under-pricing as higher financial institution ownership substantially reduces uncertainty about the firm and ultimately under-pricing. However, the relationship of industrial ownership is positive and statistically insignificant. Director ownership has been proven to positively moderate the relationship between uncertainty and under-pricing because higher director ownership increases uncertainty about the firm and ultimately under-pricing. This result is consistent with the entrenchment hypothesis which implies that directors are believed to be closely monitoring the management activities however, if they have more ownership in the firm, they may pursue private benefits. Howton, Shelly W, and Hearn, Bruace., [41 and 20] also found a positive relationship between director ownership and under-pricing. The relationship of board diversity is positive and insignificant depicting that company has no benefit of board diversity in reducing information asymmetry and under-pricing of IPO firm.

Duality exhibits negative moderating effect on relationship between level of underpricing and informational asymmetry though the results are not significant whereas, board independence reports significant positive moderating impact on level of under-pricing. The results are contrary to the general perception that board independence signal presence of effective control mechanisms and hence increase firm value, supported by a vast body of literature [42,43, 44]. Negative relationship is found between outside dominated board and under-pricing; aligned with [45 and 46]. The findings also support the assumption that insiders have more information about firm resources and they possess a psychological ownership hence, they are more committed, and this loyalty of insiders may serve as an anti agency cost (47 and 7].

The regression model in column 5 of table 4.2 includes the board size variable which was not included in the previous model due to multicollinearity issue. All other results remain same while Board size is found to have a positive moderating effect on the relationship between uncertainty and level of under-pricing which is consistent with the assumption that larger boards are less effective, consistent with [48]. The column 6 of table 4.4 studies the moderating effect of issue-specific variables, size of issue and market sentiment, along with corporate governance measures, on the relationship between uncertainty and level of under-pricing. Empirical findings provide robustness to earlier results while, estimated results regarding issue specific variables report insignificant results.

CONCLUSION

IPO under-pricing is a worldwide phenomenon and earlier studies have documented that its extent varies across countries ranging from 3–14% in France to 127–950% in China. Researchers proposed different theories to explain IPO under-pricing based on information asymmetry, institutional factors, control considerations and behavioral explanations. Current study attempts to test the relationship between informational asymmetry and level of IPO under pricing by using sample data of 55 IPOs listed on Karachi Stock Exchange during the period 2000-2011. The study also examined the role of corporate governance in mitigating the informational asymmetry and ultimately the level of under-pricing. Consistent with the existing literature, Pakistani corporations depict on average 28.03% under pricing, however, the level of under-pricing in Pakistan is lesser than other Asian countries like China, India and Bangladesh.

Empirical findings supported significant positive impact of information asymmetry on the level of under-pricing which implies that the presence of information asymmetry increased the extent of under-pricing in Pakistani corporations. Hence, in order to signal firm value at the time of IPOs, corporations should use corporate governance mechanisms as supported by the current study. The findings regarding the role of corporate governance in deriving firm's level of under-pricing demonstrate that an independent board plays an important role in signaling firm value and reduces IPO under-pricing which results in a decrease of agency problems, ensures effective monitoring, averts the possibility for senior managers to seek opportunism and behave in a way that adversely affect interests of shareholders. In addition, dual leadership structure helps in diluting the unregulated power and plays an important role in signaling firm value and reduces IPO under-pricing. Significant negative relationship between institutional ownership and level of under-pricing implies that higher institutional ownership ensures effective monitoring in Pakistani corporations and enhances firm value as institutional investors have resources and expertise therefore, they can prevent managerial opportunism and suboptimal decision making. Hence, in order to increase investor's confidence and ultimately firm value, Pakistani corporations should increase more institutional investment in order to signal firm value.

The results do not provide any clear evidence regarding the relationship between board size and level of under-pricing which might be because the benefits of a large board, providing more expertise and resources, are offset by the detrimental effect of lack of coordination and communication among board members. The results also reveal that independent directors have negative effect on under-pricing. A possible reason for this insignificant relationship is biased proxy since present study has considered those directors to be independent which are non-executive and do not hold substantial number of shares, whereas a better proxy of board independence is the percentage of directors who do not have any personal or professional affiliation with the company, which could not be measured due to data unavailability.

The study contributed to the existing literature by exploring the moderating role of corporate governance on the relationship between information asymmetry and under-pricing. Empirical findings imply that board independence ensures underwriters' belief that directors having more familiarity about the firm's operations can better serve a growth-oriented IPO firm as compared to outside directors. The significant positive effect of insider's ownership on the relationship between informational asymmetry and level of underpricing implies that more is the insider's ownership the more they have information about firm resources and therefore, they possess a psychological ownership towards the firm which motivates commitment and loyalty, which ultimately serves as an anti agency cost [47]. Thus, higher percentage of insiders may be more beneficial for firm at the time of IPO. Significant positive moderating effect of larger board at the time of IPO implies that in Pakistani corporations larger boards have a detrimental effect on the monitoring mechanisms due to lack of coordination and poor decision making process, which ultimately increases the level of informational asymmetry and therefore, increases firm's level of underpricing. The positive moderating role of directors' equity is aligned with entrenchment hypothesis and signals that directors being the controllers of management activities and having more ownership in the firm may pursue personal benefits hence increasing information asymmetry about the firm.

Current study focused only on information asymmetry theories of under-pricing however, future research could be undertaken on testing the institutional, control and behavioural approaches of under-pricing phenomena in Pakistan. The study has provided evidence of a positive relationship between underwriter reputation and under-pricing one can investigate which underwriters' attributes significantly influence the level of underpricing in Pakistan. Lastly, study examined ownership structure and board composition as corporate governance mechanisms, future research can explore other corporate governance tools like auditor quality, executive compensations for better understanding the role of corporate governance as a signal firm value at the time of IPO in developing courtiers like Pakistan.

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