

TEST OF OWNERSHIP DISPERSION THEORY AS EXPLANATION OF UNDERPRICING OF NEW ISSUES IN PAKISTAN

Attiya Yasmin Javid, Malik Muhammad Shehryar and Shakeel Shahzad¹

Abstract

The present study investigates the underpricing phenomenon by testing ownership dispersion hypothesis for 72 Initial Public Offerings (IPOs) issued at Karachi Stock Exchange (KSE) from 2000 to 2015. This hypothesis postulates that firms underprice new issues to achieve oversubscription and broad shareholders base to create more liquid secondary market. The empirical results of this study confirm these arguments that firms/issuers underprice new issues to create a large set of small shareholders. The greater number of shareholders increases market liquidity and reduces risk of existing owners. The underpricing induces oversubscription creating demand for new shares that causes secondary market liquidity as shown by using different proxies of ownership and liquidity. The empirical evidence proves that ownership dispersion hypothesis is a valid explanation of underpricing IPOs in Pakistan. This allows dispersed ownership structure and higher aftermarket liquidity.

Keywords: Initial public offerings, underpricing, ownership structure, after market liquidity.

JEL Classification: G3, G12, G24

1. INTRODUCTION

One of the major motives of a firm is to achieve secondary market liquidity. As through initial public offerings (IPOs) ownership expands, number of owners increases to raise capital for investment opportunity, so liquidity also increases. Liquidity is reckoned to be one of the main objectives of any IPO (Booth and Chua (1996) and Phem *et.al.* (2003) as the future stock offerings of liquid shareholdings are low (Ibbotson and Ritter, 1995), liquidity maximizes the firm value, benefits to stakeholders (Amihud and Mandelson, 1986) and liquidity may reduce hostile takeovers (Shleifer and Vishny, 1986). The oversubscription creates dispersed ownership structure which in turn increases aftermarket liquidity (Booth and Chua, 1996).

On the other hand, there are some firms that may purposely chose concentrated ownership that reduces liquidity, but agency costs are also minimized due to increase in monitoring firms' activities (Jenson and Meckling, 1976). The firms incur information cost to attain liquidity that create dispersed ownership base. The small

¹ Authors are respectively Professor of Economics, MPhil Scholar in Department of Economics and Finance and PhD scholar in Department of Econometrics and Statistics at Pakistan Institute of Development Economics. (email of corresponding author: attiyajavid@pide.org.pk)

investors need to be compensated to increase their participation. In the model of ownership dispersion hypothesis, they are rewarded in form of initial returns (underpricing) to compensate for their information costs. The firms' new offerings have different objectives, some firms may prefer after market liquidity through ownership dispersion other may require concentrated ownership structure to minimize agency cost problem.

This motivates to undertake the current study to test ownership dispersion hypothesis of Booth and Chua (1996) for Pakistani IPOs. This study adds to existing literature by exploring whether liquidity can be acquired by underpricing directly through oversubscription that is increased demand causes secondary market liquidity as shown by Scultz and Zaman (1994) as well as indirectly through ownership dispersion that is large number of shareholders increase liquidity as examined by Phem *et.al.* (2003). This relationship is also confirmed by theories of trading liquidity by Amihud and Mandelson (1986) and Rock (1986) "winners curse" hypothesis. These theories assist to explain after market liquidity through ownership dispersion hypothesis from IPOs. Underpricing determines breadth of shareholding base and equality of shareholder distribution that creates aftermarket liquidity. There is only couple of studies in Pakistan by Sohail and Nasr (2007), Javid and Malik (2016) and Malik *et al.* (2017) on short-run and long-run performance of IPOs listed in KSE. There is a vast gap of research to be done in this area. The present study fills this gap by explaining the underpricing phenomenon in the light of ownership dispersion theory for Pakistani IPOs.

There are special features of Pakistani IPOs that makes it interesting sample for study. The IPOs has started² just after the inception of Karachi Stock Exchange (KSE) in 1948³. The political, instability, law and order disturbances and nationalization process cause the slow growth in issuance of IPO from 1953 to 1990. The result of liberalization in 1991 and privatization process is that the IPOs increases on average as per year 35 offerings are issued at KSE till 1999. However, privatization has shown mixed results, so IPOs become low as there are only 90 IPOs up to March 2015. However, the incumbent government is taking interest in privatization to improve capital market. The IPOs listed at KSE is selected to explain underpricing anomaly. Karachi stock market is oldest and most active market of Pakistan Stock Exchange (PSX) and it is classified as major market by Bloomberg (2015)⁴ and declared as fifth best market in the world ranking. This justifies targeting KSE IPOs as sample for explaining underpricing anomaly.

²Karachi Electric Supply Corporation was the first company which got listed at KSE on April 2, 1949.

³Later in January 11, 2016 Pakistan Stock Exchange (PSX) was established by the merger of three stock exchanges, Karachi Stock Exchange established in 1948, Lahore Stock Exchange in 1970 and Islamabad Stock Exchange in 1992.

⁴<https://www.bloomberg.com/quote/kse100>

The main objective of the study is to explain underpricing phenomenon for IPOs issued at KSE. More specifically this study assesses underpricing level for IPOs listed at KSE. The study examines how underpricing affect breadth and equality of share ownership and how in turn shareholder distribution effect liquidity in secondary market. The direct effect of underpricing on market liquidity is also investigated.

The remainder of the study is organized as follow. The review of the theoretical and empirical literature on this issue is presented in second section. Third section discusses the theoretical framework, empirical model, variables construction, data and data sources. The empirical results are discussed in fourth section and the last section concludes the study.

2. LITERATURE REVIEW

The debate on initial public offering is still continued as there are several puzzles which are not yet solved by researchers. One of the puzzles is ‘underpricing’ anomaly, the relevant empirical literature is briefly reviewed on underpricing anomaly and its impact on shareholding base and after market liquidity.⁵

Booth and Chua (1996) find that due to underpricing shareholding base increases that creates more trading turnover in secondary market. This reduces the returns required by investors and increase price of new shares. Bernnan and Franks (1997) document that underpriced firms have oversubscription that enables them to discriminate larger bidder to control block holdings for IPOs of London Stock Exchange. This finding confirms that the firm is extending towards separating ownership from control. In analyzing after market stabilization by underwriters for the initial three days from the issue Scultz and Zaman (1994) find that underwriters sustain this by purchasing and creating decrease supply of shares for hot and cold issues that increases share price from offer price.

The association among ownership structure and underpricing is also empirically examined by several studies. For Indian Stock Market Bansal and Khanna (2012) document that underpricing has positively associated for non-promoter institutional investors and negative promoter institutional investors. Stoughton and Zechner (1998) come up with a counter argument in favor of larger shareholder by finding that underpricing needs to be higher for firms with high benefit to cost ratios, firms that monitor/control and firms with more small investors. The evaluation of different methods of sale of IPOs Mello and Parsons (1998) find that exiting methods do not appear optimal. They suggest that to create a more aftermarket liquidity and maximize shareholders wealth firms must discriminate inactive shareholders such as block holders.

⁵Long run underperformance and hot and cold issue cycle of IPOs are the other puzzles identified by Ibbotson and Jaffe (1975).

For relation between ownership structure and liquidity Bolton and Thadden (1998) concludes that ownership having small blocks can be considered as optimal instead of full dispersion in this structure as it deals with free rider problem. Chen and Strange (2004) observe that underpricing is inversely related with larger shareholdings and conclude that larger shareholder increase their control to have private benefits by lower underpricing. Heflin and Shaw (2000) document that concentration of ownership decrease liquidity of the firm's stock though it minimizes agency costs. Booth and Chua (1996) argument of ownership dispersion hypothesis is that firms aim to achieve broad shareholders base is to create liquid secondary market. Plem *et.al.* (2003) and Bansal and Khanna (2012) find empirical validity of this hypothesis.

The empirical literature confirms that underpricing directly impacts the aftermarket liquidity. Jacoby and Zheng (2010) have documented that ownership dispersion improves market liquidity for firms. Some studies reveal underpricing is a reward to coup up aftermarket liquidity as it allows to increase (Ellul and Pugano, 2006). They state that expectations of aftermarket illiquidity will lead to large underpricing of new shares. Brennan and Subrahmanyam (1996) observe that total return carries premium for the illiquidity both fix and variable segment of transaction cost. This premium variable cost function is U shaped and premium fixed cost is inverse U shape. There is extra risk premium for inverse price factor. Aggarwal, *et.al.* (1993) explanation is that managers deliberately underprice IPOs to create information production flow that pushes investors buying the stocks, therefore as lock-up expiration reach managers off load stocks at upper price. Thus the higher managerial ownership increases underpricing.

In case of Pakistan only a couple of studies are done on underpricing and long run underperformance (Sohail and Nasr, 2007, Javid and Malik, 2016 and Malik *et al.*, 2017). The above discussion identifies that the explanation of underpricing and related anomalies is less seriously addressed. It would be interesting to check the validity of ownership dispersion hypothesis by investigating relationship between underpricing, ownership dispersion and aftermarket liquidity for Pakistani IPOs.

3. METHODOLOGY AND DATA

3.1. Ownership Dispersion: Theoretical Model

The theoretical framework developed by Booth and Chua (1996) is adopted in this study. The firm demand for defused ownership effects IPO underpricing by including information production and information cost. The present study examines the impact of underpricing on ownership structure, then ownership structure causing aftermarket liquidity and thereafter underpricing effects liquidity.

3.2. Modeling Ownership Structure and Underpricing

The assumptions include, stocks are offered by firms' commitment contract to extend capital for growth. The investor and investment banker have ex-ante symmetric information; however, noise remains, and estimates are not perfect. The firm

commitment contract and hiring of prestigious underwriter for capital issue creates common-value information for new shares. After series of deliberations underwriter calculates reasonable estimates for price and come up with an offer price in preliminary prospectus. Thereafter, marketing begins by investment banker that inspires potential investors to undertake investigation cost.

Consider, for a new share a , an investor x , incur cost CI_a , gets close calculation of the market price of the stock. The decision to bid or not depends on investors comparison of their estimates with the offer price OF . The potential investor base consists of those perspective investors that undertake information costs (Merton, 1987). Informed investors have more chance to take part in aftermarket trading and in future offering of the firms. A large shareholding base ensures aftermarket liquidity as preferred also by listing requirement of KSE. The uninformed investors may not participate in bidding for the shares as consequence of adverse selection.

Both firm/issuer and investment banker persuade many investors to undertake information cost. This production of sufficient information creates oversubscription. Therefore, issuer is able to obtain diffused shareholdings and equality in distribution to get more aftermarket liquidity. The assumption here is as potential investors increase information cost also increases. As a result the first and second derivative of information cost with respect to number of investors greater than zero.

$$\frac{\partial CI(i)}{\partial i} > 0 \Leftrightarrow \partial CI^2(i)/\partial i^2 > 0.$$

For simplicity to understand the benefits of oversubscription the shareholding base of one investor is assumed here. Participation in bidding will come from all potential investor with same likeliness of allocation, but only one will win and get the shares. Therefore, final offer price OF is maximized such that investors meet information cost.

$$OF = EV(i^*) - CI(i^*) \quad (1)$$

Where $EV(i^*)$ is value at maximum oversubscription calculated by investment banker, $CI(i^*)$ is total information cost and i^* is maximum number of investor that buy information. The $EV(i)$ is convex function and $CI(i)$ is concave function. Therefore, in equilibrium the estimated value and offer price depends on maximum proceeds given the set of informed investors.

$$[EV(i^*) - OF] - CI(i^*) = 0 \quad (2)$$

As shown by the above equation that underpricing/initial returns equals the information costs. The informed investors only bid if expected profits by win equates the total information cost of all participants.

The larger the investors that buy information the more is sum of information costs and likewise more estimated value. Therefore, in equation (1) offer price OF depends on the change in $CI(i)$ and $EV(i)$ written as:

$$\frac{\partial OF}{\partial i} = \frac{\partial EV(i)}{\partial i} - \frac{\partial CI(i)}{\partial i} \quad (3)$$

If $\frac{\partial EV(i)}{\partial i} > \frac{\partial CI(i)}{\partial i}$

Thus the higher initial returns/underpricing will be when market price will increase after the new shares.

$$\frac{\partial OF}{\partial i} > 0$$

In this case the reason of underpricing becomes oversubscription because the rate of change in $EV(i)$ is greater than rate of change in $CI(i)$. Conversely, when this change in information cost is greater than the change in expected value then investors have negative returns, undersubscription of shares and outcome is overpricing.

At equilibrium offer price is at optimum level and investment banker achieves a level of oversubscription at which expected value of benefits become equal to information costs of an extra investor. Thus i^* is equilibrium level of informed investor where issuer optimizes its revenue assuming investors to recover information costs by initial underpricing that is when $\frac{\partial EV(i^*)}{\partial i} = \frac{\partial CI(i^*)}{\partial i}$.

Modeling Ownership Structure and Liquidity

The existence of continual trading is called liquidity that is possible if number of shareholders match opportunity of trading (Demsetz and Lehn, 1985). Holmstrom and Tirole (1993) consider small shareholders as liquidity trader. The increase in dispersed ownership base increases liquidity because asymmetric information has not much impact. This also reduces probability of adverse selection costs called winners curse and enhance aftermarket liquidity. The dispersion of ownership increases agency cost as with large shareholders it is difficult and costly to gather company information and control managers from activities of their interests and opposite is case with concentrated ownership (Jensen and Meckling (1976) and Vishny and Shleifer (1986). Holmstrom and Tirole (1993) counter argue that in diffused ownership some speculators might collect information in expectation of future profits. Therefore, there will be still private information in market from unbiased sources. Agency cost and governance problems can be improved through incentive schemes for managers.

The present study focuses on that underpricing is reward to uninformed investors to attain dispersed ownership as a consequence aftermarket liquidity also increases. To boost aftermarket liquidity different stock markets have different requirements for listing such as in KSE where smaller bidders will be preferred for allotment. It is expected that the ownership dispersion theory is valid if initial returns/underpricing) is positively associated with dispersed ownership. In turn the dispersed ownership is positively associated with aftermarket liquidity. The aftermarket liquidity is also directly positively associated with underpricing.

Empirical Specification of the Model

The analysis begins with examining the firm/issue specific factors that affects its decision to underprice the new shares or not. Following Phem *et.al.* (2003) the model is specified in equation (4) as:

$$MAR_i = \alpha + \beta_1 IS_i + \beta_2 MB_i + \beta_3 Rk_i + \beta_4 D_i + \beta_5 Int_i + \beta_6 Sub_i + \beta_7 RR_i + \beta_8 FS_i + \beta_9 F + \varepsilon_i \quad (4)$$

Where MAR_i is market adjusted abnormal returns of issue i for first trading day that captures underpricing decision of an IPO and it take value 1 if issue is underpriced takes value 0 if it is fair/overpriced. The set of two variables are control variables to capture pre-bid information costs includes: issue size (IS) measured as natural log of market capitalization after listing and intensity (Int) is number of IPO in three months immediately after IPO (Booth and Chua, 1996). The other explanatory variable are market to book value (MB) measures growth potential (Booth and Chua, 1996), debt (D) captures agency cost as higher agency costs are associated with higher leverage (Jenson and Meckling, 1976). The level of risk (Rk) effects underpricing calculated as standard deviation of daily share returns during first trading month (Leahy and Leach, 1991). The subscription (Sub) captures demand of the issue. Higher the demand higher will be the level of underpricing (Phem *et.al.*, 2003). The retained ratio (RR) is defined as proportion of shares retained by the original investors (Booth & Chua (1996). The F is a dummy variable which takes value of 1 if issue is of a financial institution and financial service provider and zero otherwise. The binary dependent variable suggests that Probit and Logit model both are suitable for estimation (Phem *et.al.* 2003). However, Wooldrige (2002) argues that in presence of heteroskedasticity and non-normality the Probit estimates are inconsistent. Therefore, Logit model is used for estimation.

According to the dispersed ownership hypothesis if the demand for an issue is higher the more are the prospects for firm/issuer to attain dispersed ownership as suggested by Booth and Chua (1996). This hypothesis is verified by estimating the relationship between different proxies of ownership and underpricing along with a set of firm specific variables as suggested by Phem *et.al.* (2003):

$$OS_i = \alpha + \beta_1 MAR_i + \beta_2 RR_i + \beta_3 Rk_i + \beta_4 FS + \beta_5 MB_i + \beta_6 D_i + \beta_7 F_i + \varepsilon_i \quad (5)$$

The ownership structure (OS) is captured by: Herfindahl index (HHI), block of shareholders proportion ($BLOCK$), Top 20 investors in IPO ($T20$), large investors holding more than 100,000 shares ($LARGE$) to take account into concentrated/inequality of ownership and breadth of shareholder base ($BREADTH$) for dispersed ownership. On the right-side variables are underpricing (MAR), retain ratio (RR), risk (Rk), firm size (FS), market to book ratio (MB), debt (D) and financial

dummy (F). This model is estimated by taking each ownership category one by one, the right-hand side variables remains the same as in equation (4) by applying OLS.⁶

The ownership dispersion theory postulates that liquidity is positively related to breadth of ownership structure and negatively related to concentrated ownership. This hypothesis is tested by regressing liquidity against each proxy of ownership structure and other explanatory variable. There is evidence that firm size (Roll, 1981) and trading volatility (Stoll, 1978) have impact on liquidity, therefore, these variables are included for analysis. The shares retained by the issuers (RR) is used as control variable as they are not allowed to trade in initial period (Lee *et al.* 1996). The trading turnover (TT) as proxy of liquidity is regressed on different proxies of ownership one by one. The other variables remain the same as defined in equation (4) and following liquidity model is estimated (Phem *et.al.*, 2003).

$$TT_i = \alpha + \beta_1 OS_i + \beta_2 Rk_i + \beta_3 FS_i + \beta_4 RR_i + \varepsilon_i \quad (6)$$

While using bid-ask (BAS) as liquidity measure the inverse stock price ($Invp$) is used as control variable because spreads also covers for transaction costs such as dealers' processing cost Stoll (1978). The other variables remain the same as discussed in equation (4) and for bid-ask as liquidity the model becomes:

$$BAS_i = \alpha + \beta_1 OS_i + \beta_2 Rk_i + \beta_3 FS_i + \beta_4 Invp_i + \varepsilon_i \quad (7)$$

Finally, the study examines that liquidity is achieved directly by underpricing. If the results support that underpricing leads to disperse ownership and in turn dispersed ownership generate aftermarket liquidity. Then this confirms direct relationship between liquidity and underpricing. To investigate this relationship a liquidity model is estimated by taking underpricing and other explanatory variables on right hand side. For bid-ask spread as the model takes following form (Phem *et.al.*, 2003):

$$BAS_i = \alpha + \beta_1 MAR_i + \beta_2 Rk_i + \beta_3 IS_i + \beta_4 RR_i + \beta_5 Invprice_i + \varepsilon_i \quad (8)$$

For trading turnover as liquidity variable, the model takes following specification:

$$TT_i = \alpha + \beta_1 MAR_i + \beta_2 Rk_i + \beta_3 IS_i + \beta_4 RR_i + \beta_5 BAS_i + \varepsilon_i \quad (9)$$

The variables used in the study are constructed as follows:

⁶The Instrumental Variable technique like 2SLS is more suitable but due to non-availability of data on instruments OLS is applied.

Table 1. Construction of Variables

Variable Name	Dependent Variables Definition
Underpricing (MAR)	Underpricing is Market Adjusted initial returns (MAR) on first day of the issue and natural logarithm of MAR is used to deal non-normality (Dewenter and Malatesta (1997)) $MAR_i = Ln(P_{i1}/OP) - Ln(M_{i1}/M_{i0})$ MAR _i =Market Adjusted Returns, P _{i1} =price at the end of first trading day, OP=offer price of the issue, M _{i1} =closing price of market index (KSE 100) on ith issue date, M _{i0} =Opening price of market index.
Breadth of Ownership (Breadth)	Breadth of ownership is ratio of total number of shareholders to total amount of shares offered in an IPO (Phem <i>et. al.</i> , 2003). $Breadth = TNSH/TotCap$ TNSH = total number of shareholders of an IPO and Tot Cap = dollar amount of shares issued.
Large shareholders (concentrated Ownership structure) (Large)	Large shareholders having more than 100000 shares (Brenan and Franks, 1997) $LARGE = (\sum_{k=1}^n TopCategory - Retain_i)/OfferSize$ Retain _i =number of shares kept by original owners of firm i. Offer size = total number of shares issued by firm. Top category shows investors holding 100000 or more shares and n is total number of those shareholders.
Block holders (concentrated Ownership structure) (Block)	Block holders are the investor holding more than 5 % of issued equity (Brenan and Franks, 1997)calculated as: $BLOCK = (\sum_{k=1}^m BlockSize - Retain)/OfferSize$ The variables are same as used for <i>Large</i> .
Top Twenty (concentrated Ownership structure) (T20)	To check inequality of ownership distribution measure percentage of shares held by top 20 investors (Phem <i>et.al.</i> ,2003). $Top20 = (\sum_{k=1}^{20} Top20Shareholders - Retain) / OfferSize$ The variables are same as used for <i>Large</i> .
Herfindhal Hirschmann Index (HHI) (concentrated Ownership structure)	Herfindhal-Hirschmann Index is calculated summing squared shareholdings of five largest shareholders (Pham <i>et.al.</i> , 2003): $HERF = \sum_{i=1}^5 s^2_i$ HERF _i is the part that belong to the i th largest shareholder (i=1, 2,..5). Range of HHI is from close to zero to 10,000, as close to 0 means low concentration while close to 10,000 depicts high level of concentration. To deal with non-normality this study uses square root of index.

Continued on next page

(continued) Table 1. Construction of Variables

Variable Name	Dependent Variables Definition
Trading Turnover (<i>TT</i>) (Liquidity)	<p>Trading turnover is calculated up to six months after first listing date. This study has excluded first four days because there is huge trading turnover in first four days compared to remaining days of month. Trading turnover is calculated through scaling trading volume of firms followed by Phem <i>et.al.</i> (2003),</p> $Turnover = \sum_{t=5}^{180} Volume / (180 * IssuedCapital)$ <p>Here t is number of days. Volume is number of shares traded per day and issued capital dollar amount of issued capital. This study also calculated first day trading turnover of firms going public.</p> $FTR = Volume / IssuedCapital$ <p>Volume shows first day trading of that stock.</p>
Bid-Ask Spread (<i>BAS</i>) (Liquidity)	<p>Bid-Ask Spread <i>BAS</i> (average) is calculated from daily closing bid and ask quotes following Heflin and Shaw (2000),</p> $BID-ASK = 1/240 \sum_{t=5}^{240} (ASK_t - BID_t) / (ASK_t + BID_t) / 2$ <p>ASK=high price of a stock on specific day, BID=lowest price of stock on specific day, Time horizon is same for bid-ask as for trading turnover.</p>
Independent Variables	
Firm Size (<i>FS</i>)	Firm Size may indicate firm quality or decrease information uncertainty Booth & Chua (1996) and measured as natural log of total assets of issue at the end of twelve months period closest to time of listing.
Issue Size (<i>IS</i>)	Issue Size is magnitude of IPOs is measured by taking natural log of market capitalization after listing where market capitalization is calculated by multiplying the number of stock issues with their offer price.(Booth & Chua, 1996; Phem <i>et.al.</i> , 2003)
Offer Price (<i>OP</i>):	Offer price is the price fixed by the issuer/underwriter measured as natural logarithmic form is used in analysis (Beatty and Ritter, 1986).
Market-to-Book Ratio (<i>MB</i>)	log of market-to-book ratio as a proxy of growth (Gompers, 1995)
Debt	Debt is used to capture agency cost and measured as total debt by total assets (Phem <i>et.al.</i> , 2003; Booth and Chua, 1996).
Intensity (<i>Int</i>)	Intensity shows number of issues in a period before and after 3 months of an issue. It depicts production information proxy higher the intensity higher will be the information production and lower will be underpricing (Booth and Chua, 1996).

Continued on next page

(continued) Table 1. Construction of Variables

Variable Name	Independent Variables Definition
Subscription (<i>Sub</i>)	Subscription shows that how many times an issue is subscribed. Such that if an issue is of 10 million shares and it has been subscribed (bid) by 20 million then the issue will be 2 times subscribed. So time subscribed is used as a proxy of demand of the issue. Higher the demand higher will be the level of underpricing (Phem <i>et.al.</i> , 2003)
Retain (<i>RR</i>)	Retain is defined as proportion of shares retained by the original investors (Booth & Chua (1996), Phem <i>et.al.</i> (2003).
Risk (<i>Rk</i>)	Proxy for the risk in this study is the price volatility measured as standard deviation of price for first month after listing. High risk firms need to underprice more to have a successful issue (Mac Guinness, 1992)
Inverse Price (<i>Invp</i>)	Inverse price is used as transaction cost which can affect bid-ask spread. This study uses this for analysis of bid-ask spread following Stoll (1978).

3.4. Data.

The sample size of this study is based on 72 IPOs listed on KSE from March 2000 to July 2015. Data related to firm's characteristics such as firm size, market to book value, ownership structure are obtained from annual reports and prospectuses. Information about issued firms, their listing dates, offered capital, subscription ratio is taken from Capital Issuing department of Securities and Exchange Commission of Pakistan (SECP). While data of daily opening-closing stock prices and KSE index are obtained from KSE website and Business Recorder website. For analysis the fixed price offers are used and book-building offers are not considered. The non-availability of data limit the sample to 72 IPOs.

4. EMPIRICAL RESULTS AND DISCUSSION

The analysis begins with descriptive statistics of the data in section 4.1. Then the regression results are presented and discussed in section 4.2.

4.1. Summary Statistics.

Summary statistics reported in the Table 2 show that on average IPOs at KSE are underpriced up to 23% calculated by Market adjusted returns that is level of initial underpricing or initial abnormal returns. The ownership structure is calculated by breadth measuring the shareholding base also called dispersed ownership. The equality of the shareholder base also known as concentrated ownership is measured by different proxies. The result of mean breadth reveals that on average there are 92 shareholders of every one million shares issued in KSE. Among concentrated owners the investors having more 100000 shares called Large shareholders, hold almost 56% of the shares. The block holders (having more than 5% of the shares) are allocated about 31% of shares. The Herfindahl Index captures the concentration of ownership to top 5 shareholders it is almost 20 % revealed by this data. For liquidity is measured by turnover and bid-ask spread. The data shows that there is nearly 11 % trading

turnover for first day of trading and on average there is almost 4% turnover per day up to sixth months of trading. Average bid-ask spread from day 5 to day 180 is close to 4%.

Table 2. Summary Statistics of the Data

Variable	Mean	Median	St Dev	Min	Max	Skewness
Market adjusted returns (%)	23.3	8.9	43.37	-98.10	142.4	1.19
Breadth	91.7	33.0	155.08	8.59	731.25	1.94
Large (%)	55.8	62.0	30.78	0	99.34	-0.266
Block (%)	29.7	19.2	33.33	0	98.00	0.64
Herfindahl index (%)	18.0	12.5	16.5	0.4	64.6	1.082
Retention Ratio (%)	78.8	79.6	15.1	16.7	98.9	-1.16
First day Trading Turnover (%)	10.7	4.1	14.54	0.003	65.19	1.998
Trading Turnover (%)	3.6	1.3	5.2	0.002	26.16	1.53
Bid-Ask Spread (%)	3.8	3.7	4.72	0.074	26.67	1.841

4.2. Regression Results

First this study examines the firm specific factors that derive the firm/issuer's decision to underprice the issue or not. Therefore, the dependent variable is to underprice or not to underprice, which is converted in to binary variable take value 1 if underpriced and zero if fair/overpriced. This first day market adjusted initial returns (underpricing) is regressed on set of variables: risk, market to book value, issue size, firm size, debt, subscription, retention ratio, intensity and dummy for financial firms following Phem *et.al.* (2003). The Logit model is used for estimation and results are reported in Table 3.

Table 3. Results of Factors Affecting of Underpricing

Variable	Coefficient	t-Statistics	p-value
Risk	1.99***	2.20	0.028
Market to Book	-1.511**	-1.84	0.066
Issue Size	0.731	0.89	0.375
Debt	3.517	1.02	0.306
Subscription	1.372**	1.9	0.057
Retention Ratio	-6.313	-1.07	0.283
Firm Size	-0.648**	-1.80	0.07
Intensity	-0.909**	-1.70	0.089
Dummy for Fin	-2.195	-1.19	0.233
Constant	1.02	0.20	0.84
Pseudo R ²	0.55		

Note: The Logit model is used for estimation. The ***, ** and * are significance at 1%, 5% and 10% respectively.

The firms with higher growth opportunities are less likely to underprice their issue and this result is confirmed by Gompers (1995). The oversubscription is more likely

to underprice as advocated by Rock (1986). He argues that underpriced issue is subscribed by both informed as well as uninformed investors that results in oversubscription. The large size firms are less likely to underprice also supported by Frinkle (1998) and Booth and Chua (1996). This is because firms having more assets are less uncertain for potential investors. They enjoy economies of scale and easy access to credit. The intensity is less likely to be underpriced and this result is in line with Booth and Chua (1996). This is due to the reason that IPOs issued three months before and after a specific issue reduce information costs for investors. These results in nut shell suggest that firm characteristics are main drivers in a decision to underprice an issue.

To test the hypothesis that underpricing effects on ownership structure the equation (5) is estimated results are reported in Table 4. For ownership this study uses breadth for shareholder base to measure dispersion of ownership and square root transformation of the Herfindahl index, Block, Large and T20 for the concentration of ownership (Phem *et.al.*, 2003). The explanatory variables are underpricing firm size, retained ratio and market to book ratio. The results are reported in Table 4.

Table 4. Results of the Effect of Underpricing on Ownership Structure

	Breadth	HERF	Block	Large	T20
Underpricing (Market Adjusted returns)	1.122*** (0.03)	-0.11 *** (0.05)	-0.072*** (0-05)	-0.027** (0.08)	-0.070*** (0.05)
Firm Size	0.142** (0.08)	0.042*** (0.03)	0.011** (0.05)	0.006* (0.09)	0.024* (0.08)
Retention Ratio	-0.365*** (0.05)	-0.282** (0.08)	-0.478** (0.08)	-0.285*** (0.03)	-0.623*** (0.04)
Market to B00k Value	-0.034 (0.80)	-0.028 (0.11)	-0.003* (0.09)	-0.01** (0.09)	-0.068** (0.04)
Constant	3.058 (0.41)	0.358*** (0.01)	0.674 (0.03)	0.857*** (0.005)	0.085*** (0.003)
R ²	0.32	0.33	0.31	0.32	0.32
F Stat (p value)	0.003***	0.023***	0.058**	0.079**	0.095*

Note: OLS is used as estimation technique. The p-values are below the coefficient are estimated using heteroscedaticity adjusted standard errors. The ***, ** and * are significance at 1%, 5% and 10% respectively.

The results indicate that underpricing is positively related with breadth of ownership. This suggests that issuer want to have larger shareholding base so they underprice new shares that increase demand of the shares and oversubscription is attained. Therefore, the firm/issuer favor small investors and obtain dispersed ownership. Phem *et.al.* (2003) and Brennan and Franks(1997) obtain the similar result. The expected negative relationship is obtained when concentration of ownership: HERF, Block, Large and T20 is regressed on underpricing and other explanatory variables. These results suggest that underpricing helps issuer to deal with inequality/concentration of ownership. The underpricing results in oversubscription

and firm/issuer can discriminate large investors so there will be lower concentration of ownership. These results are confirmed by the previous studies (Brennan and Franks, 1997 and Phem *et.al.*, 2003) and according to the ownership dispersion theory. Other variables are size, growth and retained ratio that have significant effect on concentration of ownership and these results are consistent with Booth and Chua (1996). Small issues have lower concentrations and similar results are found by Booth and Chua (1996). Other firm characteristics such as debt, risk and subscription are not significantly affecting ownership structure. Phem *et.al.* (2003) also find these variables have no impact on ownership therefore in final estimation these variables are excluded from the analysis.

To examine that the ownership effects after market liquidity, this study regresses ownership structure and other variables on liquidity given by equation (6) and (7). The liquidity is measured by trading turnover. The more is trading turnover more is aftermarket liquidity. Therefore, it is expected that proxy of dispersed ownership *i.e.*, breadth is positively related with liquidity and proxies for the concentrated ownership *i.e.*, inequalities such as Block, Large, T20 and HERF are negatively related to liquidity for IPOs. The results displayed in the Table 5 are found to be expected as per theory and previous literature (Phem *et.al.* 2003).

Table 5. Results for Effect of Ownership on Liquidity (Trading Turnover)

Dependent Variable	Trading Turnover				
	(1)	(2)	(3)	(4)	(5)
Breadth	0.20*** (0.04)				
Large		-0.467*** (0.04)			
Block			-0.67** (0.09)		
T20				-0.70* (0.10)	
Herf					-1.79*** (0.03)
Retain	0.42** (0.07)	-0.70** (0.08)	-0.75** (0.07)	-0.79* (0.07)	-0.88* (0.09)
Risk	0.71* (0.10)	0.65** (0.06)	0.67** (0.08)	0.70** (0.07)	0.45* (0.08)
Size	0.37*** (0.02)	0.39*** (0.002)	0.35*** (0.005)	0.36*** (0.005)	0.34*** (0.007)
Intercept	-0.95 (0.29)	-0.12 (0.90)	0.12 (0.90)	0.28 (0.78)	0.49 (0.62)
F (p value)	0.002***	0.012***	0.006***	0.006***	0.002***
R ²	0.33	0.32	0.33	0.33	0.35

Note: OLS is used as estimation technique. The p-values are below the coefficient are estimated using heteroscedasticity adjusted standard errors. The ***, ** and * are significance at 1%, 5% and 10% respectively.

The results indicate that broader shareholder base and less concentrated shareholding firms can attain large aftermarket liquidity for IPOs that is in line with (Demsetz and Lehn (1985), Holmstrom and Tirole (1993)). The models perform satisfactory as shown by goodness of fit as shown by F-test. The findings with other proxy of liquidity bid-ask spread do not appear to have any meaningful effect by ownership, therefore, these results are not presented here. The reason is that this analysis is based on data of firms that are not sound enough and sample size is small and primary market is not fully developed. Phem *et.al.* (2003) also observes that the explanatory variables turn out to be insignificant in explaining liquidity. However, Shleifer and Vishny (1986) come up with significant impact of these variables because the sample firms of their analysis are strong firms with optimal ownership structure and competitive trading that minimizes agency cost.

Analyzing the ownership dispersion hypothesis these findings support the evidence that underpricing increases breadth of ownership and decrease concentration of ownership. This increase in shareholder base in turn increases the aftermarket liquidity. This evidence validated ownership dispersion hypothesis in case of new issues. Further, these results indicate that a direct relationship may exist between underpricing and secondary market liquidity. To investigate this relationship a regression analysis is conducted between underpricing along with explanatory variables with liquidity given an equation (8) and (9) and results are reported in Table 6.

Table 6. Evidence for Effect of Underpricing on Market Liquidity

	Trading Turnover		Bid Ask Spread	
	Coefficient	p-value	Coefficient	p-value
Underpricing	1.01***	0.04	0.95***	0.06
Issue Size	0.36***	0.00	0.41***	0.00
Risk	-0.59***	0.04	0.44*	0.10
Retention Ratio	-0.99	0.33	-1.33	0.27
Bid Ask Spread	0.18***	0.05		
Inverse Price			0.08**	0.09
Constant	0.006***	0.01	0.14	0.63
R ²	0.30		0.30	
F Stat (p-value)	0.00***		0.00***	

*Note: OLS is used as estimation technique. The p-values are estimated using heteroscedasticity adjusted standard errors. The ***, ** and * shows significance at 1%, 5% and 10% respectively.*

The results reported in Table 6 column 2 and 3 show positive and highly significant coefficient of underpricing/market adjusted returns with liquidity measured by trading turnover suggesting that underpricing promotes secondary market liquidity. Among control variable issue size, risk increases liquidity and this finding is supported by Booth and Chua (1996) and Phem *et.al.* (2003). The pre-issue demand of shares also impacts trading turnover confirmed by Booth and Chua (1996). Due to

non-availability of data for bid and ask prices, bid-ask spread as calculated by high and low price for this analysis. The existing literature suggests that turnover is also affected by the bid-ask spread (Stoll, 1978) and similar is case here, average bid-ask increases turnover. The estimated results of bid-ask spread as measure of liquidity also comes up supporting evidence that underpricing increases secondary market liquidity. Among other variables issue size, risk, inverse price increases bid-ask spread as found by Booth and Chua (1996) and Phem *et.al.* (2003). The F-test confirms overall goodness of fit for and reasonable coefficient of determination in liquidity models.

To sum up the findings of this study validate ownership dispersion hypothesis for Pakistani IPOs. It is evident from the above discussion that firms going public underprice new issues to achieve a dispersed ownership base, in turn the dispersed ownership base increases liquidity indirectly in the secondary market. The after-market liquidity is achieved by underpricing directly as well.

5. CONCLUSION AND POLICY IMPLICATIONS

The present study validates the ownership dispersion hypothesis given by Booth and Chua (1996) to describe the underpricing puzzle in case of Pakistani IPOs listed at Karachi Stock Exchange from 2000 to 2015. The empirical results of the current study confirm the argument presented by this hypothesis that firms underprice new issues to have broader shareholder base. The underpricing firms have oversubscription that enables them to discriminate in favor of small shareholders and underpricing is compensation for uninformed investors. The greater number of shareholders increases market liquidity. The underpricing directly increase liquidity as underpricing creates more demand for new shares and that demand causes secondary market liquidity.

The implications that may emerge from the results of this study for investors, issuer and regulators are as follows. Mostly informed investors take advantage of underpricing as large investors have access of information and small investors do not have much information. The underpricing is compensation for uninformed investors and is indirect cost for the firm/issuer The range of underpricing can be set such that cost and benefits of underpricing are in balance. Managers who are owners can be observed to avoid intentional underprice the issue to take personal incentives after lock up expiration. This can also be a reason of long term under performance of the IPOs found by Javid and Malik (2016) for Pakistan and others. The block holdings or concentration of ownership by IPOs can be controlled by regulatory authorities by preferring small shareholders for allocation of shares. The awareness increases the participation of more investors that will enhance market liquidity.

References

Aggarwal, R., Leal, R., and Hernandez, L. (1993) The aftermarket performance of initial public offerings in Latin America, *Financial Management*, 22, 42-53.

Amihud, Y. and Mendelson, H. (1986) Asset pricing and the bid–ask spread, *Journal of Financial Economics*, 17, 223–249.

Booth, J. R. and Chua, L. (1996) Ownership dispersion, costly information and IPO underpricing, *Journal of Financial Economics*, 41, 291–310.

Bansal, R. and Khanna, A. (2012) Pricing mechanism and explaining underpricing of IPOs: Evidence from Bombay Stock Exchange, India. *International Journal of Research in Finance and Marketing*, 2, 205-216.

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

Bhide, A. (1993). The hidden costs of stock market liquidity. *Journal of Financial Economics*, 34, 31-51.

Bolton, P. and Thadden, V. (1998) Blocks, liquidity, and corporate control. *Journal of Finance*, 53, 1-25.

Brennan, M. and Franks, J. (1997) Underpricing, ownership and control in initial public offerings of equity securities in the UK, *Journal of Financial Economics*, 45, 391–413.

Brennan, M. J. and Subrahmanyam, A. (1996) Market microstructure and asset pricing: On the compensation for illiquidity in stock returns, *Journal of Financial Economics*, 41, 441-464.

Chowdhry, B. and Sherman, A. (1996) The winner’s curse and international methods of allocating initial public offerings, *Pacific-Basin Finance Journal*, 4, 15–30.

Chen, J. and Strange, R. (2004) The effect of ownership structure on the underpricing of initial public offerings: Evidence from Chinese Stock Market. Working Paper April, King’s College London, London.*

Constantinides, G. (1986) Capital market equilibrium with transaction costs, *Journal of Political Economy*, 94, 842–862.

Demsetz, H. and Lehn, K. (1985) The structure of corporate ownership: Causes and consequences, *Journal of Political Economy*, 93, 1155–1177.

Dewenter, K. L. and Malatesta, P. H. (1997) Public offerings of state-owned and privately-owned enterprises: An international comparison, *The Journal of Finance*, 52, 1659-1679.

Ellul, A. and Pagano, M. (2006) IPO underpricing and after-market liquidity, *Review of Financial Studies*, 19, 381-421.

- Finkle, T. A. (1998) The relationship between boards of directors and initial public offerings in the biotechnology industry, *Entrepreneurship Theory and Practice*, 22, 5-30.
- Gompers, P. A. (1995) Optimal investment, monitoring, and the staging of venture capital, *The Journal of Finance*, 50, 1461-1489.
- Heflin, F. and Shaw, K.W. (2000) Blockholder ownership and market liquidity, *Journal of Financial and Quantitative Analysis*, 35, 621-633.
- Holmström, B. and Tirole, J. (1993) Market liquidity and performance monitoring, *Journal of Political Economy*, 101, 678-709.
- Ibbotson, R.G. and Ritter, J.R. (1995) Initial public offerings. In: Jarrow, R.A., Maksimovic, V., Ziemba, W.T. (Eds.), *Handbooks in Operations Research and Management Science: Finance*, vol. 9. North-Holland, Amsterdam, pp. 993–1016.
- Ibbotson, R.G. and Jaffe, J.F. (1975) Hot issue” markets, *The Journal of Finance*, 30, 1027-1042.
- Javid, A.Y, and Malik, H. (2016) Performance and capital structure of IPOs in Pakistan from 2000 to 2015. *Financial Innovation*, 2(1), 1-19. DOI : 10.1186/s40854-016-0032-y.
- Jensen, M.C. and Meckling, W.H. (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics*, 3, 305–360.
- Jacoby, G. and Zheng, S.X. (2010). Ownership dispersion and market liquidity. *International Review of Financial Analysis*, 19, 81-88.
- Leech, D. and Leahy, J. (1991) Ownership structure, control type classifications and the performance of large British companies, *The Economic Journal*, 101, 1418-1437.
- Lee, P. J., Taylor, S. L., and Walter, T. S. (1996) Australian IPO pricing in the short and long run, *Journal of Banking & Finance*, 20, 1189-1210.
- Malik, H. Javid, A.Y. and Yar, M.M.S, (2017) New Issues Puzzle: Experience from Karachi Stock Exchange. *PIDE Working Paper No. 148*
- Mello, A.S. and Parsons, J.E. (1998) Going public and the ownership structure of the firm. *Journal of Financial Economics* 49, 79–109.
- McGuinness, P. (1992) An examination of the underpricing of initial public offerings in Hong Kong: 1980–90, *Journal of Business Finance & Accounting*, 19, 165-186.

Pham, P.K., Kalev, P.S. and Steen, A.B.(2003) Underpricing, stock allocation, ownership structure and post-listing liquidity of newly listed firms, *Journal of Banking and Finance*, 27, 919–947.

Rock, K. (1986) Why new issues are underpriced, *Journal of Financial Economics*, 15, 187-212.

Roll, R., (1981) A possible explanation of the small firm effect, *Journal of Finance*, 36, 879–888.

Schultz, P.H. and Zaman, M.A. (1994) After-market support and underpricing of initial public offerings, *Journal of Financial Economics*, 35, 199–219.

Shleifer, A., Vishny, R. (1986) Large shareholders and corporate control, *Journal of Political Economy*, 94, 461–488.

Sohail, M.K. and Nasr, M. (2007) Performance of Initial Public Offerings in Pakistan, *International Review of Business Research Papers*, 3, 420 - 441.

Stoughton, N.M. and Zechner, J. (1998) IPO-mechanisms, monitoring and ownership structure, *Journal of Financial Economics*, 49, 45–77.

Stoll, H.R. (1978) The pricing of security dealer services: An empirical study of Nasdaq stocks, *Journal of Finance*, 33, 1153–1172.

Wooldridge, J. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press.