Liquidity Benefits from Underpricing: Evidence from Initial Public Offerings Listed at Karachi Stock Exchange

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ABSTRACT

This study explains the underpricing phenomenon through the relationship of underpricing (initial returns), ownership structure and after-market liquidity empirically by using cross-sectional data of 59 IPOs issued at Karachi Stock Exchange from 2000 to 2012. Ownership dispersion theory suggests that underpricing creates oversubscription which helps issuer to create dispersed ownership structure (Broader shareholder base and equal distribution of shareholdings). Both of these factors increase after-market liquidity as higher demand (oversubscription) and dispersed ownership structure is characterised with higher after-market liquidity. As the main objectives of a firm going public is to create more dispersed ownership for the existing shareholders and to reduce risk of existing owners by creating liquid market. By using a sample of 59 IPOs this study found evidence of the above arguments. This study found statistically significant results of models incorporated different proxies of ownership and underpricing, ownership and liquidity and underpricing with liquidity after controlling some firm characteristics which affects firm decision to underprice the issue. From the evidence of the study it can be said that liquidity and dispersed ownership dispersion are benefits of underpricing. Issuers underprice the issue to obtain these benefits. These findings leads to the implications that issuer underprice their issue to obtain its two main objectives, first to attain dispersed ownership structure and achieve after-market liquidity.

JEL Classification: G3, G12, G24
Keywords: Underpricing, Ownership Structure, After Market-Liquidity

1. INTRODUCTION

Capital is the basic need for running a business. Capital can be generated through different methods. Selling equity to investors is one way. When a firm raises capital by selling its stocks to the general public for the first time, this process is called initial public offering (IPO). It involves underwriters who are usually investment bankers. Since IPO involves big capital, it has been researched rigorously yet there are questions to which no solutions have been found. One of them concerns 'underpricing' anomaly which refers to high average initial returns in the beginning (such as large average increase in stock prices on the first trading day). There are very few studies on emerging markets, especially Pakistan. This study attempts to explain underpricing anomaly in Pakistan.

A major motive of firms going public is to create a liquid market by expanding ownership through IPO. Ibbotson and Ritter (1995) have argued that transaction costs for future equity offerings of liquid stocks come down. According to Amihud and Mandelson (1986) liquidity helps to increase the shareholders wealth by increasing firm value. Hostile takeovers can also be impeded by creating liquidity via dispersed ownership as shown by Shleifer and Vishny (1986).

Reilly and Miller (1987), Hanley (1993), Zaman and Scultz (1994), Booth and Chua (1996), Reese (1998), Phem, *et al*. (2003), Xiaofon and Mingsheng (2008) have shown that there is higher after-market liquidity for underpriced IPOs. According to Reese (2008) and Booth and Chua (1996), information about an issue creates oversubscription which in turn increases after-market liquidity. Booth and Chua (1996) also argue that oversubscription disperses ownership structure.

There are certain drawbacks linked with higher liquidity mentioned in the literature. As concentrated shareholders tend to monitor the firm's activities, it minimises agency costs as evidenced by Jenson and Meckling (1976), Demsetz and Lehn (1985) among others. Some companies may deliberately adopt a concentrated ownership structure and forfeit liquidity. The issuers also have to incur cost to achieve liquidity since to achieve a dispersed ownership base, the small investors have to be rewarded to induce their participation. In this model they are rewarded in the form of initial returns (underpricing) to compensate for their information costs.

Firms going public have different priorities. Some may require a liquid after-market through ownership dispersion while others may go for a concentrated ownership structure to reduce the agency cost problem. This study identifies a company's preferences with regard to liquidity requirement or agency cost minimisation. This will help control firm characteristics that can also influence underpricing, ownership structure and liquidity as shown by Phem, *et al.* (2003). The present study tries to find the characteristics of firms that determine underpricing by employing a logit model. Market to book ratio, risk, issue size, oversubscription, total assets and intensity. It attempts to find empirical evidence through 59 IPOs issued at Karachi Stock Market if liquidity can be achieved by higher underpricing through direct channel (as shown by Miller and Reilly (1987), Scultz and Zaman (1994)) as well as indirectly through ownership dispersion [as examined by Phem, *et al.* (2003)]. It is supported by theories of trading liquidity and "winners' curse" hypothesis [Holmstron and Tirole (1993), Amihud and Mandelson (1986), and Demsetz (1968)] and Rock (1986). These theories help to explain after-market liquidity through ownership dispersion from IPOs. Underpricing determines the breadth and equality of shareholder distribution which in turn influences after market liquidity. This study also aims to investigate if there is a direct significant relationship between liquidity and underpricing.

Primary markets have not yet been explored in Pakistan. There is only one study in Pakistan as far as the present authors know that of Sohail and Nasr (2007), in which short-run and long-run performance of 50 IPOs listed on KSE have been studied. There is a vast research gap that needs to be filled. This study contributes to the existing literature by explaining the liquidity benefits of underpricing and its channel using IPOs data from 2000 to 2012. In Pakistan there is no previous research that explains the underpricing phenomenon, or the relationship between liquidity and underpricing, and underpricing and ownership structure. This study will be useful for investors intending to invest in primary markets as there is high compensation in the form of high initial returns (underpricing). As underpricing is the indirect cost for any issuer so, as per firm objectives, the cost should be minimised up to a level where its benefits equal its costs. This study may not suggest any specific level of underpricing since firms differ in their objectives. It is a research question that academicians and financial researchers need to answer. However, authorities like the Securities and Exchange Commission of Pakistan and the Karachi Stock Exchange may consider constraining underpricing to a level that prevents managers from making personal profits by retaining shares up to lock-up expiration (end of period when managers can sell their shares in the market after the issue) while considering under dispersed ownership.

This study explains underpricing phenomenon for 59 IPOs issued at Karachi Stock Exchange. It first checks the level of underpricing for IPOs listed at KSE from 2000 to 2012. Second, it examines how underpricing affects allocation of shares and how in turn shareholder distribution affects liquidity in secondary market. Third, it investigates the effect of underpricing on market liquidity.

The remaining part of the study is organised as follow. The second section overviews the issue of underpricing on the global and Pakistan levels. The review of the theoretical and empirical literature is presented in the third section. The theoretical model and development of hypothesis forms the next section, the fifth presenting the empirical methodology, data and data sources and construction of the variables. The empirical results are discussed in the sixth section and the last section concludes the study.

2. OVERVIEW OF UNDERPRICING ISSUE

This section presents the brief history and overview of initial public offerings in Pakistan. The underpricing of IPOs on first trading day and its comparison with other countries are also discussed.

2.1. Overview in Pakistan's Scenario

The Stock Market of Pakistan is an emerging market of the world. Three exchanges are in operation—the Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE). The KSE is the most established, old and active among the three. It was established in 1947, and has been open for trading (liberalised) from 1992. Almost 651 firms are listed on it with a market capitalisation of US $ 26.48 billion. In 2013 there were 570 companies listed with a market capitalisation of Rs 5417065.8 million. The International Finance Corporation (1991) ranked it third in percentage returns in the local stock market index. In 2002, KSE was listed as the best operating market in the world according to the Business Week magazine. This rising trend continued and in the International Monetary Fund's Country Report for Pakistan (2004), Pakistan's macroeconomic conditions were described as better on account of low interest rates, easy excess to liquidity and good regulations and better supervision. However the market crashed in 2005 due to Badla Financing/Carry Over Trade according to forensic examination by USA, LLC (on request of SECP). It recovered and carried on but bearishly and in 2007 the KSE 100 index had a return of 40.19 percent. Presently KSE is in a bullish phase. The KSE-100 index shows major firms' performance collectively, as it consists of 100 stocks on the basis of weighted market capitalisation. All top capitalised companies of each sector of the 34 sectors and the remaining 66 stocks are taken on the basis of market capitalisation irrespective of the sector. As such this market can fairly reflect the market trend. Ordinary shares are the most traded security in

the market while TFCs, preference shares and redeemable certificates are also traded. Future trading of some stocks also started in 2003. Other regional exchanges—LSE and ISE—are comparatively less active.

The IPOs are issued through fixed-price offer (which is fixed before the issue) and sale by tender (i.e., the Book Building Method where the underwriter determines the offer price on its demand) around the world. Firms go public generally through fixed-price offer in Pakistan. Shares are allotted in multiples of 500. An investor can only bid for shares once at offer price under SECP (Section 62-Company Ordinance, 1984) regulations. Most of the IPOs were issued in the 90s as KSE was liberalised in 1992, from 1992 to 1999 on average there were 35 IPOs per year. That is a very good growth for an emerging market. But from 2000 onwards the intensity of IPOs has been very low, only 80 IPOs had been offered up to 2012 which means almost 7 IPOs per year. This is because of different political, social and security reasons. For instance after the nuclear tests a lot of sanctions were imposed on Pakistan resulting in only one IPO in 1998 and none in the next year. After 9/11 due to security reasons the stock market activity remained low up till 2003. Recovery started in 2004, market confidence regained increasing trading activity. After the financial crisis of 2007 there was low activity in the primary market. Table 2.1 shows offered capital in millions. The maximum, on average 52 million shares per IPO, were issued at KSE. On average 28.24 million capital per IPO were issued per year at the Karachi Stock Exchange. In all 5138 million shares have been issued at KSE for the study period.

Table 2.1

Number of Shares Offered in Millions by IPOs

Year.	No. of IPOs	Mean	Median	STD DEV	Min	Max
2000	3	15.5	18.5	4.7	10	18.5
2001	4	20.2	5.5	23.9	12.5	54
2002	4	22	13.2	12.6	10	37
2003	4	21	16	22	6.2	60
2004	12	52.2	30	59	100	21.5
2005	14	29.6	25	41	25	15.8
2006	3	30.3	40	17.6	10	41
2007	11	21.4	23.2	10.1	50	34
2008	9	32.3	12	35	75	119
2009	4	38.7	22.5	39	4	95
2010	5	41	16.6	41	10	110
2011	4	24.1	27	13.6	5	37.2
2012	3	18.8	20	10.8	7.5	29
Full Sample	80	28.24	20.73	25.41	25.02	51.69

Source: Table is generated from data taken from SECP.

Table 2.2 shows the average offer price of IPOs issued at Karachi stock market from 2000 to 2012. The average highest price offered was Rs 50 in 2007 for 11 IPOs while the lowest was Rs 10 in 2002 and 2012. On an average Rs 20.23 is the offer price at which new equity is being issued in the sample.

Table 2.2

Offer Price (Rs)

Year	No. of IPOs	Mean	Median	STD DEV	Min	Max
2000	3	12.16	11.5	2.56	10	15
2001	4	35	10	27	10	80
2002	4	10	10	0	10	10
2003	4	17.1	10	20	10	46
2004	12	15.38	15	15.85	10	55
2005	14	24	18	17.82	10	57.75
2006	3	12	11	2.64	10	15
2007	11	50	10	69	10	235
2008	9	33.5	17.5	38	10	125
2009	4	11	10	2	10	14
2010	5	15.8	12.5	8	10	30
2011	4	17	14	6.4	10	25
2012	3	10	10	0	10	10
Full Sample	80	20.23	12.27	16.10	10.00	55.21

Source: Table is generated from data taken from SECP.

Table 2.3 shows the average capital raised through IPOs from 2000 to 2012. On an average Rs 298 million capital was raised through IPOs per year. The maximum capital raised through IPOs was 9639 million rupees in 2008 from 9 IPOs. A total of Rs 28023.55 million capital was generated through primary market operations (from IPOs).

Table 2.3

Capital Raised in Million Rs

Year	No. of IPOs	Mean	Median	STD DEV	Min	Max
2000	3	55.5	185	47	100	185
2001	4	216	55	239	125	540
2002	4	148	132	126	100	370
2003	4	240	160	220	62	600
2004	12	258	300	590	1000	215
2005	14	221.2	250	410	250	158
2006	3	123	400	176	100	410
2007	11	374	232	101	500	340
2008	9	1071	120	350	750	1190
2009	4	380	225	390	40	950
2010	5	550	166	410	100	1100
2011	4	148.8	270	136	50	372
2012	3	87	200	108	75	290
Full Sample	80	297.8846	207.31	254.08	250.15	516.92

Source: Table is generated from data taken from SECP.

The only study on Pakistani stock market is by Sohail and Nasr (2007) who found almost 36 percent underpricing of 50 IPOs from 2000 to 2006 at the Karachi Stock Exchange. They also found long run underperformance of IPOs. The present study has estimated 51 percent initial returns (underpricing) for IPOs issued from 2000 to 2012. This shows very large initial abnormal returns on the issues. The general public of Pakistan does not participate in investing in stock markets. It can be seen from the statistics that on average 92 people hold one million shares in our sample (Table 6.1). This is very low participation rate which may be due to the fact that about 60 percent of them are family owned businesses in Pakistan [Cheema, *et al.* (2003)]. The ownership level is very concentrated due to family involvement. The retention rate is also very high in case of firms listed at KSE. Trading activity of many firms in Pakistan is low because of low general public participation.

In recent years primary market activity has been very low. It is therefore necessary for firms to go public. This can be done by providing some incentives to the firms. Capital generated through equity offering might be costlier than that from debt (since firms might have financial constraints). This can be one of the reasons why firms are not going public. Awareness among the general public can be promoted to increase its participation in the stock markets. Nonetheless the Pakistani market is emerging and public participation will increase with its growth.

2.2. International Evidence of Underpricing

Underpricing is a well-documented phenomenon in financial literature, it was Ibbotson (1975) who identified underpricing for the first time. He has found average initial return of 11.4 percent using IPO data from 1960 to 1969. Table 2.2.1 shows the phenomenon internationally in different developed and emerging stock markets. The average initial returns given in the table are

generally of first trading day returns. As IPOs involve a lot of wealth so it has been investigated rigorously in the developed countries but in developing markets it has not been investigated seriously. The present study has found almost 52 percent initial returns (on first trading day).

Table 2.2.1

International Evidence on Average Initial Returns

Country	Source	Sample Size	Time Period	Average Initial Return (%)
Argentina	Eijgenhuijsen and Vander Valk (1997)	20	1991-1994	4.4
Australia	Lee, *et al.* (2012)	1103	1976-2006	19.8
Belgium	Rogiers, *et al.* (2010)	93	1984-2004	14.2
Brazil	Aggarwal, *et al.* (1993)	62	1979-1990	78.5
Canada	Kryzanowski and Rakita (2000)	500	1971-1999	6.3
Chile	Celis and Maturana (1998)	55	1982-1997	8.8
China	Yu and Tse (2006)	343	1995-1998	123.59
Cyprus	Nounis, *et al.* (2007)	51	1999-2002	23.7
Denmark	Jakobsen and Sorensen (2001)	117	1984-1998	5.4
Egypt	Omran (2005)	53	1994-1998	8.4
Finland	Keloharju;Westerholm (2006)	99	1984-1997	10.1
France	Chahine (2008)	192	1996-200	22.76
Germany	Schuster (1996)	219	1988-1998	25.66
Greece	Nounis, *et al.* (2009)	363	1976-2005	25.1
Hong Kong	McGuinness, *et al.* (2010)	857	1980-2001	19.3
Hungary	Dawson (1987)	21	1978-1984	14
India	Shelly and Singh (2008)	1963	1992-2003	69.57
Indonesia	Hanafi, *et al.* (2010)	265	1989-2003	20.2
Iran	Bagherzadeh (2010)	279	1991-2004	22.4
Ireland	Ritter (2004)	31	1999-2006	13.8
Italy	Cassia, *et al.* (2004)	182	1985-2001	21.87
Japan	Kaneko and Pettway (2003)	1689	1970-2001	28.4
Jordan	Marmar (2010)	53	1999-2008	149
Korea	Choi and Heo (2005)	477	1980-1996	74.3
Malaysia	Uddin (2008)	539	1990-2000	93.31
Mexico	Aggarwal, *et al.* (1993)	37	1987-1990	33
Netherlands	Roosenboom and Goot (2003)	118	1984-2001	11.03
New Zealand	Aggarwal, *et al*. (1993)	201	1979-1999	23
Nigeria	Ikoku (1998)	63	1987-1993	19.1
Norway	Emilsen, Pedersen and Saettern (2000)	68	1984-1996	12.5
Pakistan	Sohail and Nasr (2007)	50	2000-2006	35.66
Philippines	Sullivan and Unite (2001)	104	1987-1997	22.7
Poland	Jelic and Briston (2003)	92	1991-1999	28.83
Russia	Ritter (2007)	40	1999-2006	4.2
Singapore	Lee, *et al.* (1999)	441	1973-2001	29.6
South Africa	Page and Reyneke (1997)	118	1980-1991	32.7
Spain	Ansotegui and Fabregat (1999)	99	1986-1998	10.68
Sri Lanka	Peter (2007)	30	1996-2000	57.2
Sweden	Bodnaruk, *et al*. (2008)	124	1995-2001	14.2
Switzerland	Drobertz, *et al*.	120	1983-2000	34.97
Turkey	Kiymaz (2000)	163	1990-1996	13.6
Taiwan	Chen (2008)	1312	1980-2006	37.2
U.K.	Dimson; Levis; Ljungqvist (2009)	3122	1959-2001	17.4
U.S.	Loughran and Ritter (2003)	3025	1990-1998	14.04

Sources: This is an updated version of Table in Loughran, Ritter, and Rydqvist (2010), compiled by various studies.

3. LITERATURE REVIEW

The initial public offering is an extensively researched issue in financial economics. This process involves underwriters who are usually investment bankers. Though researched rigorously from early 70's there are still some puzzles that need to be solved. There are different theories that explain the determinants of underpricing such as Information Asymmetries, Ex-Ante Uncertainty, Information Cost compensation, Diffuse Ownership Structure, and Liquidity benefits. But puzzles remain like the one concerning the 'underpricing' anomaly which is reflected in high average initial returns (such as large average increase in stock prices on first trading day). 'Long-run underperformance' of IPOs is the other puzzle; Stern and Bornstein (1985) have identified it by using a sample of 1922 IPOs. It has also been tested by Ritter (1991), Loughran and Ritter (1993), Levis (1993), Aggarwal, *et al.* (1993) and Sohail and Nasr (2007). The 'hot and cold issue cycle' is also a puzzle (IPO anomaly) as it specifies stocks issues which have high abnormal returns, i.e., their prices mount abnormally. It occurs when prices of new issues increase for an extended time period. Ibbotson and Jaffe (1975) have identified it by showing patterns of underpricing in different time periods, which are in cycles of both Hot and Cold. This section reviews the relevant theoretical and empirical literature on underpricing anomaly. This section is further divided into two sub-sections; review of theoretical literature on underpricing, review of empirical literature on underpricing, underpricing effect on ownership structure, ownership structure effect on liquidity and underpricing effect on liquidity.

3.1. Theoretical Literature Review on Underpricing Anomaly

There are several explanations for the underpricing anomaly. Some theories have been developed to explain it such as Risk Compensation suggested and empirically tested by Ritter (1984), Mitigation of Winner's Curse by Rock (1986) and Beatty and Ritter (1986), Signaling the Quality of Firm modeled by Grinblatt and Hwang (1989), Welch (1989), Faulhaber and Allen (1989), Over-reaction hypothesis analysed by Aggarwal and Rivoli (1990) and Ritter (1991). Another explanation which is given for 'underpricing' is Price support or Stabilisation activity by the underwriter in the secondary market as identified by Ruud (1993), and Kumar and Seguin (1993). The ownership dispersion theory has been suggested by Booth and Chua (1996), Brenan and Franks (1997) and Michaely and Shaw (1994).

Compensation for Risk theory suggests that as underwriters have to absorb the equity if they fail to sell or the market could not absorb it in case of overpricing (having negative initial returns i.e., price decreases on first trading day) so the underwriter needs to be compensated for this risk. It is empirically tested by Ritter (1984), but its indirect way for compensation is that the underwriter can be rewarded directly in the contract. The Winner's curse

problem is described as that where there are two group of investors, informed and uninformed. The informed investor knows the true value of an issue while the uninformed investors do not have estimates of true market value of the stock. So while bidding for the issue informed investors only bid for stocks which are underpriced while the uninformed investor bids for both underpriced and overpriced issues. The probability of allotment of underpriced issues is low for the uninformed investors as large number of investors bid for the same rendering the probability of allocation of overpriced issues high for the uninformed investor as few investors bid for them. This is the winner's curse phenomenon: if the uniformed investor succeeds in his bid, he is allotted the shares which get negative profits (loss), while the informed investor always bids for underpriced IPOs. So to encourage uninformed investor, IPOs on average are kept underpriced assuming the informed investor will not have the capacity to buy all the shares to fill the gap. The uninformed investors are rewarded by average initial returns to take part in the bidding process. Chowdhry and Sherman (1996) have hypothesised that strategic allocation of equity can reduce the winner's curse problem. As the informed investors place larger orders than the uninformed investors, whether with the same or different wealth levels, it results in the winner's curse problem if all orders go to the informed investors. Therefore small investors are favoured which maximises issuers' expected revenue. The winner's curse problem can be minimised by discriminating against larger investors and favouring small investors.

Signalling the quality of firm assumes that high quality firms deliberately give initial returns to new investors as they can afford to do so because they can retrieve them subsequently in the next issues. The total proceeds in this case will be higher than if the issues had been underpriced. An empirical analysis by Garfinkel (1993) has not found support empirically for this explanation. The over-reaction hypothesis suggests that the issuer and the underwriter set the price fairly and underpricing is only resorted to in case of over-reaction of irrational investors in the aftermarket. This hypothesis is based on behavioural and psychological reasoning. There are two flaws in this hypothesis: one that the investor cannot be irrational so consistently and overreaction is not the only reason for underpricing. One more reason of underpricing is that managers intentionally underprice the issue to have private benefits. The Aggarwal, *et al.* (2002) model shows that managers intentionally underprice the issue to maximise their wealth on lock-up expiration. The model states that underpricing generates information momentum which attracts investors for the stock. Resultantly, the demand curve for the issue shifts outward raising the price Therefore, at the end of lock up expiration, the managers sell their stocks at higher market and reap the benefits.

Ownership dispersion hypothesis as suggested by Booth and Chua (1996), Brenan and Franks (1997) and Michaely and Shaw (1994) argues that

issuers underprice the issue to achieve dispersed ownership structure. They achieve oversubscription through information production. Therefore, they discriminate in favour of small investors to have a dispersed ownership structure and discourage large block-holdings by outside investors.

Another explanation given by some researchers is Price Stabilisation by underwriters in the aftermarket. They argue that the underwriter buys stocks in the market to control the supply and price of stocks. It is mostly done in overpriced IPOs. Hanley, *et al.* (1993) show that price declines only by 2.5 percent after price stabilisation activity has ceased. The principal-agent conflict suggests that inexperienced issuers are exploited by underwriters through underpricing. It also helps underwriters to promote the issue more easily. Barron (1982) has identified it as an agency problem between the underwriter as an agent and the issuer as principal. The cascade behaviour is observed when perspective investors in seasoned offerings give high weighting to the decisions of investors in the first issue. If the initial investors have a lower valuation, the cascade behaviour (rush down) can cause the IPO to fail. Therefore, in order to minimise the chances of failure by such behaviour, IPOs need to be underpriced.

3.1.1. *Empirical Literature Review on Underpricing Anomaly*

Booth and Chua (1996) have analysed their model empirically by using a sample of 2151 IPOs issued from 1977-1988. They find that there is a positive relationship between initial returns and ownership dispersion with costly information. Due to dispersed ownership there is a liquid secondary market for equity and this results in lower rate of return required by investors and high equilibrium price of newly issued shares. Bernnan and Franks (1997) have examined how separation of ownership and control evolves due to an IPO, and how IPO underpricing can be used to retain insider control. To prove it they have used data for 69 IPOs of London Stock Exchange listed from 1986-1989. Empirical analysis shows that underpricing is used to achieve oversubscription, which allows owner/issuer to discriminate against the larger bidder to prevent block holdings. The study also reveals that pre IPO owners of a firm sell almost 2/3rd of their shareholdings in subsequent 7 years while firm directors only have a modest fraction of their shares. Results indicate that the firm is advancing the process of separation of ownership and control. Laura and Sheehan (2004) have checked the hypothesis that managers underprice the issue to have dispersed ownership structure to get private benefits from low monitoring or have a concentrated ownership structure through increased monitoring. By using logit model and OLS regression model on 953 IPOs they conclude that there is no relationship between underpricing and outside block holdings.

Scultz and Zaman (1994) have empirically analysed aftermarket stabilisation activity of underwriters for the first three days from the issue by using data of 72 firm commitment IPOs on NASDAQ. They find stabilisation

activities of underwriters which answer why issues are underpriced and the underwriter's part in IPOs. The results of the study reveal that underwriters do support IPOs in the aftermarket through buying and reducing supply of stocks for both Hot and Cold issues and resultantly the stock price increases over the offer price.

3.1.2. *Empirical Literature on the Relation between Ownership and Underpricing*

A case study on Indian stock exchange was done by Bansal and Khanna (2012) by using data of 319 IPOs issued at BSE from 2000 to 2011. They have empirically analysed the relationship between underpricing and ownership structure. They find a positive relationship between underpricing and non-promoter institutional investors and negative one in case of promoter institutional investors. They also find a positive impact of individual investors on underpricing. Bouzouita, *et al.* (2012) checked which channel of IPO underpricing affects secondary market liquidity of newly issued stocks of Euronext, Paris for the period 1995 to 2008. They try to discover whether it is through ownership dispersion theory (issuers underprice the issue to have a more dispersed ownership structure which in turn creates a liquid aftermarket) or information production (investor is compensated for the information cost and information production) that after-market liquidity increases? Results show that high initial returns influence post-listing liquidity through additional information production such as analyst coverage. According to this study information production channel is more effective than the ownership dispersion channel. There is a counter argument on rationing in favour of larger shareholder by Stoughton and Zechner (1998). They study different IPO mechanisms on shareholder structure and investigate the role of underpricing and rationing on investor shareholdings by keeping focus on agency problems. They have hypothesised that rationing in favour of large shareholders is positively correlated with underpricing. The initial returns should be higher for firms having high benefit-to-cost ratio for monitoring firms, and as per regulation requirements for significant participation of small investor IPOs which should have high initial returns. Mello and Parsons (1998) have evaluated different methods for sale of new issues and show that commonly used methods are not optimal. Methods could be optimised by discriminating against inactive shareholders such as block holders to create a liquid secondary market which increases all shareholders' wealth.

3.1.3. *Empirical Literature on the Relation between Ownership and Liquidity*

Using data for 85 right issues on NASDAQ from 1973 to 1986, Meeta and Kathore (1997) examine the impact of right issue and initial issue on ownership structure and liquidity. They find there is concentrated ownership

structure and high bid-ask spread after right issue, while after initial issue get a diffuse ownership structure and proportionally low bid-ask spread. Consequently the after right issue liquidity decreases with increase in ownership structure and liquidity increases with diffuse ownership structure after initial offerings. Bolton and Thadden (1998) develop a model to provide the measure of optimal ownership structure. By examining cost and benefits of ownership concentration, taking into account aftermarket liquidity and corporate control, they have suggested that ownership structure with small blocks may be optimal rather than fully dispersed ownership structure. This also reduces the free rider problem. Another case study was done in China by using 467 IPOs listed at Shenzan and Shinghai stock exchanges for the period of 1995 to 1999. Chen and Strange (2004) examine the impact of corporate control on the level of underpricing. They have concluded that larger shareholders try to have control to get private benefits. So to achieve their benefits shareholders try to have lower initial returns such as lower underpricing to retain their control. After controlling for other factors they find negative relationship between underpricing and larger shareholder. Heflin and Shaw (2000) have determined the relationship between block ownership and market liquidity. Using data for 259 firms trading at NYSE during 1988-1989 they find effective and relative spreads have positive relationship with firms owned by block holders. The results determine that block holder ownership reduces liquidity of the firm's stock though they might be useful for reduced agency costs.

The ownership dispersion hypothesis also implies that the issuer objective to get dispersed ownership structure is to attain liquid secondary market so that with greater number of shareholders there will be more trading activity in secondary market, that was initially hypothesised by Booth and Chua (1996). This hypothesis is tested empirically by Phem, *et al.* (2003), Xiaofan and Mingsheng Li (2008), Bouzouita, *et al.* (2012), and Bansal and Khanna (2012). Using data of 113 IPOs of Australian firms from Jan 1996-June 1999, Phem, *et al.* (2003) have hypothesised that IPOs underpricing and shareholder base are positively correlated while IPOs underpricing and inequality of shareholders result in block holdings. Liquidity is also positively related to underpricing for IPOs of Australian firms. Empirical analysis shows that underpricing has a positive relationship with ownership structure which in turn has a positive relationship with aftermarket liquidity. There is also a direct positive relationship between underpricing and secondary market liquidity. By using 1179 IPOs listed on NASDAQ from 1993 to 2000, Xiaofan and Mingsheng Li (2008) have investigated Booth and Chua hypothesis empirically. Regression analysis has found a negative relationship between underpricing and change in shareholders and positive association between underpricing and non-block institutional shareholders. These non-block institutional shareholders create higher secondary market liquidity. They have also found positive relationship of underpricing with aftermarket liquidity. Their findings are consistent with Booth and Chua hypothesis.

3.1.4. *Empirical Literature on the Relation between Liquidity and Underpricing*

There is some literature which shows how underpricing affects liquidity of stocks such as Jacoby and Zheng (2010) who have analysed the relationship between ownership structure and market liquidity for 3576 firms listed on NYSE, AMEX and NASDAQ. Results indicate ownership dispersion (number of shareholders and block holdings) improves market liquidity (spread, turnover and depth).Some studies show underpricing is just like a premium to achieve market liquidity and enhance it, as Ellul and Pugano (2006) have modelled that investors give weightage to secondary market liquidity of newly issued stocks. If stocks are expected to have less liquid secondary market then IPO underpricing will be larger. By using 337 IPOs of London Stock Exchange from June 1998 to December 2000 they find the expected after market liquidity and liquidity are important measures of underpricing. Brenan and Subrahmanyam (1996) have identified risk premium factor in total monthly returns due to illiquidity by applying OLS and GLS. They find that there is premium factor in total return for the illiquidity such as for both fixed and variable part of transaction cost. This premium is the concave function of variable cost and convex in the case of fixed cost. They also find an additional risk premium for inverse price factor.

Other reasons of underpricing according to some researchers include managers' intentional underpricing of the issues to have private benefits. As shown by Aggarwal, *et al.* (2002) in their model that shows that managers intentionally underprice the issue to maximise their wealth on lock up expiration. The model states that underpricing generates information momentum which attracts investors for the stock. Resultantly, the demand curve for the issue shifts outward increasing the price. So, at the end of lock up expiration, managers sell their stocks at higher market price to get incentives. They find that managerial shareholdings are positively related to underpricing for 618 IPOs from 1994-1999.

In case of Pakistan there is only one study done by Sohail and Nasr (2007) on underpricing and long run underperformance of the shares. They have quantified average initial underpricing of 50 IPOs issued from 2000-2006 at KSE and calculated 35.66 percent returns on the first trading day. They have also calculated average market adjusted cumulative abnormal returns and buy-and-hold over one year after listing –19.67 and –38.10 respectively by using Market Adjusted Return (MAR) model. They find that uncertainty, offer price, size, market capitalisation and oversubscription determined underpricing in case of Pakistan.

To sum up the review of literature indicates that there are different explanations for underpricing anomaly such as risk compensation, mitigation of winner's curse, signalling the quality of firm, overreaction hypothesis, price support or stabilisation activity, and ownership dispersion theory. Reviewed

literature reveals that the firms underprice the issue to achieve dispersed ownership structure which in turns helps to increase aftermarket liquidity.

This literature review also suggests that the issue of underpricing and related anomalies is widely tested for the developed markets. These issues are less seriously addressed for the emerging markets and in Pakistan's case these anomalies are not tested at all. It would be interesting to examine these anomalies in case of Pakistan which is focusing on increase in initial public offering to promote private sector development. This study tries to fill this gap by testing the underpricing anomaly.

4. THEORETICAL FRAMEWORK AND WORKING HYPOTHESIS

This section discusses the theoretical foundation and conceptual framework of the model and draws the hypothesis for empirical testing.

4.1. Theoretical Framework

This study uses the model that was formed by Booth and Chua (1996), who have modelled issuer's demand for diffused ownership effects of IPO underpricing. They have included information production, and information cost in the model. This study incorporates underpricing as determinant of ownership structure, ownership structure causing after-market liquidity and correlation of underpricing and liquidity.

4.1.1. *Ownership Structure and Underpricing*

Assuming equity is offered through firm commitment contract to finance growth opportunity and that no ex-ante lack of asymmetric information exists among investor and investment banker, yet still estimates are not perfect but remain noisy. By using prestigious underwriter and firm commitment contract, capital issuing company produces common-value information for issue. Then the underwriter carries out due diligence process to get better estimates for price and sets an offer price in preliminary prospectus. The investment banker then starts marketing to encourage perspective investor to incur investigation cost.

Assume for an issue *a, an investor x,* by bearing cost y_a, investor get better estimates of the market price of the share (MV). So investors compare their estimates with the offer price OP, to decide whether to bid or not. According to Merton (1987) all perspective investors who incur information costs are part of potential investor base. Informed investors have more probability to take part in secondary as well as in future offering of the firms. A broad ownership structure is important to have secondary market liquidity, as required by listing requirement of KSE. Due to adverse selection consequences uninformed investors do not bid for the shares.

In the model, both issuer and investment banker induce investors to incur information cost to number of investors. Due to production of sufficient information by issuer and investment bankers, oversubscription is achieved. So tissuer can achieve broader shareholder base and equal shareholder distribution in consideration of higher after-market liquidity. This study assumes that there will be lower information cost to attract potential investors and subsequent investors incur higher information costs. Thus information cost is an increasing function of a number of potential investors as potential investors increase information cost also. It means both first and second derivatives are positive i.e.,

$$\partial y(i)/\partial i > 0 \; and \; \partial y^2(i)/\partial i^2 > 0.$$

To show advantages of oversubscription benefits, the model assumes the ownership base of one shareholder. To achieve the required level of oversubscription, investment bankers must induce enough number of investors to purchase information to become potential investor. Assuming that only one bidder will be successful and the share will be allotted to him, all potential investors will bid having equal chances of allocation. Thus the final offer price OP is maximised with investors recovering information cost, when

$$OP = EV(i^*) - y(i^*) \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (4.1)$$

Where,

$EV(i^*)$ is Investment Bankers estimate of value at optimal level of oversubscription.

$y(i^*)$ is total Information Cost.

i^* is Optimal number of investor purchasing information.

Here $EV(i)$ is increasing function, but increasing with decreasing rate. Similarly $y(i)$ is also an increasing function but with increasing rate. In equilibrium, maximum proceeds calculate the estimated value and set final OP, keeping in mind the informed investors

$$\left[EV(i^*) - OP\right] - y(i^*) = 0 \quad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (4.2)$$

As the equation shows that initial underpricing or initial returns equal the information costs. As Wilson (1997), and French and McCormick (1984) argued a finite number of bidders expect the value of winning a bid is lower than the expected value of asset. It means informed investors only enter bidding process if winners expected profits equal the sum of all bidders information cost.

Fig. 1. Optimal Level of Oversubscription

Information Costs per Share y(i)

Market Value per Share EV(i)

Offer Price (OP$_i$)
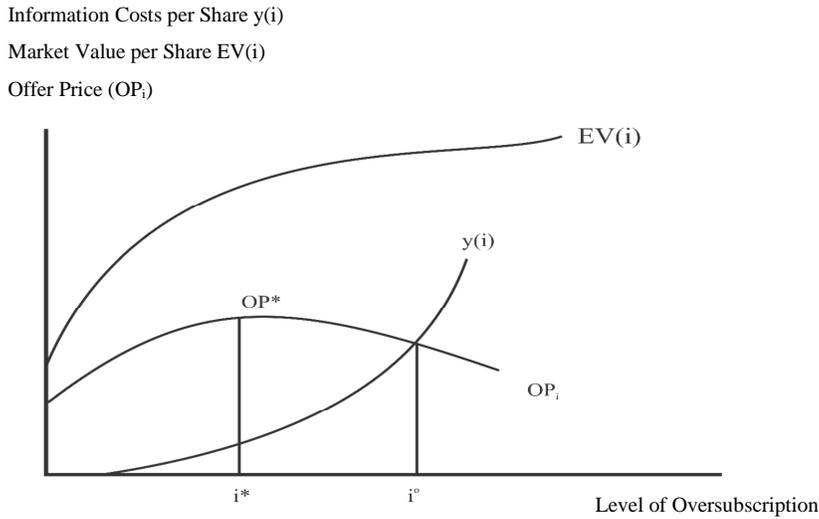
Source: Regenerated from Booth and Chua (1996).

Figure (1) shows a desirable number of potential investors purchasing information i^*. As it is assumed that the estimated value rises with oversubscription i^*, it is supported by Merton (1987) argument that more promoted issues induce more potential investors. While Amihud and Madelson (1986) show that broader marketing increases after market liquidity which is incorporated by the investors in valuation of stocks.

As investors' purchasing information (i) increases, so do the total information costs y(i), similarly EV (i) also increases with the increase in i. It can also see that y(i) increases with increasing rate and EV (i) increases with decreasing rate from Figure (1). As both EV (i) and y(i) increase so in Equation (4.1) the offer price OP can either increase or decrease, depending on the magnitude of the change in y(i) an EV(i). Due to change in i equation one becomes

$$\partial OP / \partial i = \partial EV(i) / \partial i - \partial y(i) / \partial i \qquad \dots \qquad \dots \qquad \dots \qquad \dots \quad (4.3)$$

If; $\partial EV(i) / \partial(i) > \partial y(i) / \partial(i)$

Then there will be higher initial returns for the investor so that market price will increase after the issue.

So, $\partial OP / \partial i > 0$

Here underpricing occurs because of oversubscription as the rate of change in EV(n) is larger than the rate of change in C(n).

If; $\partial EV(i) / \partial i < \partial y(i) / \partial(i)$

In this case investors will have negative returns.

So that $\partial OP / \partial i < 0$

Since the issue is undersubscribed the rate of change in information cost $y(i)$ increases more than the rate of change in expected value $EV(i)$. So overpricing occurs.

When $\partial EV(i^*) / \partial i = \partial y(i^*) / \partial i$

At i^* the offer price is at optimum level and the investment banker achieves a level of oversubscription at which the expected value of benefits become equal to information costs of an extra investor so that marginal benefits equal marginal information costs. Thus i^* is the equilibrium level of informed investor. At i^*, the issuer optimises his revenue, assuming investors to retrieve information costs by initial underpricing.

4.1.2. *Ownership Structure and Liquidity*

Liquidity is defined as the presence of continuous trading which is dependent on a number of shareholders to match opportunity of trading i.e., every seller has a buyer, Demsetz (1968). Small shareholders are also categorised as liquidity trader and according to Holmstrom,Tirole (1993) and Bhide (1993) the presence of dispersed ownership base increases liquidity and it is not substantially affected by asymmetric information. This also decreases chances of adverse selection costs (winner's curse) and promotes after-market liquidity in case of new issues. There is a trade-off between liquidity and monitoring for agency costs. As Jensen and Meckling (1976) and Vishny and Shleifer (1986) suggest, dispersion of ownership increases agency cost so that with no or small proportion of large shareholders, it is difficult to gather company information collectively as well as individually because it is costly. Also preventing managers from activities in their interest (increasing agency cost). While in concentrated ownership structure there are marginal benefits to small investors too, because it's easier for big shareholder to collect company information and take corrective measures. From their argument it can be concluded that some companies may give up liquidity to achieve benefits of control and monitoring.

Holmstrom and Tirole (1993) counter argue for the above argument by explaining that a firm owned by dispersed uninformed shareholders achieves after-market liquidity, yet some speculators might collect information about the firm in expectation of future profit. Thus there will still be private information in the market from unbiased sources, while agency cost and governance problems can be improved through incentive schemes for managers.

From the above arguments it is evident that the issuer can opt for after-market liquidity or agency cost minimisation taking into consideration the costs

related to the objective. The present study tries to investigate that underpricing can be used to compensate uninformed investors to achieve dispersed ownership structure which in turn increases after-market liquidity. To boost after-market liquidity, different stock markets have different requirements for listing so that in KSE smaller bidders will be preferred for allotment.

4.2. Development of Hypothesis

From the above arguments it is clear that firms decide to go for liquidity or agency cost minimisation to achieve their objectives considering the costs incurred. As this study is not going to settle this dispute and it rather examines how firm's underpricing can help to achieve dispersed ownership structure through oversubscription. The study analyses how dispersed ownership structure helps to have more liquid after-market. Liquidity is also achieved by compensating un-informed investors through initial returns (underpricing). The following hypotheses are formulated to investigate these issues:

> **Hypothesis 1**: Initial Returns (Underpricing) are positively related to dispersed ownership structure.
>
> **Hypothesis 2**: After-market liquidity is negatively dependent upon concentrated ownership structure and positively dependent on dispersed ownership structure.
>
> **Hypothesis 3**: All else equal, after-market liquidity is positively influenced by initial returns.

5. METHODOLOGY AND DATA

The empirical methodology, econometric tools used to achieve objectives of the study. data, and data sources used in this study are discussed in this section.

5.1. Empirical Model

5.1.1. *Determinants of Underpricing*

First, this study determines firm characteristics which are related to its decision to underprice the issue or not. Therefore the dependent variable is, to underprice or not to underprice, which can be translated into binary variable. So this study has to use a binary choice dependent model, and the simplest would be the Linear Probability Model. But it has a drawback: in it probability can be greater than one, due to this drawback, this study applies the logit model while the previous study also adopts such models as Phem, *et al.* (2003) use i.e. the probit model. Both probit and logit models give acceptable results and there is no specific advantage of one over the other, Amemiya (1981). The model is specified as:

$$\Pr ob(UNDP=1) = e^{z} / (1+e^{z}) \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (5.1)$$

Where

      UNDP = Underpricing
      UNDP = 1   if underpriced
      UNDP = 0   if overpriced

Where *e* is the base to natural logarithm

The empirical specification of the model is described by the following model suggested by Phem, *et al.* (2003).

$$UNDP = \alpha + \beta_1 LnSize + \beta_2 LnMB + \beta_3 Risk + \beta_4 MB + \beta_5 Debt$$
$$+ \beta_6 Int + \beta_7 Fin + \beta_8 TS + \beta_9 RR + LnTA + \varepsilon \qquad \ldots \qquad \ldots \quad (5.2)$$

UNDP is the proxy of underpricing decision of an IPO and it takes value of 0 if issue is fair/overpriced and 1 if it is underpriced. LnSize is issue size calculated by taking natural logarithm of market capitalisation after listing; the intensity shows the number of IPO in three immediately after IPO; these three variables are used as control variables for pre bid information costs. MB is used as a proxy of growth potential and computed as natural logarithm of MB. Debt is computed as book value of total debt divided by total assets used as agency cost variable. Debt is included as higher agency costs are associated with higher leverage [Jenson and Meckling (1976)]. Fin is a dummy variable which takes value of 1 if the issue is of a financial institution and financial service provider. The level of risk affects underpricing as mentioned by [Lehn and Domsetz (1985); Leahy and Leach (1991)], and is proxied by standard deviation of daily share returns during the first trading month. Intensity, TS and retained ratio is used by Booth and Chua (1996). The higher size issues are easier to value the argument by Booth and Chua (1996). The results from the model will identify the factors that affect the company's decision to underprice their shares.

5.1.2. *Ownership Structure and Underpricing*

According to the first hypothesis, there is a relationship between underpricing and ownership structure do that firms underprice the issue to achieve a dispersed ownership structure. This hypothesis is tested by using multiple regression model (MRM), which shows the relation between underpricing and ownership structure. Oversubscription, size, risk, leverage also affect ownership structure, therefore by incorporating these factors into the regression equation we get the following empirical specification:

$$OWNERSHIP = \alpha + \beta_1 LnR + \beta_2 OverSub + \beta_3 Risk + \beta_4 Size + \beta_5 MB$$
$$+ \beta_6 Debt + \beta_7 Fin + \varepsilon \quad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (5.3)$$

In the model *OverSub* shows the level of oversubscription of an IPO, it is the level of subscription for an issue. It shows demand for an issue, the higher

the demand the higher will be the opportunity for the issuer to achieve dispersed ownership consistent with the previous studies such as Booth and Chua (1996) and Phem, *et al.* (2003). On the dependent side OWNERSHIP is proxied for Herfindahl index (HERFNDL), Block holders proportion (BLOCK), Top 20 investors in IPO (TOP20), large investors holding more than 100,000 shares (LARGE), and breadth of shareholder base (BREADTH). Hypothesis 1 is tested by this model consistent with Phem, *et al.* (2003).

5.1.3. *Liquidity and Ownership Structure*

As mentioned in the second hypothesis, liquidity is positively related to breadth of ownership structure and negatively related to concentrated ownership. As liquidity is presence of regular trading which depends on a number of shareholders that help to achieve a match of buyer and seller according to Demsetz (1968). To check the second hypothesis this study regresses both of the proxies for liquidity against each proxy of ownership structure. The previous literature shows that liquidity can also be affected by firm size [Roll (1981)] and trading volatility [Stoll (1978); Karpoff (1987)], this study uses them as control variables for tests. When trading turnover works as the proxy of liquidity, this study controls for shares retained by the owners and the directors as they are not bound to trading their shares in the market under the KSE Listing Regulation 6 and Companies Issue of Capital Rules 1996 (3,4). Also used by Lee, *et al.* (1996), who find that it is less likely to see trading by internal owners during the initial period. So using trading turnover as dependent variable and all the proxies of ownership structure one by one, this study uses the following regression model to test our second hypothesis:

$$TURNOVER = \alpha + \beta_1 OWNERSHIP + \beta_2 Risk + \beta_3 Size + \beta_4 \operatorname{Re} tain + \varepsilon \quad (5.4)$$

According to Stoll (1978) inverse stock price variable should be controlled while using bid-ask as liquidity proxy. As spreads also cover for transaction costs such as dealers' processing cost, therefore for bid-ask as an independent variable the following model is estimated:

$$BIDASK = \alpha + \beta_1 OWNERSHIP + \beta_2 Risk + \beta_3 Size + \beta_4 Invprice + \varepsilon \quad (5.5)$$

5.1.4. *Liquidity and Underpricing*

Our third hypothesis stipulates that liquidity can be achieved by underpricing. To show this relation this study tests the third hypothesis i.e., whether the results support the first two hypotheses which show direct relationship between liquidity and underpricing. To estimate the given relationship, this study regresses both the proxies of liquidity against underpricing and other factors. For bid-ask spread as a dependent variable, the following regression model is estimated:

$$BIDASK = \alpha + \beta_1 LnR + \beta_2 Risk + \beta_3 Size + \beta_4 Invprice + \varepsilon \quad \dots \quad \dots \quad (5.6)$$

For trading turnover as a dependent variable, the regression has following specification:

$$TURNOVER = \alpha + \beta_1 LnR + \beta_2 Risk + \beta_3 Size + \beta_4 \operatorname{Re}tain + \varepsilon \qquad \dots \quad (5.7)$$

5.2. Variables Definition and Construction

This section describes the variables' definition and construction to test the hypothesis presented above.

5.2.1. *Measure of Underpricing*

Underpricing is defined as abnormal initial returns on the first day of the issue. This study uses Market Adjusted Returns consistent with previous studies. Initial returns are calculated and adjusted with market returns as shown in the equation,

$$MAR = \big((P_1 - OP)/OP\big) - \big((M_1 - M_0)/M_0\big)$$

where

MAR is Market Adjusted Returns
P_{i1} is price at the end of first trading day
OP is offer price of the issue
M_{i1} is closing price of market index on ith issue date
M_{i0} is Opening price of market index.

MAR is a good measure for descriptive use but it can violate normality assumption which can cause problems in econometric analysis. To deal with this problem the study uses natural logarithm MAR, consistent Dewenter and Malatesta (1997),

$$LnMAR_i = Ln(P_{i1}/OP) - Ln(M_{i1}/M_{i0})$$

5.2.2. *Measures of Ownership Dispersion*

Ownership structures of firms differ as it comprises different distributions of investor shareholdings. So there is not a single empirical measure used unanimously in literature instead these studies use breadth and equality of shareholders simultaneously to measure shareholder distributions.

5.2.2.a. Breadth

The size and variety of outside investor in IPO can be covered by the breadth parameter. It is the ratio of total number of shareholders to total amount of shares offered in an IPO.

$$Breadth = TNSH / Tot\,Cap$$

Here TNSH shows the total number of shareholders of an IPO and Tot Cap is the dollar amount of shares issued. Using breadth only as ownership dispersion is not sufficient because it only focuses on size, not on equality of shareholders. There may be the same breadth of shareholders but there may be no equal distribution. So this study uses other measures to cover for equality of shareholder's distribution. This shows deviation in proportion of outside shareholders. Breadth is further divided among shareholders per one million shares, which is consistent with the previous studies like Phem, *et al.* (2003).

5.2.2.b. Large

The study uses different measures to calculate equality of shareholders' distribution. For large shareholders having more than 100000 shares the following variable (large) is used: Large is calculated following Brenan and Franks (1997).

$$LARGE = (\sum_{k=1}^{n} Top\,Category\ - \mathrm{Re}\,tain_i) / Offer\,Size$$

Here *Retain$_i$* shows the number of shares kept by the original owners of firm *i*. Offer size shows total number of shares issued by the firm. Top category shows investors holding 100000 or more shares and *n* is the total number of those shareholders.

5.2.2.c. Blockholders

To show the effect of block holders, they are defined as investors holding more than 5 percent of the issued equity. It is calculated as

$$BLOCK = (\sum_{k=1}^{m} Block\,Size - \mathrm{Re}\,tain) / Offer\,Size$$

This proxy is calculated in line with Brenan and Franks (1997) and Stoughton and Zechner (1998).

5.2.2.d. Top Twenty

Another measure that is used to check inequality of ownership distribution measures the percentage of shares held by the top 20 investors consistent with Phem, *et al.* (2003).

$$Top20 = (\sum_{k=1}^{20} Top20Shareholders - \mathrm{Re}\,tain) / OfferSize$$

5.2.2.e. Herfindahl-Hirschmann Index

This study has also calculated Herfindhal-Hirschmann Index (HERF) by

summing squared shareholdings of the five largest shareholders:

$$HERF = \sum_{i=1}^{5} s^2{}_i$$

$HERF_i$ is the part that belongs to the ith largest shareholder (i=1, 2, 3, 4, 5). There exists non normality for Herfindahl index; to deal with it this study altered the original index with its square root followed by Phem, *et al.* (2003) and Bouzouita, Gajewski, and Gresse (2012).

5.2.3. *Measures of Liquidity*

Liquidity has been measured by two proxies in previous literature, trading turnover (trading volume divided by total number of outstanding shares) and bid-ask spread (shows average difference between buying and selling price). This study uses both of these proxies.

5.2.3.a. Trading Turnover

Trading turnover is calculated up to six months after the first listing date. This study has excluded the first four days because there is huge trading turnover in the first four days compared to the remaining days of the month. Trading turnover is calculated by scaling the trading volume of the firms followed by Phem, *et al.* (2003),

$$Turnover = \sum_{t=5}^{180} Volume / (180 * Issued\ Capital)$$

Here t is number of days, Volume is number of shares traded per day and issued capital is the dollar amount of issued capital. This study also calculated the first day trading turnover of firms going public.

$$FTR = Volume / Issued\ Capital$$

Volume shows the first day trading of that stock.

5.2.3.b. Bid-Ask Spread

This study estimates the average bid-ask spread from daily closing bid and ask quotes following Heflin and Shaw (2000),

$$\text{BID-ASK} = 1/240 \sum_{t=5}^{240} (ASK_t - BID_t) / (ASK_t + BID_t) / 2$$

ASK is high price of a stock on specific day
BID is lowest price of stock on specific day

Time horizon is the same for BID -ASK spread as it is for trading turnover.

5.2.4. *Other Control Variables*

Size

This variable shows magnitude of IPOs and this study uses it in the natural logarithmic of issue size. Booth and Chua (1996), Phem, *et al.* (2003) have also used the variable in their study.

Offer Price (OP)

Offer price is the price fixed by the issuer/underwriter measured as the natural logarithmic form used in analysis. Higher offer price affects returns negatively. Different studies such as Beatty and Ritter (1986), Mauer and Senbet (1992), Dewenter and Malatesta (1998) have used it as explanatory variable.

Market-to-Book Ratio (MB)

This study uses the log of market-to-book ratio as a proxy of growth. Gompers (1995), Pagano, *et al*. (1998) also used it as a proxy for the growth of a firm.

Debt is used as a proxy of agency cost and it is measured as total debt by total assets. It is also used by Phem, *et al.* (2003), Booth and Chua (1996).

Intensity (INT)

Intensity shows the number of issues in a period before and after 3 months of an issue. It depicts information production proxy, the higher the intensity the higher will be the information production and the lower will be underpricing. Booth and Chua (1996) introduced this variable in their study.

Fin

Fin is a dummy variable used for capturing the effect for financial firms which are strictly monitored and so are less likely to be underpriced. It has also been used in studies by Phem, *et al.* (2003) and Gresse, *et al.* (2012).

Times Subscribed (TS)

Times subscribed shows the number of times an issue has been subscribed. It means if an issue is of 10 million shares and it has been subscribed (bid) by 20 million than the issue will be considered to have been subscribed 2 times. So times subscribed is used as a proxy of demand for the issue. The higher the demand the higher will be the level of underpricing. Phem, *et al.* (2003) consider it an important determinant of underpricing and following their study it has been included in this study.

Risk

The proxy for the risk in this study is price volatility. This study uses standard deviation of price for the first month after listing. High risk firms need to underprice more to have a successful issue. Previous studies like Reilly (1977) and MacGuinness (1992) have also used it in their studies and found significant results.

Retain (RR)

Retain is defined as the proportion of shares retained by the original investors. This study has used the retain ratio as a control variable as previously done by Booth and Chua (1996), Phem, *et al.* (2003).

Inverse Price (INV)

Inverse price is calculated and is used as transaction cost which can affect bid-ask spread. Stoll (1978) has used inverse stock price as a control variable while analysing for bid-ask spread. This study uses this for analysis of bid-ask spread.

Total Assets (TA)

It is used as a proxy for firm size. Fama and French (1992) have found that size is negatively related to stock returns. Booth and Chua (1996) have explained that larger IPOs can be easily valued. This study uses the log of the total assets as a control variable.

5.3. Data

The sample for the analysis consists of 78 IPOs listed on KSE covering the period from March 2000 to July 2012. The data set used is extracted in the form of prospectuses collected from the Capital Issuing department of Securities and Exchange Commission of Pakistan and other data concerned with market liquidity is collected from financial websites like those of Business Recorder and Khistocks'. The data related to ownership structure is compiled from annual reports and other sources. This study has used only the fixed-price offers while book building offers have been excluded from the sample. Finally, due to unavailability of data, the sample of this study has been reduced to up to 59 IPOs.

6. EMPIRICAL RESULTS AND DISCUSSION

The empirical results and result discussion is provided in this section. The descriptive statistics are discussed in section 6.1. Section 6.2 includes the results of the determinants of underpricing, the effect of underpricing on ownership structure, the effect of ownership structure on liquidity and of underpricing on liquidity.

6.1. Descriptive Statistics

Descriptive statistics of market adjusted returns, proxies of ownership structure and proxies for market liquidity are given in the following table:

Table 6.1

Descriptive Stats for MAR, Ownership Structure and Liquidity

Variable	Mean	Median	Standard deviation	Min	Max	Skewness
MAR (%)	51.57	28.67	71.46	−26.22	319.64	1.19
Breadth	91.68	33.025	155.08	8.59	731.25	1.94
Large (%)	55.77	62	30.78	0	99.34	-0.266
Block (%)	30.93	17.35	34.43	0	98	0.64
T20 (%)	48.56	49.86	19.85	2	99.34	0.1286
Herfindahl index (%)	19.54	13.1	17	0.4	64.6	1.082
Retention Ratio (%)	76.27	75	14.7	0.1666	97.5	-1.16
First day Trading Turnover (%)	10.69	4.1	14.54	0.00321	65.19	1.998
Trading Turnover (TR) (%)	3.58	1.301	5.2	0.0025	26.16	1.53
Bid-Ask Spread (%)	3.755	3.74	4.72	0.074	26.67	1.841

Table 2 shows the descriptive statistics for MAR (Market adjusted returns which is the level of initial underpricing or initial abnormal returns), different proxies of ownership structure calculated as per formulas as given above and for the proxies of liquidity with given specifications.

Descriptive statistics show that on average IPOs at KSE are underpriced up to 51 percent; the ownership structure is defined by Breadth and Equality of the shareholder base for which different proxies have been used.

The mean result shows the breadth. On average there are 92 shareholders of every one million shares issued at KSE and almost 56 percent of the shares are held by the investors having more than 100000 shares. About 31 percent of the shares are being held by block holders (having more than 5 percent of the shares). On average 49 percent of the shares are held by the top 20 shareholders of an IPO. The Herfindahl Index shows the concentration of ownership to top 5 shareholders which is nearly 20 percent according to data. For liquidity, this study has used turnover as well as bid-ask spread calculated as given above. According to our data there is nearly 11 percent trading turnover for the first day of trading and on an average there is nearly 4 percent turnover per day up to sixth months of trading. The average bid-ask spread from day 5 to day 180 is close to 4 percent.

6.2. Regression Results

6.2.1. *Determinants of Underpricing*

The regression analysis begins with the determinants of underpricing. As the dependent variable (underpricing) takes the value of 1 if an IPO is

underpriced and 0 otherwise; the Ordinary Least Square is not appropriate as it is a binary dependent variable. The non-linear estimation technique ie Logit is more suitable for binary variable like UNDP as a dummy variable so that the underpricing is 1 or otherwise 0. The UNDP is regressed on risk, market to book value, size, debt, oversubscription and retained ratio. Table 6.2 shows the results of the logit model.

Table 6.2

Logit Regression Model Exploring Firm's Determinant of UP

	Coefficient	t-Statistics	p-Value	Pseudo R^2
Risk	1.99**	2.2	0.028	55.54
MB	−1.5111***	−1.84	0.066	
Size	0.7311	0.89	0.375	
Debt	3.5173	1.02	0.306	
TS	1.3723***	1.9	0.057	
RR	−6.3134	−1.07	0.283	
Fin	−2.1952	−1.19	0.233	
TA	−0.6477***	1.8	0.07	
INT	−0.9087***	1.7	0.089	
Constant	1.0201	0.2	0.84	
Pseudo R^2	0.55			

Note: The results are estimated as Eq.(5.2). The dependent variable (UNDP) takes a value of 1 if an IPO is underpriced and 0 otherwise. Explanatory variables include percentage of shares retained by the initial owner (RR), total asset as a proxy of firm size (TA), after market standard deviation of daily returns (RISK), log of Issue size (SIZE), log of the market-to-book ratio (MB), debt ratio is taken as book value of debt over total assets (DEBT), times subscribed in times as described demand of the issue (TS), dummy for financial firms (FIN) and intensity of the issues for three months before and after the issue (INT). The * indicates significance at 1 percent,**shows significance at 5 percent and *** indicates significance at 10 percent.

The results from the logit model indicate that IPOs with high market-to-book ratios, lower risk, high magnitude of the issue, and low demand with lower subscription, lower issue intensity for three months before and after the issue and with higher assets are less likely to be underpriced so that there will be no or less abnormal initial returns. If investors perceive that the firm might have higher price volatility, then to make their issue successful firms need to underprice; therefore firms with higher price volatility are going to underprice the issue as found by Reilly (1977) and MacGuinness (1992). Companies with higher growth opportunities (Higher market-book ratio) are less likely to underprice their issue. This result is supported by previous studies like Gompers (1995), Pagano, *et al.* (1998). As subscription shows the demand of an issue— the higher the demand the higher will be the price and higher will be the returns. In this respect Rock (1986) argued that an underpriced issue is subscribe by both

informed as well as uninformed investors. Therefore the issue will be oversubscribed. For this reason there is a positive relationship between demand (TS) and underpricing. Firms with greater assets have less uncertainty for potential investors because they have economies of scale as well as they can have access to credit easily. This relationship is confirmed by previous studies like Frinkle (1998) and Carter, Dark, and Singh (1998). It is evident from the results that firms with higher total assets are less likely to underprice their issue. Fama and French (1992) also argued that size is negatively related to stock returns. Booth and Chua (1996) explained that larger IPOs can be easily valued. Intensity has a negative sign and it is consistent with Booth and Chua (1996) findings which show that the IPOs issued three months before and after a specific issue with higher intensity reduce information costs i.e., investors are more informed in case of higher intensity as they have to incur low information cost for another issue. Overall, this estimated model indicates different firm characteristics affect firm decision to underprice an issue.

6.2.2. *Results of Effect of Underpricing on Ownership Structure*

Now the question arises how these firm characteristics are related to the objective of a firm to have its desired ownership structure? High risk firms have to underprice, more consistently with previous studies such as Reilly (1977) and Paul MacGuinness (1992), which means high initial returns induce more prospective investors and with oversubscription the firm can have its desired ownership structure, as argued by Booth and Chua (1996) and Phem, *et al* (2003). Firms with high market-to-book ratio are linked with more agency costs and need monitoring from shareholders, as argued by Gompers (1995), companies with high market-to-book ratio are expected to have lower profits in future as the company is at its best time (there is low potential of firm growth) when it went public. This is shown empirically by Pagano, *et al.* (1998). It can be one of the reasons for the long run underperformance of IPOs. As larger shareholders have to bear lower cost for monitoring, as argued by Brkart, *et al.* (1997). So firms with high market-to-book ratio have less probability to underprice their shares and they might look for large shareholders, as argued by Zingales (1995). Higher subscription gives owners of a firm more opportunity to have the desired level of ownership structure, as argued by Booth and Chua (1996) and Phem, *et al.* (2003). Firms having greater total assets have less uncertainty for prospective shareholders, so the firm with this type of characteristics is less likely to underprice its issue which is consistent with Frinkle (1998). IPO is a crucial first step of selling a firm consistent with Zingales (1995), Mello and Parsons (1998) and Pagano, *et al.* (1998). Therefore, the ownership structure attained in IPOs must be optimal for subsequent issue.

For exploring underpricing effects on ownership structure, the equation (5.3) is estimated. The following tables show the brief results. For ownership

this analysis used Breadth for shareholder base, and for equality square root, transformation of the Herfindahl index (to cope with non-normality) which is consistent with Gresse, *et al.* (2012) and Phem, *et al.* (2003). The explanatory variables include market adjusted returns, total assets, retained ratio and market-to-book ratio. The Ordinary Least Square is used as estimation technique and the standard errors adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix.

Table 6.3

Results of the Effect of Underpricing on Ownership Structure (Breadth)

Independent Variables	Dependent Variable is Breadth		
	Coefficient	t-Statistics	p-Value
LnR	1.1216*	2.16	0.037
TA	0.1424***	1.8	0.08
RR	–0.3649	–0.61	0.547
MB	–0.0399	–0.25	0.804
Constant	3.0577*	11.41	0
R^2	0.20		
F Stat (p value)	4.54 (0.003)		

Note: The results are based on the regression specified in Equation (5.3). The dependent variable natural log of shareholders per one million shares (Breadth). Explanatory variables are continuous returns (log market adjusted returns)showing underpricing (LnR), log of total assets for as a proxy of firm size (TA), percentage of shares attained by initial owner and log of the market-to-book ratio(MB) as growth proxy. The * indicates significance at 1 percent, **shows significance at 5 percent and *** indicates significance at 10 percent.

The results indicate the direction of relationship with breadth of ownership which is consistent with previous literature as empirically shown by Phem, *et al.* (2003) and Brenan and Franks (1997). They have found that the issuer wants to have broader ownership structure so they underprice their issue which increases the demand of the issue leading to oversubscription. The issuer therefore has the opportunity to favour small investors to create dispersed ownership structure. The result of this study is consistent with the above mentioned studies. The model is significant at five percent over all.

Results of the Effect of Underpricing on Ownership
  Structure (Concentration)

As breadth alone is not a good measure of ownership structure so this study used variables for concentration of shareholders too. It used Large, T20, Block and HERF (which is the sum square root of last five shareholders, showing the concentration of ownership structure). Here HERF is used as a dependent variable and the main independent variable is market adjusted return. The other control variables are the same as in the previous model. The multiple

regression model is used with the standard errors adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix.

Table 6.4

Results of the Effect of Underpricing on Ownership Structure (Concentration)

Independent Variables	Dependent Variable is HERF		
	Coefficient	t-Statistics	p-Value
LnR	–0.1101***	–1.94	0.058
TA	0.0424*	2.16	0.036
RR	–0.2817***	–1.77	0.082
MB	–0.0282	–1.59	0.117
Constant	0.3584*	2.6	0.012
R^2	0.21		
F Stat (p value)	3.00 (0.02)		

In the estimated model the expected results are obtained when concentration of ownership is regressed on market adjusted returns and control variables. The result indicates that underpricing is negatively related to concentrated ownerships and this result is consistent with the studies of Brennan and Franks (1997), Michealy and Shaw (1994) and Phem, *et al.* (2003). All of the above mentioned studies have found underpricing helps the issuer to deal with concentration as by underpricing there will be oversubscription and the issuer can discriminate large investors. Therefore there will be lower concentration of ownership. These results are in line with the previous studies and according to the ownership dispersion theory. Other control variables are total assets and retained ratio consistent with Booth and Chua (1996). Small issues have lower concentrations as found by Booth and Chua. Our model's result is similar to their's. The model is overall significant at 5 percent. Other firm characteristics such as debt, risk, size and market-to-book do not significantly affect ownership structure and this is consistent with the study of Phem, *et al.* (2003).

Other proxies of ownership structure (Large, T20 and Block) have the expected signs according to the theory (using univariate regression model) but the models estimated with these proxies are not significant (Shown in the Appendix B). So for brevity this study is showing these results only.

6.3. Results of Effect of Ownership Structure on Liquidity

The second hypothesis is how ownership structure affects liquidity. This is tested by regressing ownership structure and control variables on liquidity given by Equations (5.4) and (5.5). As high turnover shows higher liquidity, the expected signs of proxies of ownership structure are positive for breadth and negative for the

inequalities of the shareholder base of new issues. The results from Equation (5.4) show the relationship between ownership structure and liquidity. The results reported in Table 6.5 are for testing the second hypothesis, which are as expected as per theory and previous literature. As the trading turnover is being used as the dependent variable (higher turnover shows higher liquidity) in the theory, it is expected that it is positively correlated with the shareholder base (Breadth) and negatively related to the inequality of ownership structure of new issues.

Table 6.5

Results of Relationship between Ownership Structure and Liquidity

Independent Variables	Dependent Variable: Trading Turnover				
	(1)	(2)	(3)	(4)	(5)
Breadth	0.2031**				
	0.042				
Large		–0.467**			
		0.035			
Block			-0.669***		
			0.09		
T20				-0.7614	
				0.112	
Herf					-1.79**
					0.034
Retain	0.42	-0.7	-0.748	-0.788	-0.879
	0.68	0.499	0.47	0.47	0.389
Risk	1.71	0.65	0.67	0.7	0.45
	0.145	0.561	0.54	0.525	0.679
Size	0.37*	0.39*	0.35*	0.36*	0.34*
	0.002	0.002	0.005	0.005	0.007
Intercept	–0.95	–0.115	0.107	0.277	0.49
	0.29	0.9	0.9	0.78	0.616
F(4,54)	4.69	3.53	4	4.03	4.7
	0.002	0.012	0.0065	0.0062	0.002
R^2(%)	24.5	21	23	23	25.7

Note: The results are based on Equation (5.4). The dependent variable is average trading turnover per day for six months after trading (TR). Each regression use some of the proxies for ownership structure as the main explanatory variable, i.e. the breadth of the shareholder base (BREADTH), the proportion of total shares held by shareholders with at least 100,000 shares (LARGE), proportion of shares owned by blockholders (BLOCK) , proportion of shares owned by top-20 investors (T20), and the square root of the Herfindahl index (HERF). The common control variables are original owner retention(RETAIN), after-market standard deviation of daily returns (RISK), log of firm size (SIZE).All p-values are reported in parentheses and based on the standard errors adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix. The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent.

Overall, all the models are significant at one percent, only size from the control variables has significant results. Other control variables are not significant. Because this study is using data of the firms which are not much established and their sample size is small and the primary market is underdeveloped. In contrast Demsetz and Lehn (1985) and Shleifer and Vishny (1986) have found these variables to be significant, because they are using data of more established firms. Established firms have an optimal ownership structure and competitive trading which reduces their agency cost.

Phem, *et al.* (2003) also find the control variables insignificant in explaining liquidity. The main explanatory variables—Breadth, Large and Herf are significant at 5 percent while block is significant at 10 percent and T20 is not significant at 10 percent but all have the expected signs. The results are consistent with the previous studies such as Phem, *et al.* (2003), Demsetz (1968), Holmstrom and Tirole (1993), such that with higher shareholder base and lower concentration of shareholding firms can achieve more liquid secondary markets for their issues. The results are not significant for the other proxies of liquidity which is bid-ask spread. The underdeveloped nature of the market is the reason that it has very little impact of ownership structure on liquidity.

6.4. Results for Effect of Underpricing on Liquidity

From analysing the first and second hypotheses this study comes up with the evidence that underpricing does impact the shareholder base and concentration, which consequently affects the liquidity of its shares on the secondary market. Therefore, from these results one can expect a relation between underpricing and secondary market liquidity, which is the third hypothesis of the study. To test this hypothesis, underpricing along with control variables are regressed on liquidity and the relationship is given in Equations (5.6) and (5.7). Following are the results of the estimations.

The result reported in Table 6.6 show positive, greater than one and highly significant coefficient of market adjusted returns indicating that underpricing has an impact on secondary market liquidity. The control variable size is also significant consistent with Booth and Chua (1996) and Phem, *et al.* (2003). The pre issue demand of shares also affects trading turnover consistent with Booth and Chua (1996). Overall, our model is significant at 1 percent. From equation (5.7) the estimates are insignificant. This might be because of the small sample and developing nature of our market. Also, there is no proper proxy in case for bid-ask spread as this study used high and low price instead of bid-ask. From the previous literature it is evident that turnover is also influenced by the bid-ask spread, consistent with Stoll (1978) and Constantinides (1986). So equation 5.7 is regressed using bid-ask as the explanatory variable, Table 6.7 below shows the results:

Table 6.6

Results for Effect of Underpricing on Liquidity

Independent Variables	Dependent Variable: Trading Turnover		
	Coefficient	t-Statistics	p-Value
LnR	1.01**	2.03	0.048
Size	0.36*	3.09	0.003
Risk	−5.98**	−2.11*	0.04
RR	−0.99	−0.99	0.334
TS	0.08***	1.74***	0.087
Constant	0.006	0.01	0.994
R^2			
F Stat (p value)			

Note: The results are based on the regression specified in Equation (3.8). The dependent variable is trading turnover, showing the volume of trading in newly issued stock (TR). Explanatory variables are continuous returns (log market adjusted returns) showing underpricing (LnR), log of issue size (SIZE), the percentage of shares attained by initial owner and times subscription of the issue. The * indicates significance at 1 percent, **shows significance at 5 percent and *** indicates significance at 10 percent.

Table 6.7

Results for Effect of Underpricing on Liquidity

Independent Variables	Dependent Variable : Trading Turnover		
	Coefficient	t-Statistics	p-Value
LnR	0.93***	1.87***	0.067
Size	0.41*	3.44*	0.001
Risk	-4.4	-1.66	0.103
RR	-1.31	-1.24	0.217
BAS	0.18***	1.93***	0.059
Constant	-0.41	-0.47	0.638
R^2	0.30		
F Stat (p value)	4.55 (0.0016)		

Note: The results are based on the regression specified in Equation (3.8). The dependent variable is trading turnover, showing the volume of trading in newly issued stock (TR). Explanatory variables are continuous returns (log market adjusted returns) showing underpricing (LnR), log of issue size (SIZE), the percentage of shares attained by initial owner and average bid-ask spread (BAS). The * indicates significance at 1 percent, **shows significance at 5 percent and *** indicates significance at 10 percent.

The result documented in Table 6.7 further confirms that underpricing has an impact on secondary market liquidity. Among control variables size has also positive and significant effect on liquidity and this result is confirmed by the findings of Booth and Chua (1996) and Phem, *et al.* (2003). The average bid-ask is also affecting turnover significant at 10 percent similar to the findings of

Phem, *et al.* (2003). Overall our model is significant at 1 percent. From Equation (5.9) estimates are insignificant similar to the previous equation.

7. CONCLUSION AND POLICY IMPLICATIONS

This study tried to explain the underpricing anomaly in case of Pakistan for the very first time. It is found that overall underpricing in KSE for the 59 IPOs issued during 2000 to 2012 is almost 52 percent. As the study explains the phenomenon through ownership dispersion hypothesis given by Booth and Chua (1996), the firms underprice the issue to achieve a broader ownership base through oversubscription of the issue which in-turn helps the firms to enhance their after-market liquidity.

To test the above hypothesis, this study first determines the characteristics of the firms which cause underpricing. By using a logit model this study finds that risk and demand (oversubscription) are positively related to underpricing while lower growth opportunity, higher assets and intensity are negative determinants of underpricing in line with the previous studies.

Then this study examines the relationship between ownership structure and underpricing by applying the OLS method. Two proxies of ownership structure (Breadth and Herfindahl index) have the significant effect of underpricing. Directions of the other proxies are also the same as per literature but the study could not find significant results from the sample. The result of this study is similar to Brennan and Franks (1997), and Phem, *et al.* (2003).

To test the relationship between ownership structure and liquidity this study has used multiple regression model by taking two proxies of liquidity as dependent variable and all the proxies of ownership structure one by one. It has found significant results with ownership structure proxies except T20, when regressed on turnover. Phem, *et al.* (2003), Jacoby and Zheng (2010) Domsetz (1968) also find similar results arguing that the number of shareholders is a factor of liquidity. The results with bid-ask spread is not significant which may be due to the developing nature of the market.

Finally this study examines the relationship between underpricing and liquidity. Two proxies of liquidity are used in the study—trading turnover (trading volume) and bid-ask spread. According to Stoll (1978) there exists simultaneity between these two variables so that both affect each other. This study has applied the 2 SLS model but the signs of both coefficients of turnover and bid-ask spread are insignificant. Therefore, there is no simultaneity in this case. For this reason OLS is used to estimate the relation between liquidity and underpricing. It is found that while using turnover as a dependent variable, it is consistent with Phem, *et al.* (2003). While using bid-ask, this study has found that insignificant relationship might be due to the developing nature of the market. Constantinides (1986) has used bid-ask spread to capture trading turnover and found significant results. Therefore, bid-ask spread has an impact on turnover.

From the above conclusions of the study, it can be said that the empirical analysis of the present study supports the ownership dispersion hypothesis given by Booth and Chua (1996) and Brennan and Franks (1997). It means that ownership underprice the issue to have broader shareholder base. The underpricing firms have oversubscription which helps them to discriminate in favour of small shareholders. Here underpricing is compensation for uninformed investors. Then this broader shareholding base makes a liquid secondary market since according to Domsetz (1968), the greater number of shareholders increases market liquidity. Underpricing also has a positive impact on liquidity, as it induces oversubscription which increases the demand which in turn causes secondary market liquidity.

From the above results of this study some implications can be drawn for investors and regulatory bodies. Regulatory authority such as SECP (Securities and Exchange Commission of Pakistan) can consider setting some limits on the level of underpricing. As informed investors take advantage of it having access to information while small investors do not have much information. Managers who have some shareholding can also be monitored as they can intentionally underprice the issue to take personal incentives after lock up expiration. (Lock up expiration period consists of six months as per listing regulation No 6(A)(7)(i) of KSE. Sponsors and pre-IPO private placements come under this act) This can also be a reason of long term under performance of the IPOs. Regulatory authorities can monitor the ownership structure of new issues to stop block-holdings or concentrated shareholding which decreases after-market liquidity. As underpricing is the indirect cost of any issue for the firm, so the issuer/firm must set a specific range of underpricing to achieve its objective of dispersed ownership and liquid secondary market. Awareness increases the participation of more investors which will enhance market liquidity.

This study has found an explanation of underpricing anomaly. Further research may be carried out for long run underperformance with managerial ownership. It might be one of the reasons for underpricing. Since on lock-up expiration the supply of shares increases than its demand it leads to fall in stock price. It will be interesting to check whether benefits from liquidity are greater than the marginal benefits from information cost or not. All the other theories of underpricing must be tested empirically to find if equity is a costlier way to raise capital or the debt.

APPENDICES

APPENDIX 1

Table shows name and sectors of the firms which have raised capital through initial public offerings.

Appendix 1

Name of Companies Having IPO

Name of the Company	Year of Listing	Sector
Worldcall Payphones Ltd.	2000	Transp. & Comm.
Dewan Farooq Motors Ltd.	2000	Auto & Allied
Al-Meezan Investment Bank Ltd.	2000	Inv. Co. & Banks
Bestway Cement Ltd.	2001	Cement
Arif Habib Securities Ltd.	2001	Sec. Cos'/Banks
First Capital Equities Ltd.	2001	Sec. Cos'/Banks
WorldCALL Multimedia	2002	Tran. & Comm.
National Bank of Pakistan	2002	Sec. Cos'/Banks
Ittehad Chemicals	2003	Chemical & Pharma.
TRG Pakistan Limited	2003	Tech. & Comm
Pakistan International Container Ltd.	2003	Transport
First National Bank Modaraba	2003	Modaraba
OGDCL	2004	Fuel & Energy
World Call Broad Band Ltd.	2004	Technology & Comm.
Mac Pac Films Ltd.	2004	Misc.
Callmate Telips Telecom Ltd.	2004	Technology & Comm.
Bank Alfalah Limited	2004	Comm. Banks
Pakistan Petroleum Limited	2004	Oil & Gas Exploration Co's.
First National Equities Ltd.	2004	Inv. Banks/ Inv. Co's/ Sec. Co's
AMZ Ventures Ltd.	2004	Inv. Banks/ Inv. Co's/ Sec. Co's
Network Micro Finance Bank Ltd.	2005	Inv. Banks/ Inv. Co's/ Sec. Co's
International Housing Finance Ltd.	2005	Inv. Banks/ Inv. Co's/ Sec. Co's
Jahangir Siddiqui Capital Market Ltd.	2005	Inv. Banks/ Inv. Co's/ Sec. Co's
Attock Petroleum Ltd.	2005	Oil & Gas Mkt. Companies
Kot Addu Power Compnay Ltd.	2005	Power Generation and Distribution
Dewan Farooq Spinning Mills Ltd.	2005	Textile Spinning
United Bank Limited	2005	Commercial Banks
NetSol Technologies Ltd.	2005	Technology & Communication
D.S Industries Limited	2005	Textiles
Siddiqsons Tin Plates.	2005	Misc.
The Bank of Khyber	2006	Commercial Banks
BankIslami Pakistan Ltd.	2006	Commercial Banks
SME Leasing Ltd.	2006	Leasing Companies
Allied Rental Modaraba	2007	Modaraba
Arif Habib Ltd.	2007	Inv. Banks/ Inv. Co's/ Sec. Co's
Pace (Pakistan) Ltd.	2007	Misc.
Flying Cement Co. Ltd.	2007	Cement
JS ABAMCO Ltd.	2007	Inv. Banks/ Inv. Co's/ Sec. Co's
Pervez Ahmed Securities Ltd.	2007	Inv. Banks/ Inv. Co's/ Sec. Co's
Sitara Peroxide Ltd.	2007	Chemicals
Habib Bank Limited	2007	Commercial Banks
Dost Steel Mills Ltd.	2007	Engineering
Arif Habib Bank Ltd.	2008	Commercial Banks
Invest & Finance Securities Ltd.	2008	Inv. Banks/ Inv. Co's/ Sec. Co's
Thatta Cement Ltd.	2008	Cement
Dawood Equities Ltd.	2008	Inv. Banks/ Inv. Co's/ Sec. Co's
Engro Polymer & Chemicals Ltd.	2008	Chemicals
Arif Habib Investment Management	2008	Inv. Banks/ Inv. Co's/ Sec. Co's
Descon Oxychem Ltd.	2008	Chemicals
Nishat Power Limited	2009	Power Generation and Distribution
Ghani Gases Limited	2009	Power Generation and Distribution
Fatima Fertiliser Co. Ltd *	2010	Chemicals
Safe Mix Concrete Products Limited	2010	Construction and Materials
Agritech Limited	2010	Chemicals
Wateen Telecom Ltd	2010	Technology & Communication
International Steels Limited	2011	Industrial Metals and Mining
Engro Foods Limited	2011	Food Producers
TPL Direct Insurance Limited	2011	Non Life Insurance
TPL Trakker Limited.*	2012	Technology Hardware and Equipment

Note: This table shows name and sectors of the firms gone public from 2000 to 2012 and are included in this study.

APPENDIX 2

This part shows the insignificant results of some of the proxies with underpricing (initial returns). A table shows insignificant results of underpricing with large shareholders, as can be seen from the table.

Appendix 2A

Results of the Effect of Underpricing on Ownership Structure (Concentration)

Independent Variables	Dependent Variable :Large		
	Coefficient	t-Statistics	p-Value
LnR	–0.0269	–0.24	0.808
TS	–0.0005	–0.04	0.971
Risk	–0.343	–0.73	0.471
Debt	–0.057	–0.36	0.723
TA	0.00068	0.02	0.986
RR	–0.285	–0.89	0.376
MB	–0.0006	–0.02	0.986
Constant	0.837*	2.95	0.005
R^2	0.19		
F Stat (p value)	0.28 (0.958)		

Note: The results are based on the regression specified in Eq (5.3).The dependent variable ps proportion of shareholders having shareholding greater than 100000 shares. Explanatory variables are market adjusted returns shows underpricing (LnR), log of total assets for as a proxy of firm size, percentage of shares attained by initial owner and log of the market-to-book ratio(MB) as growth proxy. The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent.

APPENDIX 3

Here the insignificant results of underpricing are shown for the top twenty shareholders taken as one of the proxies of ownership structure, as can be seen from the table.

Appendix 3

**Results of the Effect of Underpricing on Ownership Structure
(Concentration)**

Independent Variables	Dependent Variable :T20		
	Coefficient	t-Statistics	p-Value
LnR	–0.070	–0.66	0.510
TS	–0.0031	–0.21	0.831
Risk	–0.132	–0.29	0.773
Debt	0.115	0.74	0.463
TA	0.042	1.15	0.257
RR	–0.623	–2.03	0.047
MB	–0.068	–2.05	0.045
Constant	0.855*	3.14	0.003
R^2	0.22		
F Stat (p value)	1.10 (0.379)		

Note: The results are based on the regression specified in Eq(5.3).The dependent variable proportion of shares held by top 20 shareholders. Explanatory variables are market adjusted returns shows underpricing (LnR), log of total assets for as a proxy of firm size, percentage of shares attained by initial owner and log of the market-to-book ratio(MB) as growth proxy. The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent

APPENDIX 4

Here the insignificant results of underpricing with BLOCK (defined as shareholders having more than 5 percent shareholdings) shareholders taken as one of the proxy of ownership structure are shown in the table:

**Results of the Effect of Underpricing on Ownership Structure
(Concentration)**

Independent Variables	Dependent Variable :BLOCK		
	Coefficient	t-Statistics	p-Value
LnR	–0.0723	–0.59	0.559
TS	0.0246	0.58	0.564
RR	–0.4787	–1.35	0.184
Debt	–0.0591	–0.33	0.745
TA	0.0105	0.63	0.530
Risk	–0.5285	–1.00	0.320
MB	–0.0031	–0.08	0.935
Constant	0.6747**	2.13	0.038
R^2	0.12		
F Stat (p value)	(1.1 (0.379)		

Note: The results are based on the regression specified in Eq (5.3).The dependent variable percentage of shareholders having more than 5 percent shares.. Explanatory variables are market adjusted returns shows underpricing (LnR), log of total assets for as a proxy of firm size, percentage of shares attained by initial owner and log of the market-to-book ratio(MB) as growth proxy. The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent.

APPENDIX 5

　　　　Appendix 5 shows the impact of ownership proxies on one of the proxies of liquidity (Bid-Ask Spread). It can be seen from the table that there is no causal effect of ownership proxies for the case of Bid-Ask spread. The overall signs of the coefficients of ownership proxies are consistent with the ownership dispersion theory. But it can be seen from the table that there is significant effect of control variables such as retain and risk on Bid-Ask spread.

Results of Relationship between Ownership Structure and Liquidity

Independent Variables	Dependent Variable: Bid-Ask Spread				
	(1)	(2)	(3)	(4)	(5)
Breadth	0.2238				
	0.178				
Large		0.0415			
		0.95			
Block			-0.3119		
			0.603		
T20				0.0828	
				0.901	
Herf					0.0817
					0.945
Retain	3.93*	3.98*	3.92*	4.018*	4.01*
	0.007	0.008	0.009	0.008	0.008
Risk	3.78**	3.51**	3.456**	3.538**	3.543**
	0.015	0.028	0.029	0.026	0.027
Size	–0.275***	–0.245	–0.3119	–0.241	–0.243
	0.078	0.149	0.127	0.168	0.167
Intercept	0.355	0.9714	1.221	0.852	0.891
	0.776	0.476	0.37	0.549	0.528
$F_{(4,54)}$	3.58	2.62	2.7	2.62	2.62
	0.0116	0.0451	0.04	0.0449	0.0451
R^2(%)	15%	10%	10%	10%	10%

Note: The results are based on Eq.(5.4).The dependent variable is average Bid-Ask Spread per day for   six months after trading (TR). Each regression use some of the proxies for ownership structure as the main explanatory variable, i.e. the breadth of the shareholder base(BREADTH),the proportion of total shares held by shareholders with at least 100,000 shares (LARGE), proportion of shares owned by blockholders (BLOCK) , proportion of shares owned by top-20 investors (T20), and the square root of the Herfindahl index (HERF). The common control variables are original owner retention(RETAIN), after-market standard deviation of daily returns (RISK), log of firm size (SIZE).All p-values are reported in parentheses and based on the standard errors adjusted for heteroscedasticity using White's(1980) heteroscedasticity-consistent covariance matrix. The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent.

APPENDIX 6

Appendix 6 shows the insignificant relationship of underpricing (initial returns) on bid-ask spread of the issued stocks.

Results for Effect of Underpricing on Liquidity

Independent Variables	Dependant Variable: Trading Turnover		
	Coefficient	t-Statistics	p-Value
LnR	0.097	0.18	0.858
Size	–0.0367	–0.17	0.865
Risk	2.41	1.59	0.135
INVPRICE	3.456	0.43	0.666
Constant	–0.41	–0.47	0.638
R^2	0.20		
F Stat (p value)	0.87 (0.618)		

Note: The results are based on the regression specified in Eq.(5.9).The dependent variable is Bid-Ask spread, showing the volume of trading in newly issued stock (TR). Explanatory variables are market adjusted returns (MAR), log of issue size (SIZE), the percentage of shares attained by initial owner and average bid-ask spread (BAS). The *indicates significance at 1 percent, **shows significance at 5 percent and ***indicates significance at 10 percent.

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