



Liquidity Benefits from Underpricing

Evidence from IPOs listed at KSE



by

MALIK MUHAMMAD SHEHR YAR

07/M.PHIL-EAF/PIDE/2011



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Supervisor

Dr. Attiya Yasmin Javid

Professor of Economics

Pakistan Institute of Development Economics

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Dedicated to my Family

Friends and Teachers

(May ALLAH bless them)

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Table of Contents

Abstract	1
<i>Chapter 1</i>	2
<i>Introduction</i>	2
1.1 Background:	2
1.2 Significance of the Study:	5
1.3 Objectives:	6
1.4 Organization of the Study:	7
<i>Chapter 2</i>	8
Overview of the Underpricing	8
2.1 Overview in Pakistan’s Scenario:	8
2.2 International Evidence of Underpricing:	12
<i>Chapter 3</i>	15
<i>Literature Review</i>	15
3.1 Background:	15
3.2 Theoretical Literature Review on Underpricing Anomaly:	16
3.2.1 Empirical Literature Review on Underpricing Anomaly:	18
3.2.2 Empirical Literature on the Relation between Ownership Structure and Underpricing:	19
3.2.3 Empirical Literature on the Relation between Ownership Structure and Liquidity:	21
3.2.4 Empirical Literature on the Relation between Liquidity and Underpricing:	22
<i>Chapter 4</i>	26
<i>Conceptual Framework and Working Hypothesis</i>	26
4.1 Theoretical Framework:	26
4.1.1 Ownership Structure and Underpricing:	26

4.1.2 Ownership Structure and Liquidity:	30
4.2 Development of Hypothesis:	31
<i>Chapter 5</i>	32
<i>Methodology and Data</i>	32
5.1 Econometric Model:	32
5.1.1 Determinants of Underpricing:	32
5.1.2 Ownership Structure and Underpricing:	33
5.1.3 Liquidity and Ownership Structure:	34
5.1.4 Liquidity and Underpricing:	35
5.2 Variables Definition and Construction:	36
5.2.1 Measure of Underpricing:	36
5.2.2 Measures of Ownership Dispersion:	36
5.2.2.a Breadth:	37
5.2.2.b Large:	37
5.2.2.c Blockholders:	37
5.2.2.d Top Twenty:	38
5.2.2.e Herfindahl-Hirschmann Index:	38
5.2.3 Measures of Liquidity:	38
5.2.3.a Trading Turnover:	39
5.2.3.b Bid-Ask Spread:	39
5.2.4 Other Control Variables:	40
<i>Chapter 6</i>	43
<i>Empirical Results and discussions</i>	43
6.1 Descriptive Statistics:	43
6.2 Regression Results:	44
6.2.1 Determinants of Underpricing	44
6.2.2 Results of Effect of Underpricing on Ownership Structure:	46
6.3 Results of Effect of Ownership Structure on Liquidity:	49
6.4 Results for Effect of Underpricing on Liquidity:	51
<i>Chapter # 07</i>	54
<i>Conclusion and Policy Recommendations</i>	54

7.1 Conclusion:	54
7.2 Policy implications:	56
7.3 Future Research:	57
7.4 Limitations of the study:	57
References:	58
Appendix:	64

List of Tables

Table 1: No of shares offered in millions by IPOs	10
Table 2: Offer Price (Rs).....	10
Table 3: Capital Raised in millions Rs	11
Table 4: International Evidence on Average Initial Returns	13
Table 5: Descriptive Stats for MAR, Ownership Structure and Liquidity	43
Table 6: Logit Regression Model Exploring Firm's determinant of UP	45
Table 7: Results of the Effect of Underpricing on Ownership Structure (Breadth) .	47
Table 8: Results of the Effect of Underpricing on Ownership Structure (Concentration).....	48
Table 9: Results of Relationship between Ownership Structure and Liquidity	50
Table 10: Results for Effect of Underpricing on Liquidity	52
Table 11: Results for Effect of Underpricing on Liquidity	53

List of Figure and Appendix

Figure 1 :Optimal Level of Oversubscription:.....	28
Appendix 1: Name of companies having IPO	64
Appendix 2: Results of the Effect of Underpricing on Ownership Structure (Concentration).....	66
Appendix 3: Results of the Effect of Underpricing on Ownership Structure (Concentration).....	67
Appendix 4: Results of the Effect of Underpricing on Ownership Structure (Concentration).....	68
Appendix 5: Results of Relationship between Ownership Structure and Liquidity	69
Appendix 6: Results for Effect of Underpricing on Liquidity.....	70

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 characterized 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 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.

Keywords: Underpricing, Ownership Structure, After Market-Liquidity.

JEL classification: G3, G12, G24

Chapter 1

Introduction

1.1 Background:

Capital is the basic need for any business to operate. Capital can be generated through different methods. Selling equity to the investors is one of them. A firm when raises capital by selling its stocks for the first time to general public, this process/offer is called the initial public offering (IPO). This process involves underwriters which are usually investment bankers. IPO involves large capital so it have been researched rigorously from early 70's yet there are several puzzles which are not yet solved by researchers. One of them is 'underpricing' anomaly, this refers to high average initial returns in beginning (such as large average increase in stock prices on first trading day). There are very few studies in case of emerging markets especially in case of Pakistan. Focus of this study is to explain this anomaly in case of Pakistan.

One of the major motives of a firm going public is to create a liquid market as through IPOs ownership expands, as number of owners' increases to raise capital for investment opportunity so liquidity also increases. Liquidity is reckoned to be one of important objective of any IPO. As Ibbotson and Ritter (1995) have argued that transaction costs for future equity offerings of liquid stocks are low (such that liquid after-market of stocks decreases transaction costs of later issues of that firm), 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 evident 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 studied that there is higher after-market liquidity for underpriced IPOs. According to Reese (2008) and Booth and Chua (1996), information production of a issue creates oversubscription which in turn increases after-market liquidity, Booth and Chua (1996) also argue that due to oversubscription there will be dispersed ownership structure.

There are certain drawbacks linked with higher liquidity mentioned in the literature. As concentrated shareholders have incentive to monitor firm's activities which minimizes agency costs evidence from Jensen and Meckling (1976), Demsetz and Lehn (1985) among others. Some companies may deliberately adopt concentrated ownership structure and forfeit liquidity. Issuers also have to incur cost to achieve liquidity, as in order to achieve dispersed ownership base, small investors must be rewarded to induce their participation. In this model they are rewarded in form of initial returns (underpricing) to compensate for their information costs.

Firms going public have different priorities, some may require liquid after-market through ownership dispersion other may go for concentrated ownership structure to reduce agency cost problem. This study identifies company's preferences in regard with liquidity requirement or agency cost minimization. This will help us to control for firm characteristics that can also influence underpricing, ownership structure and liquidity evidenced from Phem et al. (2003). This study tries to find the characteristics of firms determining underpricing by employing a logit model. Market to book ratio, risk, issue size, oversubscription, total assets and intensity affects firm's decision on underpricing.

This study attempts to find empirical evidence by using 59 IPOs issued at Karachi Stock Market on whether liquidity can be achieved by higher underpricing through direct channel (as did by Miller and Reilly (1987), Scultz and Zaman (1994)) as well as indirectly through

ownership dispersion (as examined by Pheem et al. (2003)). It is supported by theories of trading liquidity like (Holmstrom and Tirole (1993), Amihud and Mandelson (1986), and Demsetz (1968)) and Rock (1986) “winners curse” hypothesis. These theories help to explain after market liquidity through ownership dispersion hypothesis from IPOs.

Underpricing determines breadth and equality of shareholder distribution which in turns influence after market liquidity. This study also aims to investigate whether a direct significant relationship exists between liquidity and underpricing.

1.2 Significance of the Study:

Primary Markets are is not yet been explored in case of Pakistan. There is only one study in Pakistan according to my knowledge that is by Khalid Sohail and Nasr (2007), in which they have studied short-run and long-run performance of 50 IPOs listed on KSE. There is a vast gap of research to be done in this field.

This study is going to be first of its kind, it will contribute to existing literature by explaining the liquidity benefits from underpricing and its channel using data of IPOs from 2000 to 2012. In Pakistan there is no previous research on explaining underpricing phenomenon, nor on the relationship between liquidity and underpricing, ownership structure and underpricing, and liquidity with ownership structure. This study will be useful for investors in making decision to invest in primary markets as there is high compensation for the investors in the form of high initial returns (underpricing). As underpricing is indirect cost for any issuer so as per firm objectives cost should be minimized, so issuer must underprice up to level where its benefits must be equal to its costs. This study may not give any specific level of underpricing as firms differ in their objectives but it is a research question for academicians and financial researchers to be answered. Authorities like Securities and Exchange Commission of Pakistan and Karachi Stock Exchange must also look for level of underpricing as well as ownership, underpricing must be constrained to a level that managers cannot take personal benefits from it by retaining shares at lock up expiration (end of period when managers can sell their shares in the market after the issue) while taking under dispersed ownership under consideration.

1.3 Objectives:

Motive of the study is to explain underpricing phenomenon for 59 IPOs issued at Karachi Stock Exchange. This study will check

- First to check level of underpricing for IPOs listed at KSE from 2000 to 2012.
- To examine how underpricing affects allocation of shares and how in turn shareholder distribution affect liquidity in secondary market.
- To check how underpricing affect market liquidity.

1.4 Organization of the Study:

The remaining part of the study is organized as follow. Second chapter overviews the issue of underpricing on global and Pakistan level. Third chapter reviews of the literature of the issue. Fourth chapter includes theoretical model and development of hypothesis. Fifth chapter consists of empirical methodology, definitions of variables, and data. Sixth chapter shows results and discussions. Seventh the last chapter concludes the study and gives policy recommendations.

Chapter 2

Overview of the Underpricing

This chapter provides 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 provided.

2.1 Overview in Pakistan's Scenario:

Pakistani Stock Market (KSE) is one of emerging markets around the world. Three exchanges are working in Pakistan, Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE). KSE is the most established, old and active among the three. It was established in 1947, and it is open for trading (liberalized) from 1992. Almost 651 firms are listed on it with a market capitalization of US \$ 26.48 billion (As per KSE website). In 2013 there 570 companies are listed on KSE with a market capitalization of Rs 5417065.8 million. International Finance Corporation (1991) ranked it third as percentage returns in local stock market index. In 2002 KSE was listed best operating market in the world according to the Business Week magazine. This rising trend kept on and in International Monetary Fund's Country Report for Pakistan (2004), Pakistan's macroeconomic conditions were better, as there were low interest rates, easy excess to liquidity and good regulations and better supervision of the market. There was a crash (Due Badla Financing/Carry Over Trade acc to forensic examination by USA,LLC on request of SECP) in the market in 2005. It recovered and carried on but with decreasing rate and in 2007 KSE 100 index have a return of 40.19%. Presently due to the new Government KSE is in Bullish trend. KSE-100 index shows major firms performance collectively, as it consists of 100 stocks on the basis of weighted market capitalization. All top capitalized companies of

each sector is included as there are 34 sectors remaining 66 stock are taken on the basis of market capitalization irrespective of the sector. So this market can fairly interpret the market. 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 from 2003 at KSE. Other regional exchanges LSE and ISE are comparatively less active.

IPOs are issued through fixed-price offer (an offer where price is fixed before the issue) and offer for sale by tender (Book Building Method where 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 are issued in 90s as KSE liberalized in 1992, from 1992 to 1999 on average there are 35 IPOs per year. That is a very good growth for an emerging market. But from 2000 to onward intensity of IPOs are very low only 80 IPOs up to 2012. Such that there are almost 7 IPOs per year this can be because of different political, social and security issues. Such that after atomic explosions there were a lot of sanctions imposed on Pakistan, its impact can be seen that there was only one IPO in 1998 and not a single one in next year. After 9/11 due to the security reasons stock market activity was low up till 2003. Recovery start from 2004, confidence at the market was established so trading activity increases. After the financial crisis of 2007 there was low activity in primary market. Table 2.1 shows offered capital in millions. Maximum on average 52 million shares per IPO is issued at KSE. On average 28.24 million capital per IPO is issued per year at Karachi Stock Exchange. Total 5138 million shares have been issued at KSE for the time period selected in the study.

Table 1: No 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 average offer price of IPOs issued at Karachi stock market from 2000 to 2012. Average highest price offered is Rs:50 in 2007 for 11 IPOs while lowest is Rs:10 in 2002 and 2012. On average Rs: 20.23 is the offer price at which new equity is been issued in sample.

Table 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 average capital raised through IPOs from 2000 to 2012, on average 298 million capital is raised through IPOs per year. Maximum capital raised through IPOs is 9639 million rupees in 2008 from 9 IPOs. A total of 28023.55 million capital is generated through primary market operations (from IPOs).

Table 3: Capital Raised in millions 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 done in case of Pakistani stock market is by Sohail and Nasr (2007) they find out almost 36% underpricing of 50 IPOs from 2000 to 2006 at Karachi Stock Exchange. Also find long run underperformance of IPOs. Our study has estimated 51 % initial returns (Underpricing) for IPOs issued from 2000 to 2012. This shows very large initial abnormal returns of the issues. General public of Pakistan do 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). That's very low participating rate. Reasons for that can be the

nature of family owned businesses in Pakistan. Ownership level is very concentrated because of family ownership nature of businesses. Retention rate is also very high in case of firms listed at Karachi stock exchange. Trading activity of many firms in Pakistan is very low as most of the firms are in active. This is also because of the very low participation of general public.

In recent years primary market activities is very low firms should be encouraged to go public. There should be some incentives for the firms to go public. Capital generated through equity offering might be costlier than that from debt (such that firms might have financial constraint), can be one of the reasons of not going public. General public should also be given some financial knowledge so they participate in investment in stock markets. That can increase the trading activity of stock exchanges and our stock markets will be more active. None the less our market is emerging so it will settle with the passage of time.

2.2 International Evidence of Underpricing:

Underpricing is a well documented phenomenon in financial literature, for the first time **Ibbotson (1975)** identify underpricing. He found average initial return of 11.4% by using IPO data from 1960 to 1969. Table 2.2.1 shows the phenomenon internationally from different developed and emerging stock markets.

Table 2.2.1 shows evidence of underpricing from developed as well as some developing countries, average initial returns given in the table are generally of first trading day returns. As IPOs involves a lot of wealth so it have been investigated rigorously in developed world but in developing markets it is not investigated. Present study found almost 52 % initial returns (on first trading day), this study is an effort towards giving its explanation for the case of Pakistan.

Table 4: 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 Sættern (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	Kiyamaz (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.

Chapter 3

Literature Review

3.1 Background:

The initial public offering is extensively researched issue in financial economics. This process involves underwriters which are usually investment bankers. IPO involves large capital so it's been researched rigorously from early 70's yet there are several puzzles which are not yet solved by researchers. There are different theories that explain the determinants of underpricing such as Information Asymmetries, Ex-Ante Uncertainty, Information Cost compensation, Diffuse Ownership Structure, Liquidity benefits. However, there are several puzzles which are yet to be solved by researchers .One of the puzzles is 'underpricing' anomaly, this refer to high average initial returns in beginning (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) identified it by using a sample of 1922 IPOs. It also been tested by Ritter (1991), Loughran and Ritter (1993), Levis (1993), Aggarwal et al. (1993) and Sohail and Nasr (2007). 'Hot and cold issue cycle' is also a puzzle (IPO anomaly) as it is specifies to 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 & Jaffe (1975) identified it (By showing patterns of underpricing in different time periods, which were in cyclical of both Hot and Cold). This chapter reviews the relevant theoretical and empirical literature for underpricing anomaly. This chapter includes two sections; review of theoretical literature, review of empirical literature on underpricing, underpricing affect on ownership structure, ownership structure affect on liquidity and

underpricing effect on liquidity.

3.2 Theoretical Literature Review on Underpricing Anomaly:

Underpricing anomaly refer to high average initial returns in beginning (such as large average increase in stock prices on first trading day). There are several explanations for this anomaly. Some theories have been developed in suggesting explanation of this anomaly such as Risk Compensation suggested and empirically tested by Ritter (1984), Mitigation of Winner's Curse Rock (1986), and Beatty and Ritter (1986), for Signaling the Quality of Firm modeled by Grinblatt and Hwang (1989), Welch (1989), Faulhaber and Allen (1989), Overreaction hypothesis analyzed by Aggarwal and Rivoli (1990) and Ritter (1991), another explanation which is given for 'underpricing' is Price support or Stabilization activity done by underwriter in secondary market identified by Ruud (1993), and Kumar and Seguin (1993). Ownership dispersion theory suggested by Booth and Chua (1996), Brennan and Franks (1997) and Michaely and Shaw (1994).

Compensation for risk suggest that as underwriter have to absorb the equity if he fails to sell it or market could not absorb it in case of overpricing (having negative initial returns i.e. price decreases on first trading day) so underwriter needs to be compensated for this risk. It was empirically tested by Ritter (1984), but its indirect way for compensation while underwriter can be rewarded directly in its contract. Winner's curse problem, there are two group of investors informed and uninformed. Informed investor knows the true value of an issue while uninformed investors don't have estimates of true market value of the stock. So while bidding for the issue informed investors only bid for stocks which are underpriced and uninformed investor bid for underpriced as well as overpriced issue. Probability of allotment in underpriced issue is low for uninformed investors as large number of investor bid for the issue and probability for allocation in overpriced issue is high for uninformed investor

because of few investor bid for the issue. This is winner's curse phenomenon where if uninformed investor succeeds in its bids such that they have been allotted the shares but they get negative profits (Loss) while informed investor always bid for underpriced IPOs. So to encourage uninformed investor IPOs on average are underpriced as informed investor don't have the capacity to buy all the shares to fulfill the gap. Uninformed investors are rewarded by average initial returns to take part in bidding process. Chowdhry and Sherman (1996) hypothesized that strategic allocation of equity can reduce winners curse problem faced by investors. As informed investor place larger orders than uninformed investor even with same or different wealth levels, results in winner curse problem if allocated all orders to informed investors. Small investors are favored which maximizes issuer expected revenue. Winner curse problem can be restrained by discriminating larger investors and favoring small investors.

Signaling the quality of firm assume that high quality firms deliberately give initial returns to new investors as they can afford to do so because they can retrieve it in next issues. Total proceeds in this case will be higher than they would not have underpriced the issue. An empirical analysis by Garfinkel (1993) has not found support empirically for this explanation. Overreaction hypothesis suggest that issuer and underwriter sets price fairly and underpricing is only due to overreaction of irrational investors in aftermarket. This hypothesis is based on behavioral and psychological reasons. There are two flaws in this hypothesis such that investor cannot be irrational so consistently and overreaction is not the only reason for underpricing. One more reason of underpricing shows that managers intentionally underprice the issue to have private benefits. As shown by Aggarwal, Krigman and Womack (2002) model, which shows that managers intentionally underprice the issue to maximize their wealth on lock up expiration. Model states that underpricing generates information momentum which attracts investors for the stock. Resultantly demand curve for the issue

shifts outward so the price increases. So at the end of lock up expiration manager sales their stocks at higher market price to get incentives.

Ownership dispersion hypothesis as suggested by Booth and Chua (1996), Brennan and Franks (1997) and Michaely and Shaw (1994) argue that issuer underprice the issue to achieve dispersed ownership structure. They achieve oversubscription through information production. So they discriminate in favor of small investors to have dispersed ownership structure and discourage large block-holdings by outside investors.

Another explanation given by some researchers is Price Stabilization by underwriter in after market. They argue that underwriter buys stocks in the market to control the supply of stocks so that it can control price. Mostly it is done in overpriced IPOs. A study has showed that price declined only 2.5% after price stabilization activity is ended [Hanley et al. (1993). Principal-agent conflict suggests that inexperienced issuers are exploited by underwriters by underpricing the issue. It also helps underwriters to promote the issue more easily. Barron (1982) has identified it as an agency problem between underwriter as an agent and issuer as principal. Cascade behavior explained as for perspective investors in seasoned offerings give high weighting to the decisions of investors in first issue. If initial investors have lower valuation, the cascade behavior (rush down) can cause IPO a failure. So to minimize the chances of failure by this behavior, IPOs need to be underpriced.

3.2.1 Empirical Literature Review on Underpricing Anomaly:

Booth and Chua (1996) have analyzed their model empirically by using a sample of 2151 IPOs issued from 1977-1988, find that there is a positive relationship between initial returns and ownership dispersion with costly information. And due to dispersed ownership there exists a liquid secondary market for equity. This resulted 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 IPO underpricing can be used to retained control by insiders. 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 larger bidder to prevent block holdings. Study also shows that pre IPO owners of firm sell almost 2/3 of their shareholdings in subsequent 7 years while firm directors only sell a modest fraction of their shares. Results showed that the firm is advancing the process of separation of ownership and control. Another study is done to check the hypothesis that managers underprice the issue to have dispersed ownership structure to get private benefits in result of low monitoring or to have concentrated ownership structure to have increased monitoring Laura and Sheehan (2004) used 953 IPOs. By using Logit and regression model they concluded that there is no relationship between underpricing and outside block holdings. Another study is done by using data of 72 firm commitment IPOs on NASDAQ, Scultz and Zaman (1994) have empirically analyzed aftermarket stabilization activity from underwriters for the first three days from the issue. They find stabilization activities from underwriters which give answer to why issues are underpriced and underwriter's part in IPOs. Results of the study revealed that underwriters do support IPOs in aftermarket through buying and reducing supply of stocks for both Hot and Cold issues. Resultantly stock price increases from offer price.

3.2.2 Empirical Literature on the Relation between Ownership Structure and Underpricing:

Bernnan and Franks (1997) have examined how separation of ownership and control evolves due to an IPO, and IPO underpricing can be used to retained control by insiders. 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 (higher demand for the

issue), which allows owner/issuer to discriminate larger bidder to prevent block holdings. Study also shows that pre IPO owners of firm sell almost 2/3 of their shareholdings in subsequent 7 years while firm directors only sell a modest fraction of their shares. Results showed that the firm is advancing the process of separation of ownership and control. A case study in Indian stock exchange is done by Bansal and Khanna (2012) by using data of 319 IPOs issued at BSE from 2000 to 2011. They have empirically analyzed the relationship between underpricing and ownership structure. They find a positive relationship of underpricing for non-promoter institutional investors and negative relationship between underpricing and promoter institutional investors. Also find a positive impact of individual investors on underpricing. Bouzouita, Gajewski and Gresse (2012) have checked through which channel IPO underpricing impacts secondary market liquidity of newly issued stocks. Is it through ownership dispersion theory (issuer underprice the issue to have a more dispersed ownership structure which in turn creates liquid after market) or information production (investor is compensated for the information cost and information production also increases after-market liquidity)? Data is collected from Euronext, Paris for 1995 to 2008. A total of 326 IPOs are in data set. 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 favor of larger shareholder by Stoughton and Zechner (1998), they study different IPO mechanism on shareholder structure and investigated the role of underpricing and rationing on investor shareholdings by keeping in focus agency problems. They have hypothesized that rationing in favor of large shareholders is positively correlated with underpricing, initial returns should be higher for the firms having high benefit-to-cost ratio for monitoring firms, and as per regulation requirements for significant participation of small investor IPO should have high initial returns. Mello and

Parsons (1998) have evaluated different methods of issuing different methods of sale of new issue, show that commonly used methods are not optimal. Methods could be optimized by discriminating inactive shareholders such as block holders to create a liquid secondary market which increases all shareholders wealth.

3.2.3 Empirical Literature on the Relation between Ownership Structure and Liquidity:

Using data of 85 right issues on NASDAQ from 1973 to 1986, Meeta Kathore (1997) find there is concentrated ownership structure and high bid-ask spread after right issue while after initial issue get diffuse ownership structure and low proportionally low bid-ask spread. Such that after right issue liquidity decreases with increase in ownership structure and liquidity increases with diffuse ownership structure after initial offerings. This study is done to check the impact of right issue and initial issue on ownership structure and liquidity. Bolton and Thadden (1998) develop a model to provide measure of optimal ownership structure. By examining cost and benefits of ownership concentration, taking into account aftermarket liquidity and corporate control have suggested that ownership structure with small blocks may be optimal rather than fully dispersed ownership structure. This also reduce free rider problem. Another case study is done in China by using 467 IPOs listed at Shenzan and Shinghai stock exchanges for a time period of 1995 to 1999, Chen and Strange, (2004) check the impact of corporate control on level of underpricing. They have concluded that larger shareholder try to have their control to have private benefits, so to achieve their benefits shareholders try to have lower initial returns such as lower underpricing so to retain their control. After controlling for other factors they found negative relationship between underpricing and larger shareholder. Heflin and Shaw (2000) have determined the relationship between block ownership and market liquidity. Using data of 259 firms trading at NYSE for 1988-1989 find effective and relative spreads had positive relationship with the

firms owned by block holders. Results determine that block holder ownership reduces liquidity of the firm's stock although it might be useful for reduced agency costs.

Ownership dispersion hypothesis also implies that issuer objective to get dispersed ownership structure is to attain liquid secondary market such as with greater number of shareholders there will be more trading activity in secondary market, initially hypothesized by Booth and Chua (1996). This hypothesis is tested empirically by Phem et al (2003), Xiaofan and Mingsheng Li (2008), Bouzouita, Gajewski and Gresse (2012), and Bansal and Khanna (2012). Using data of 113 IPOs of Australian firms from Jan 1996-June 1999, Phem et al (2003) have hypothesized that IPOs underpricing and shareholder base are positive correlated while IPOs underpricing and inequality of shareholders such as block holdings. Liquidity is also positively related to underpricing. Using data of 113 IPOs of Australian firms from Jan 1996-June 1999 found the relationships. Empirical analysis shows that underpricing has positive relationship with ownership structure which in turn has a positive relationship with after market liquidity. There also existed 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 empirically. Regression analysis has found negative relationship between underpricing and change in shareholders and positive association between underpricing and non block institutional share holders. These non-blocks institutional shareholders create higher secondary market liquidity. They have also found positive relationship of underpricing with after-market liquidity. Their findings are consistent with Booth and Chua hypothesis.

3.2.4 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) have analyzed the relationship between ownership structure and

market liquidity. Number of shareholders and block holdings are used as ownership variables, and spread, turnover, Pin and depth as liquidity measures. Data on 3576 firms listed on NYSE, AMEX and NASDAQ are collected for estimations. Results ownership dispersion improves market liquidity for the firms.

Some studies show underpricing is just like a premium to coup up market liquidity and enhance it, such as Ellul and Pugano (2006) have modeled that investor 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 June1998 to Dec2000 they find expected after market liquidity and liquidity are important measure of underpricing. Brennan 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 fix and variable part of transaction cost. This premium is concave function of variable cost and convex in the case of fixed cost. They also find an additional risk premium for inverse price factor.

Some of the other reasons of underpricing according to some reaserchers i.e managers intentionally underprice the issue to have private benefits. As shown by Aggarwal, Krigman and Womack (2002) model, which shows that managers intentionally underprice the issue to maximize their wealth on lock up expiration. Model states that underpricing generates information momentum which attracts investors for the stock. Resultantly demand curve for the issue shifts outward so the price increases. So at the end of lock up expiration manager sales their stocks at higher market price to get incentives. A data set of 618 IPOs from 1994-1999 is used to find the relationship. They find that managerial shareholdings are positively related to underpricing.

In case of Pakistan there is only one study according my knowledge of literature done by

Sohail and Nasr (2007) have studied IPOs anomalies such as 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% returns on 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 capitalization and oversubscription determined underpricing in case of Pakistan.

3.3 Summary:

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, signaling the quality of firm, overreaction hypothesis, price support or stabilization activity, and ownership dispersion theory. Reviewed literature extensively showed that the firms underprice the issue to achieve dispersed ownership structure which in-turns helps to increase after-market 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 for 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 increase private sector development. This study tries to fill this gap by testing underpricing anomaly.

Chapter 4

Conceptual Framework and Working Hypothesis

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

4.1 Theoretical Framework:

This study uses model which is formed by BOOTH and CHUA (1996), they modeled issuer's demand for diffused ownership effects IPO underpricing. They have incorporated information production, and information cost in the model. This study will incorporate 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 their growth opportunity. Also assumed that no ex-ante lack of asymmetric information exists among investor and investment banker, but still estimates is not perfect stays noisy. By using prestigious underwriter and firm commitment contract, capital issuing company produces common-value information for issue. Then underwriter carries out due diligence process to get better estimates for price and sets an offer price in preliminary prospectus. 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 investor 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 don't 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 achieves. So issuer 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. So information cost is an increasing function of number of number of potential investor as potential investors increase information cost also increases. Means both first and second derivatives are positive i.e,

$$\partial y(i) / \partial i > 0 \text{ and } \partial y^2(i) / \partial i^2 > 0.$$

To show advantages of oversubscription benefits, model assume ownership base of one shareholder. To achieve a 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 share will be allotted to him. All potential investor will bid having equal chances of allocation. So final offer price OP is maximized with investors recovering information cost, when

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

Where,

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

$y(i^*)$ =Total Information Cost.

i^* =Optimal number of investor purchasing information.

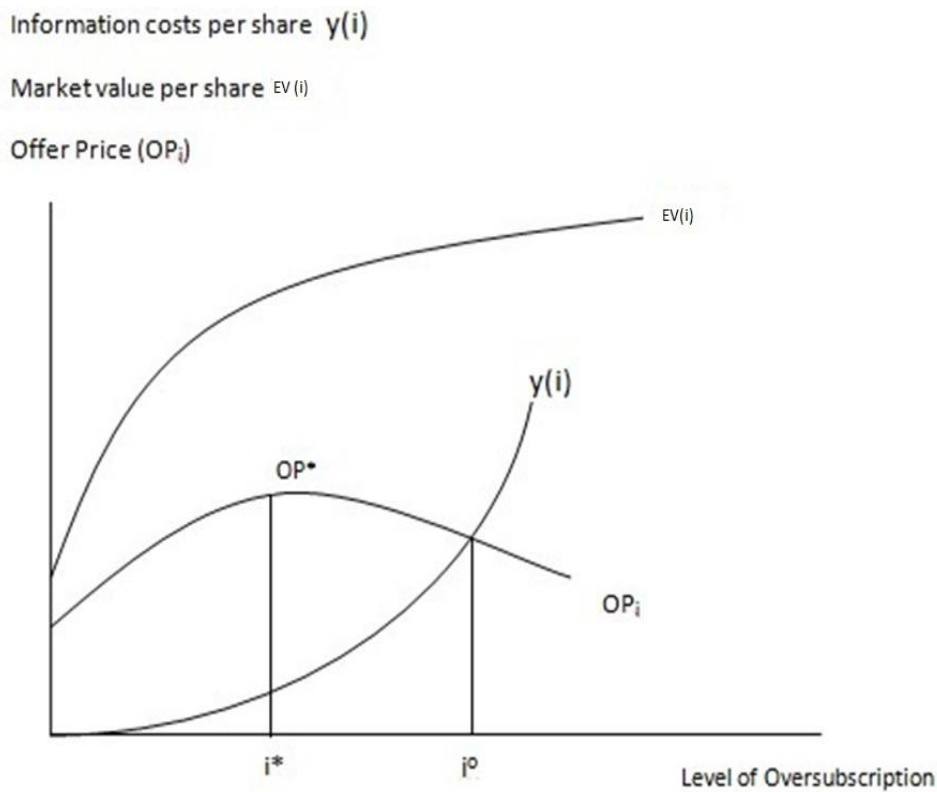
Here $EV(i)$ is increasing function, but increasing with decreasing rate. Similarly $y(i)$ is also

an increasing function but with increasing rate. In equilibrium, maximum proceeds calculates estimated value and setting final OP, keeping in mind the informed investors

$$EV(i^*) - OP - y(i^*) = 0 \quad (4.2)$$

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

Figure 1 :Optimal Level of Oversubscription:



Source: Regenerated from Booth & Chua 1996.

Figure (1) shows desirable number of potential investor purchasing information i^* . As we assumed that estimated value rises with oversubscription i^* , it is supported by Merton (1987) argument that more promoted issue induce more potential investors. While Amihud and Madelson (1986) 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 the Figure (1). As both EV (i) and $y(i)$ increases so in equation (4.1) 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

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

If;

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

Then there will be higher initial returns for the investor such 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 rate of change in C(n).

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

Here investors will have negative returns.

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

Since issue is undersubscribed so 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^* offer price is at optimum level and investment banker achieves a level of oversubscription at which expected value of benefits become equal to information costs of an extra investor. Such that marginal benefits equal marginal information costs. So i^* is equilibrium level of informed investor. At i^* , Issuer optimize its revenue, assuming investors to retrieve information costs by initial underpricing.

4.1.2 Ownership Structure and Liquidity:

Liquidity is defined as the presence of continual trading which is dependent on number of shareholders to match opportunity of trading i.e every seller have a buyer by Demsetz (1968). Small shareholders are also categorized as liquidity trader and according to Holmstrom & Tirole (1993) and Bhide (1993) presence of dispersed ownership base increases liquidity and it is not substantially affected by asymmetric information. This also decreases chances of adverse selection costs (winners 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 & Meckling (1976) and Vishny and Shleifer (1986) dispersion of ownership increases agency cost such 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 of their interests (such that agency cost increases). While in concentrated ownership structure there are marginal benefits to small investors too, because it's easier for big share holder to collect company information and do corrective measures. From there argument it can be concluded that some companies may give up liquidity to achieve benefits of control and monitoring.

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

From above arguments it is evident that issuer can opt for after-market liquidity or agency cost minimization taking in consideration the costs related to the objective. This study suggests that underpricing is 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 such as in KSE smaller bidders will be preferred for allotment.

4.2 Development of Hypothesis:

From above arguments it is clear that firms decide to go for liquidity or agency cost minimization to achieve their objectives taking consideration of the cost incurred. As this study is not going to settle this dispute rather it will check out how firm's underpricing can help to achieve dispersed ownership structure through oversubscription because due to underpricing there will be oversubscription and how dispersed ownership structure helps to have more liquid after-market. Liquidity is also achieved by compensating un-informed investors through initial returns (underpricing). In short the following our hypothesis can be formulated as:

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 dependant on dispersed ownership structure.

Hypothesis 3: All else equal after-market liquidity is positively influenced by the initial returns.

Chapter 5

Methodology and Data

This chapter of the study describes methodology, econometrics tools used to achieve objectives of the study and data used in the study.

5.1 Econometric Model:

This section describes different econometrics techniques which will aid us to analyze our hypothesis to achieve objective of the study.

5.1.1 Determinants of Underpricing:

First this study determines firm characteristics which are related to its decision to underprice the issue or not. So the dependant variable is, to underprice or not to underprice, which can be translated into binary variable. So this study have to use binary choice dependant model, simplest of it is Linear Probability Model but it has a drawback that in it probability can come greater than one, due to this drawback this study will apply logit model while previous study by Phem et al. (2003) use probit model. Both probit and logit gives acceptable results and there is no specific advantage of one on each other by Amemiya (1981). Our model specifications are:

$$\text{Prob}(\text{UNDP} = 1) = e^z / (1 + e^z) \quad (5.1)$$

Where

UNDP=Underpricing UNDP = 1 if underpriced

UNDP = 0 if overpriced

e=base to natural logarithm

The empirical specification of the model is as follows.

The analysis begins by investigating the determinants of underpricing by the following model suggested by Phem et al. (2003).

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

UNDP is 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 capitalization after listing; Intensity shows 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 issue is of a financial institution and financial service provider. The level of risk effects underpricing as mentioned by (Lehn and Domsetz, 1985; Leahy and Leach, 1991), is proxied by standard deviation of daily share returns during first trading month. Intensity, TS and retained ratio is used by Booth and Chua (1996). Higher size issues are easier to value argument by Booth and Chua (1996). 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 our first hypothesis there is a relationship between underpricing and ownership structure such that firms underprice the issue to achieve a dispersed ownership structure. This hypothesis can be tested by using multiple regression model (MRM), which shows the correlation between underpricing and ownership structure. Oversubscription, size, risk,

leverage also affect ownership structure, therefore by incorporated these factors into the regression equation gives empirical specification as follows:

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

in model *OverSub* shows level of oversubscription of an IPO , it is level of subscription for an issue. It shows demand for an issue higher the demand higher will be the opportunity for issuer to achieve dispersed ownership consistent with the previous studies such as Booth and Chua (1996) and Phem et al. (2003). On dependent side OWNERSHIP is proxied for Herfindahl index (HERFNDL), Block holders proportion (BLOCK), Top 20 investors in IPO (TOP20), large investors holding more than 100000 share (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 our second hypothesis that 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 number of shareholders that helps to achieve a match of buyer and seller according to Demsetz (1968). To check our second hypothesis this study will regress both of the proxies for liquidity against each proxy of ownership structure. 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 these in our test. When trading turnover works as proxy of liquidity, this study controls for shares retain by the owners and director as they are bound of not trading there shares in market under the KSE Listing Regulation 6 and Companies Issue of Capital Rules 1996 (3,4). Also used by Lee et al. (1996), and find that it is less likely to see trading by internal owners during initial period. So using trading turnover as dependent variable and all the proxies of

ownership structure one by one, this study will use the following regression model to test our second hypothesis:

$$TURNOVER = \alpha + \beta_1 OWNERSHIP + \beta_2 Risk + \beta_3 Size + \beta_4 Retain + \varepsilon \quad (5.4)$$

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. So 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 if the results support our first two hypotheses, which states direct relationship between liquidity and underpricing. To estimate given relationship, this study regresses both the proxies of liquidity against underpricing and other factors as in previous equations. For bid-ask spread as dependent variable, the following regression model is estimated:

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

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

$$TURNOVER = \alpha + \beta_1 LnR + \beta_2 Risk + \beta_3 Size + \beta_4 Retain + \varepsilon \quad (5.7)$$

5.2 Variables Definition and Construction:

This section of the chapter describes the variables definition and construction to test hypothesis presented in above chapter.

5.2.1 Measure of Underpricing:

Underpricing is defined to be as abnormal initial returns on first day of the issue. So this study used Market Adjusted Returns consistent with previous studies. Initial returns are calculated then it is adjusted with market returns as shown in the equation,

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

MAR=Market Adjusted Returns

P_{i1} =price at the end of first trading day

OP=offer price of the issue

M_{i1} =closing price of market index on ith issue date

M_{i0} =Opening price of market index

MAR is good measure for descriptive use but it can violate normality assumption which can cause problem in econometrics analysis. To deal with this problem study use 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 of 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:

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

$$Breadth = TNSH / Tot\ Cap$$

here TNSH shows total number of shareholders of an IPO and Tot Cap is dollar amount of shares issued. Using breadth only as ownership dispersion's is not sufficient because it only focus on size not on equality of shareholders. There may be same breadth of shareholders but there may be no equal distribution. So this study uses other measure to cover for equality of shareholder's distribution. This shows deviation in proportion of outside shareholders. Breadth is further divided to shareholders per one million shares, 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:

$$LARGE = \left(\sum_{k=1}^n Top\ Category - Retain_i \right) / Offer\ Size$$

Here $Retain_i$, shows number of shares kept by original owners of firm i. Offer size shows total number of shares issued by firm. Top category shows investors holding 100000 or more shares and n is total number of those shareholders. Large is calculate following Brennan and Franks (1997).

5.2.2.c Blockholders:

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

$$BLOCK = \left(\sum_{k=1}^m \text{Block Size} - \text{Retain} \right) / \text{Offer Size}$$

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

5.2.2.d Top Twenty:

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

$$Top20 = \left(\sum_{k=1}^{20} \text{Top20 Shareholders} - \text{Retain} \right) / \text{OfferSize}$$

5.2.2.e Herfindahl-Hirschmann Index:

This study also calculated Herfindahl-Hirschmann Index (HERF) by summing squared shareholdings of five largest shareholders:

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

here s_i is the part that belong to the i^{th} largest shareholder ($i=1, 2, 3, 4, 5$). There exists non normality for Herfindahl index to deal with it this study altered 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 is 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 will uses booth of the proxies.

5.2.3.a Trading Turnover:

This study calculated trading turnover up to six month after first listing date. This study has excluded first four days because there are huge trading turnover in first four days compared to remaining days of month. Trading turnover is calculated through scaling trading volume of firms followed by Phem 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 dollar amount of issued capital. This study also calculated first day trading turnover of firms going public.

$$FTR = Volume / Issued Capital$$

Volume shows first day trading of that stock.

5.2.3.b Bid-Ask Spread:

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

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

ASK=high price of a stock on specific day

BID=lowest price of stock on specific day

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

5.2.4 Other Control Variables:

Size:

This variable shows magnitude of IPOs. This study will use it in natural logarithmic form. It is commonly used variable in different financial studies. Booth & Chua (1996), Phem et al. (2003) too used the variable in their study.

Offer Price (OP):

Offer price is the price fixed by the issuer/underwriter. Natural logarithmic form is 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):

Used as the proxy of growth for the firms. Higher the market-to-book ratio lower will be the growth opportunity, measured as market value of share by book value of shares. This study will use log of market-to-book ratio as a proxy of growth. Gompers (1995), Pagano et al. (1998) also used it as proxy for growth of a firm.

Debt:

Use as a proxy of agency cost, measured as total debt by total assets. Also used by Phem et al. (2003), Booth and Chua (1996).

Intensity (INT):

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

Fin:

A dummy variable used for capturing the affect for financial firms, as financial firms are strictly monitored so financial firms are less likely to be underprice. It is also been used in studies by Phem et al. (2003) and Gresse et al. (2012).

Times Subscribed (TS):

Times subscribed shows that how many times an issue is subscribed. Such that if an issue is of 10 million shares and its been subscribed (bid) by 20 million than the issue will be 2 times subscribed. So time subscribed is used as a proxy of demand of the issue. Higher the demand higher will be the level of underpricing. Phem et al. (2003) consider important determinant of underpricing and following their study it is included in our study.

Risk:

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

Retain (RR):

Proportion of shares retained by the original investors, this study used the retain ratio as control variable as previously done by Booth & Chua (1996), Phem et al. (2003).

Inverse Price (INV):

Inverse price is calculated as one over price. It is used as transaction cost which can affect bid-ask spread. Stoll (1978) used inverse stock price as a control variable while analyzing for bid-ask spread. This study use this for analysis of bid-ask spread.

Total Assets (TA):

Used as a proxy for firm size. Fama and French (1992) suggested that size is negatively related to stock returns. Booth & Chua (1996) explained that larger IPOs can be easily valued. This study will use log of total assets as a control variable.

5.3 Data:

The sample for our 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 website such as business recorder (website) and khistocks (website). Data related to ownership structure is compiled from annual reports and other sources. This study only used fixed-price offers while book building offers are excluded from the sample. Finally due to unavailability of data sample of this study reduced up to 59 IPOs. So this study has 59 cross-sectional observations.

Chapter 6

Empirical Results and discussions

6.1 Descriptive Statistics:

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

Table 5: Descriptive Stats for MAR, Ownership Structure and Liquidity

Variable	Mean	Median	Standard deviation	Minimum	Maximum	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

Table2 shows the descriptive statistics for MAR (Market adjusted returns which is 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%, ownership structure is defined by Breadth and Equality of the shareholder base for which different proxies are being used, The result of mean shows breadth on average there are 92 shareholders of every one million shares issued in KSE and almost 56% of the shares are held by the investors having more 100000 shares. About 31% of shares are being held by the block holders (having more than 5% of the shares), on average 49% of the shares are held by the top twenty shareholders of an IPO. The Herfindahl Index shows the concentration of ownership to top 5 shareholders it is almost 20 % 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 % trading turnover for first day of trading and on average there is almost 4% turnover per day up to sixth months of trading. Average bid-ask spread from day 5 to day 180 is close to 4%.

6.2 Regression Results:

This section of the chapter includes results of the models specified previous chapter:

6.2.1 Determinants of Underpricing

The regression analysis begins with the determinants of underpricing. As the dependent variable (underpricing) takes a value of 1 if an IPO is underpriced and 0 otherwise, the Ordinary Least Square is not appropriate as there is binary dependant variable. The non-linear estimation technique Logit is more suitable for binary variable like UNDP as a dummy variable such that for underpricing 1 and otherwise 0. UNDP is regressed on risk, market to book value, size, debt, oversubscription and retained ratio. Table 6.1 shows the results of logit model.

Table 6: Logit Regression Model Exploring Firm's determinant of UP

Independent Variables	Dependant Variable :UNDP			
	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	

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%,**shows significance at 5% and *** indicates significance at 10%.

The results from the logit model shows model indicate that IPOs with high market-to-book ratios, lower risk, with high magnitude of the issue, low demand such that with lower subscription, with lower issue intensity such as three months before and after the issue and with higher assets are less likely to be underpriced such that there will be no or less abnormal initial returns. If investors perceive that firm might have higher price volatility than to make its issue successful firms need to underprice, so 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 the previous studies such as Gompers (1995), Pagano et al (1998). As subscription shows the demand of an issue as the higher the demand higher will be the price so higher will be returned, Rock (1986)

argued that underpriced issue is subscribe by both informed as well as uninformed investors so the issue will be oversubscribed. So 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 found in previous studies like Frinkle (1998) and Carter, Dark, & Singh (1998) document. It is evident from the results 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 & Chua (1996) explained that larger IPOs can be easily valued. Intensity has a negative sign and it's consistent with Booth and Chua (1996) findings. As it shows the IPOs issued three months before and after a specific issue, higher intensity is going to 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, our 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 that 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 consistent with previous studies such as Reilly (1977) and Paul MacGuinness (1992), so high initial returns induce more perspective investors and with oversubscription 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 is linked with more agency costs and need monitoring from shareholders as argued by Gompers (1995), companies with high market-to-book ratio is 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 of long run underperformance of IPOs. As larger shareholders have to bear lower cost for monitoring argued

by Brkart et al. (1997). So firms with high market-to-book have less probability to underprice its shares and they might desire large shareholders 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 & Chua (1996) and Phem et al. (2003). Firms having greater total assets have less uncertainty for perspective shareholders, so the firm with this type of characteristics is less likely to underprice its issue 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). So ownership structure attained in IPOs must be optimal for subsequent issue when done.

For exploring underpricing effects on ownership structure we will regress equation 8, following tables shows the brief results. For ownership this analysis used Breadth for shareholder base and four in the equality square root transformation of the Herfindahl index (to cope with non normality) consistent with Gresse et al. (2012) and Phem et al. (2003). 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 7: Results of the Effect of Underpricing on Ownership Structure (Breadth)

Independent Variables	Dependant Variable :Breadth			
	Coefficient	t-Statistics	p-Value	R ² =18%
LnR	1.1216*	2.16	0.037	F-Value=4.54
TA	0.1424***	1.8	0.08	p-value=0.003
RR	-0.3649	-0.61	0.547	
MB	-0.0399	-0.25	0.804	
Constant	3.0577*	11.41	0	

Note: The results are based on the regression specified in Eq(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%, ** shows significance at 5% and *** indicates significance at 10%.

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

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. This study used Large, T20, Block and HERF (is sum square root of last five shareholders, showing the concentration of ownership structure). Here we are using HERF as an dependant variable and the main independent variable is market adjusted return and other control variables are the same as in previous model. The multiple regression model is used with the standard errors adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix.

Table 8: Results of the Effect of Underpricing on Ownership Structure (Concentration)

Dependant Variable	Independent Variables : HERF			
	Coefficient	t-Statistics	p-Value	R ² =19.53%
LnR	-0.1101***	-1.94	0.058	F-Value=3.00
TA	0.0424*	2.16	0.036	p-value=0.023
RR	-0.2817***	-1.77	0.082	
MB	-0.0282	-1.59	0.117	
Constant	0.3584*	2.6	0.012	

Note: The results are based on the regression specified in Eq.(5.3).The dependent variable is sum square root of last five shareholders, showing the concentration of ownership structure (HERF). Explanatory variables are continuous returns (log market adjusted returns) showing 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%, **shows significance at 5% and *** indicates significance at 10%.

In the estimated model the expected results are obtained when concentration of ownership is regressed on market adjusted returns and control variables. As it was expected that for inequality of new shareholder a sign of LnR should be negative. It is found negative and significant in this model. This result is consistent with the studies of Brennan and Franks (1997), Michealy and Shaw (1994) and Phem et al. (2003) suggesting that underpricing is negatively related to concentrated ownerships. All of the above mentioned studies found underpricing helps issuer to deal with concentration as by underpricing there will be oversubscription and issuer can discriminate large investors so there will be lower concentration of ownership. Our 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 will have lower concentrations as found by Booth & Chua our model's result is similar to them. Model is overall significant at 5 percent. Other firm characteristics such as debt, risk, size and market-to-book are not significantly affecting ownership structure consistent with the study of Phem et al. (2003).

Other proxies of ownership structure (Large, T20 and Block) have expected signs as expected 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:

Second hypothesis is how ownership structure affects liquidity, is tested by regressing ownership structure and control variables on liquidity given by equation (5.4) and (5.5). As high turnover shows higher liquidity, expected signs of proxies of ownership structure are positive for breadth and negative for the inequalities of the shareholder base of new issues.

Results in equation (5.4), showing the relationship between ownership structure and liquidity.

Results shown in the Table 5 are for testing second hypothesis, the results are found that have expected signs as per theory and previous literature. As trading turnover is being used as the dependent variable (higher turnover shows higher liquidity) from theory it is expected that it will be positively correlated with the shareholder base (Breadth) and negatively related to the inequality of ownership structure of new issues.

Table 9: Results of Relationship between Ownership Structure and Liquidity

Independent Variables:	Dependant 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 Eq.(5.4). The dependent variable is average trading turnover per day for six months after trading (TR). Each regression uses 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%, ** shows significance at 5% and *** indicates significance at 10%.

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

Phem et al. (2003) also find the control variables insignificant. 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 table shows the results 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. Results are not significant for the other proxy of liquidity which is bid-ask spread. Our markets are not much developed, so it has very little impact of ownership structure on liquidity.

6.4 Results for Effect of Underpricing on Liquidity:

From analyzing the first and second hypothesis this study comes up with the evidence that underpricing do impact on shareholder base and concentration, which consequently affects the liquidity of its shares on the secondary market.

Therefore, from these results one can expect a correlation between underpricing and secondary market liquidity, which is third hypothesis of the study. To test this hypothesis underpricing along with control variables are regressed on liquidity, the relationship given an equation (5.6) and (5.7), Following are the results of the estimations.

Table 10: Results for Effect of Underpricing on Liquidity

Independent Variables	Dependant Variable : Trading Turnover			
	Coefficient	t-Statistics	p-Value	R ² =30%
LnR	1.01**	2.03	0.048	F-Value=4.36*
Size	0.36*	3.09	0.003	p-value=0.002
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	

Note: The results are based on the regression specified in Eq.(5.6).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%, **shows significance at 5% and *** indicates significance at 10%.

Result reported in Table 6.5 show positive, greater than one and highly significant coefficient of market adjusted returns indicating that underpricing has an impact on secondary market liquidity. Control variable size is also significant consistent with Booth and Chua (1996) and Phem et al. (2003). 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 (10) 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 consisted with Stoll (1978) and Constantinides (1986). So equation 10 is regressed using bid-ask as explanatory variable, table 7 below shows the results

Table 11: Results for Effect of Underpricing on Liquidity

Independent Variables	Dependant Variable : Trading Turnover			
	Coefficient	t-Statistics	p-Value	R=30%
LnR	0.93***	1.87***	0.067	F-Value=4.55
Size	0.41*	3.44*	0.001	p-value=0.0016
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	

Note: The results are based on the regression specified in Eq.(5.9).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%, **shows significance at 5% and *** indicates significance at 10%.

Result documented in Table 6.6 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). 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 (5.7) estimates are insignificant similar to the previous equation.

Chapter # 07

Conclusion and Policy Recommendations

This chapter consists of the conclusion of our study and policy recommendation in light of our results.

7.1 Conclusion:

This study tried to explain the underpricing anomaly in case of Pakistan for the very first time. It found that overall underpricing in KSE for the 59 IPOs issued during 2000 to 2012 is almost 52%. As the study explains the phenomenon through ownership dispersion hypothesis given by Booth & Chua (1996), which states that 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 above hypothesis, this study first determines the characteristics of the firms which cause underpricing. By using a logit model this study find 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 checked the relationship between ownership structure and underpricing this study use simple OLS model. Two proxies of ownership structure (Breadth and Herfindahl index) have the significant effect of underpricing. Directions of the other proxies are also same as per literature but study could not found significant results from the sample. Result of our study is similar to Brennan and Franks (1997), and Phem et al. (2003).

To test the relationship between ownership structure and liquidity this study used multiple regression model by talking two proxies of liquidity as dependant variable and all the proxies

of ownership structure one by one. This study found significant results with of ownership structure proxies except T20, when regressed on turnover. Phem et al. (2003), Jacoby and Zheng (2010) also found similar type of results. Also consistent with Domsetz (1968) who argued that no of shareholders is a factor of liquidity. The results with bid-ask spread is not significant it can be due to the developing nature of the market.

Finally this study checks out 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 such that both affect each other. This study applied 2 SLS model but the signs of both coefficients of turnover and bid-ask spread are insignificant so simultaneity does not exists. So OLS is used to check correlation between liquidity and underpricing, it was found while using turnover as dependant variable consistent with Phem et al. (2003). While using bid-ask this study found insignificant relationship might be due to the developing nature of market. Constantinides (1986) argued bid-ask spread as an explanatory variable for trading turnover, using it as our explanatory variable for turnover study found significant results. Such that bid-ask spread has an impact on turnover.

From the above conclusions of the study, it can be said that our empirical analysis for the sample supports the ownership dispersion hypothesis given by Booth & Chua (1996) and Brennan and Franks (1997). Such that ownership underprice the issue to have broader shareholder base, due to the underpricing firms have oversubscription which helps them to discriminate in favor of small shareholders, here underpricing is compensation for uninformed investors. Then this broader shareholding base make a liquid secondary market as according to Domsetz (1968) greater number of shareholders increases market liquidity. Underpricing also have a positive impact on liquidity, as underpricing induces oversubscription such that increases the demand so this demand causes secondary market liquidity.

7.2 Policy implications:

From above results and conclusions this study has some implications such that:

- Regulatory authority such as SECP (Securities and Exchange Commission of Pakistan) should have set some limits to the level of underpricing. As informed investors take advantage of it as normally large investors have access of information and small investors don't have much information.
- Managers that have some shareholding should 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 comes under this act.) This can also be a reason of long term under performance of the IPOs.
- Regulatory authorities should also look for the ownership structure of new issues. Should not allow make block-holdings or concentrated shareholding as they decreases after-market liquidity.
- As underpricing is indirect cost of any issue for the firm, so issuer/firm must set a specific range of underpricing to achieve its objective of dispersed ownership and liquid secondary market.
- More investors should be induced to take part in stock markets that will enhance market liquidity.

7.3 Future Research:

This study found an explanation of underpricing anomaly. Further research may be carried out as there is not much research on IPOs in emerging markets especially in case of Pakistan.

In future researchers can work on:

- For long run underperformance of can be checked with managerial ownership. It might be one of the reasons of underpricing. Such that on expiration lock-up expiration the supply of shares increases than its demand that will cause stock price to decrease.
- 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 checked empirically.
- To check equity is costlier way to raise capital or the debt.

7.4 Limitations of the study:

As this area of research is not yet been explored by the researchers so there are different types of limitations in this studies. Most of the IPOs were issued before 1998 and there is no access to that data. Similarly data on prices and other variables are also available from 1998. So study's sample of analysis is short, it would have been better to have that data too so our sample would be larger and estimates would be better. Data for ownership variables are collected from annual reports and most of the companies have started to disclose that information from 2003.

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Appendix:

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 Fertilizer 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 it can be seen from the table.

Appendix 2: Results of the Effect of Underpricing on Ownership Structure (Concentration)

Independent Variables	Dependant Variable :Large			
	Coefficient	t-Statistics	p-Value	R ² =9%
LnR	-0.0269	-0.24	0.808	F-Value=0.28
TS	-0.0005	-0.04	0.971	p-value=0.958
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	

Note: The results are based on the regression specified in Eq(5.3). The dependent variable is the proportion of shareholders having shareholding greater than 100,000 shares. Explanatory variables are market adjusted returns, underpricing (LnR), log of total assets as a proxy of firm size, percentage of shares attained by initial owner and log of the market-to-book ratio (MB) as a growth proxy. The * indicates significance at 1%, ** shows significance at 5% and *** indicates significance at 10%.

Appendix 3 shows insignificant results of underpricing with top twenty shareholders taken as one of the proxy of ownership structure, as it can be seen from the table.

Appendix 3: Results of the Effect of Underpricing on Ownership Structure (Concentration)

Independent Variables	Dependant Variable :T20			
	Coefficient	t-Statistics	p-Value	R ² =1.16%
LnR	--0.070	-0.66	0.510	F-Value=1.1
TS	-0.0031	-0.21	0.831	p-value=0.379
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	

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%, **shows significance at 5% and *** indicates significance at 10%.

Appendix 4 shows insignificant results of underpricing with BLOCK (defined as shareholders having more than 5 % shareholdings) shareholders taken as one of the proxy of ownership structure, as it can be seen from the table.

Appendix 4: Results of the Effect of Underpricing on Ownership Structure (Concentration)

Independent Variables	Dependant Variable :BLOCK			
	Coefficient	t-Statistics	p-Value	R ² =1.16%
LnR	--0.0723	-0.59	0.559	F-Value=1.1
TS	0.0246	0.58	0.564	p-value=0.379
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	

Note:The results are based on the regression specified in Eq(5.3).The dependent variable percentage of shareholders having more than 5 % 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%, **shows significance at 5% and *** indicates significance at 10%.

Appendix 5:

Appendix 5 shows the impact of ownership proxies on one of the proxy 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. 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.

Appendix 5: Results of Relationship between Ownership Structure and Liquidity

Independent Variables:	Dependant 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 uses 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%, ** shows significance at 5% and *** indicates significance at 10%.

Appendix 6:

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

Appendix 6: Results for Effect of Underpricing on Liquidity

Independent Variables	Dependant Variable : Trading Turnover			
	Coefficient	t-Statistics	p-Value	R=2%
LnR	0.097	0.18	0.858	F-Value=0.67
Size	-0.0367	-0.17	0.865	p-value=0.618
Risk	2.41	1.59	0.135	
INVPRICE	3.456	0.43	0.666	
Constant	-0.41	-0.47	0.638	

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%, **shows significance at 5% and *** indicates significance at 10%.