University of Dhaka,
Bangladesh

Department of Finance
Faculty of Business Studies

Price Performance of IPOs in Bangladesh and Its Behavioral Explanations

Dissertation submitted to
Obtain a Doctoral Degree
In Finance by

Ms Rumana Haque

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To Whom It may Concern

I have the pleasure to certify that Ms. Rumana Haque, Associate Professor, Business Administration Discipline, Khulna University is a registered Ph.D. student of the Department of Finance, University of Dhaka. She has completed her Ph.D thesis titled "Price Performance of IPOs in Bangladesh and its behavioral explanations" under my supervision.

It is indeed an honor for me to certify that her Ph.D. work is unique, truly scholastic and absolutely genuine. I can further certify that the Ph.D dissertation with this title has not been carried out either in this university or any other university in Bangladesh.

I wish her every success in life.

14/01/2012

(Mahmood Osman Imam, Ph.D)
Supervisor and Professor
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Abstract

The main objective of this research study is to focus on price performance of IPOs in Bangladesh and to investigate its behavioral explanations. In this dissertation, several aspects of IPOs in Bangladesh have been examined in addressing IPO anomalies. The outcomes of the investigation of these IPO aspects enable us to evaluate the price behavior of the IPOs.

One of the focal themes of this research study is to investigate the equilibrium price of IPOs being determined on event day in aftermarket for both financial and non financial issues, and also to empirically document underpricing phenomenon in Bangladesh and examine the extent of underpricing of IPOs, across industries and year. The results show that virtually all price adjustment takes place in non financial and non financial sectors on 15th day and 21st day. The equilibrium price of non financial IPOs on event day 15 means that if anyone buys the issue on any event day prior to event day 15 and holds it for some time till event day 15 can make significant abnormal return. However none can make significant abnormal return on subsequent aftermarket after the event day 15. The mean abnormal holding period return of non-financial IPOs in Bangladesh that came in during 1991 to 2007 from offering to equilibrium day of 15 is 84.29% (median of 27.85%) with a *t*-statistics of 4.30. In other words, an non-financial IPO issue is underpriced by 84.29 per cent on an average.

The direct (floatation) cost of going public firms across non financial and financial issues has been identified, calculated and compared. The direct cost of non financial issue is higher than financial issue. The mean direct cost for non financial issue is 8.47% of the gross proceeds and those on the financial issue is 5.07%. And this 3% difference in the direct cost of non financial issue over financial issue is statistically significant at the 1% level. This study also confirms that that floatation cost is decreasing function of offer size i.e. floatation cost decreases as the offer size increases.

The study investigates the determinants of underpricing in stock market of Bangladesh empirically and explains overshooting behavior that exists in our market on the first day. The extent and explanations of such underpricing are also provided. We find empirical evidence consistent with the overshooting behavior or overoptimistic behavior of the investors in IPO market of Bangladesh. The underpricing behavior of IPOs in Bangladesh

during 1991-2007 is explained by the aftermarket standard deviation (proxy for ex-ante uncertainty) oversubscription of IPOs, free-float ownership and offer size after controlling for industry effects and incorporating some well known proxies for reputation, information signaling, uncertainty, size and excess demand.

We also find evidence that firms going public in Bangladesh during 1991-2007 have been poor long-run investments for investors. Firms that went public during 1991-2007 significantly underperformed market benchmark in the five years after going public. This underperformance is 10.19% per year. The magnitude of this underperformance is economically important: based on holding period realized return, an investor would have to invest 50.48% more money, than if market portfolio were purchased at the same time in order to achieve the same terminal wealth five years later. Initial returns bear no systematic relationship with long-run underperformance. But, we find some evidence that goes in favor of "fads hypothesis". In our study we find, IPO firms, on average, have a cross-sectional beta lower than 1.00. To the extent that IPOs underperform the market benchmark, the non-presence of beta-bias with respect to the market portfolio allows us to rule out the risk-mismeasurement as a possible explanation of the long-run underperformance.

We find that, in the long-run bearish market issues have done fare worse than bullish-market issues. The difference in the performance between bullish-market issues and bearish-market issues is not statistically discernible and this casts doubt on the timing ability of Bangladeshi firms. Furthermore, earnings management in IPOs through discretionary accruals and long-run aftermarket price performance of Bangladeshi IPOs has been examined. We find evidence that entrepreneurs of IPO firms during 1991-2000 behaved myopically in boosting reported earnings in the year prior to going public. Using the market adjusted return, the most conservative accrual quartile firms produced an insignificant -55.68% five-year cumulative abnormal return, while the most aggressive accrual quartile firms produced a significant -67.64% five-year cumulative abnormal return. These results indicate that the long-run underperformance of Bangladeshi IPOs may, at least partially, be driven by the aggressive earning management by the managers of IPO firms. It indicates that pre-IPO discretionary accruals are good predictors of post-IPO return underperformance of Bangladeshi IPOs.

We also find that managerial earning forecast error is associated with long-run underperformance. Earning forecast error is the deviation of actual earning from the forecasted earning published in the prospectuses during floatation. In our study we find the evidence that firms with highest earning forecasting error quartile performed worst in three years after going public. Our result shows that the mean absolute earning forecast error of IPO profit forecasts in Bangladesh is 90%. This implies actual profits are 90% greater or lower than forecast. We find a systematic relationship of long-run performance of IPOs with earnings forecast error. So it can be concluded that poor long-run performance of IPOs can partially be driven by earning management and earning forecast error of IPO firms. Random effect and maximum likelihood effect model of panel regression, and GLS for panel data confirm the conjecture that earnings forecast error is associated with poor long-run price performance of those IPOs suggesting that investors regard these forecasts as credible signal and larger the earnings forecast error, greater the underperformance of IPOs after floatation. It suggests that earnings forecast published in prospectuses contain information that is mispriced by the market.

Apart from the obvious implication for investors, issuers and underwriters, the persistent and systematic nature of anomalous return of IPOs raises challenging questions about the informational efficiency of capital market in Bangladesh.

Table of Contents

List of Tables

List of Graphs

Introduction

An initial public offering or unseasoned new issue is a first time offering of shares by specific firms to the public. An IPO, therefore, allows a company to tap a wide pool of investors to provide itself with capital for future growth, repayment of debt or working capital. The firms go public primarily to raise equity capital for the firm and to create a public market in which the founder and other shareholders can convert some of their wealth into cash at a future date. A further incentive for going public is that the enhanced liquidity allows the firm to raise additional capital via secondary issues. In addition to the benefit, there are some costs associated with going public too. In particular, there are on going costs associated with the need to supply information on a regular basis to invertors and regulators for publicly traded firms. Further more, there are substantial one-time cost-namely, direct costs that comprise costs of legal, auditing and underwriting fees etc, and indirect costs, if the shares are sold for less than investors would be willing to pay (i.e underpricing). These direct and indirect costs combindly affect the cost of capital for firms going public.

A vibrant capital market always supports the growth of a robust economy. The frequent changing scenarios of capital markets in Bangladesh along with a hot and cold wave over the last two year have made Bangladesh Stock market a very interesting destination for such studies. But completing an IPO successfully is not an easy as this operation is surrounded by conflict of interest, uncertainty and information asymmetries. These information asymmetries lead to the traditional problem of adverse selection and moral hazards. Further, an IPO event study has significance since such a study offers a reappraisal of the informational efficiency of capital market. Furthermore, evidence is presented on two anomalies associated with IPOs in many countries. The first and most widely documented anomaly concerns the high initial returns of IPOs in the immediate aftermarket – generally known as "underpricing" phenomenon. Secondly, there is evidence, but not as common as short-run underpricing, that IPOs perform poorly in the long-run – known as the "long-run underperformance" phenomenon.

Over the last 30 years many theories explaining the high initial returns have been developed. The IPO pricing models has been categorized in three broad groups-asymmetric information model, litigation consideration model, models based on

irrationality on the part of market participants. The first two groups contend underpricing as an equilibrium phenomenon in a market where there are some informational asymmetries among the market participant. The explanation of the third group is based on irrational behavior or informational inefficiency and not fully competitive market. However, market-wide phenomena like long-run underperformance, temporal cycles in underpricing, and windows of opportunity are hardly explained by these theories. It is important to note that long-run underpricing phenomenon is not as common as short-run underpricing. Nevertheless it has revived the question about the rationality of pricing in the IPO market and regenerated interest in non-rational explanations for the initial return anomaly.

IPO underpricing has been a puzzle for corporate finance. Despite the absence of single unifying theory, a number of empirical evidence have been highlighted to investigate the determinant of IPO underpricing.In particular, the impacts of decisions made around the IPO process itself, such as the selection of underwriter(s), auditor(s), the fraction of equity retained by the owners, the role of venture capitalists, the existence of borrowing relationship, choice of investment banking contracts(firm commitment vs. best-efforts), the size of the total offer have been investigated widely in the literature.

The regulatory authority in Bangladesh Stock Market allows two basic and distinct issuing techniques – fixed price, and book building. From the day of inception of stock exchange (1956) fixed price method was the only method that had been used by the issuers in Bangladesh. The book building method–two-staged pricing method introduced in 2010 is comparatively new method for the issuers and very few companies have chosen to issue their shares by this method. Hence this study encompasses the effect of IPOs following fixed price method only.

Thus, the broad objectives of this study are to (i) investigate the equilibrium price of IPOs being determined on event day in aftermarket for both financial and non financial issues, (ii) examine underpricing of IPOs (iii) identify the determinants of underpricing of IPOs in stock market of Bangladesh, (iv) examine the aftermarket stock price performance of Bangladeshi IPOs in order to shed further light on the generality of long-run IPO underperformance; and (iv) investigate also earnings management and earnings forecast error to find a causal relationship with long-run performance of IPOs in Bangladesh.

Keeping these above objectives in mind, we have studied at the several aspects of IPOs in Bangladesh in addressing the IPO anomalies. The investigations of these aspects give rise to four separate papers. These papers are independent but related. In this thesis, each paper is presented as a chapter. The outcome of the investigation of IPO aspects covered in these papers enable us identify the equilibrium price adjustment day of short-run underpricing, generality of long-run after market performance of IPOs and the determinants of both short and long-run underpricing.

The organization of the thesis is as follows, Chapter 1 presents a literature survey on the theories of IPO pricing. For each type of model, an overview of the papers surveyed, with emphasis on intuition, and their relation to each other is provided. Testable implications of the model are derived and compared to available evidence. Chapter 2 presents evidence on the costs of going public in Bangladesh, both direct costs (expenses) and indirect costs (underpricing). To begin, using IPO literature, the equilibrium price adjustment day was first identified and then its extent of underpricing was identified across industry and year. Underpricing differential hypothesis of both financial and non-financial issues is developed, examined and tested using univariate test and determinants of underpricing are investigated using multiple cross-sectional regression tests after controlling for ex-ante uncertainty proxies' effects. The explanations for short-run underpricing are provided.

Chapter 3 presents a comprehensive analysis of the aftermarket stock price performance of IPOs in Bangladesh during 1991-2007 in the five year after going public. One of the issues that concern the relation between long-run performance and the short-run underpricing phenomenon is also addressed. Furthermore, the existence of any systematic patterns in the aftermarket performance of these issues and the risk behavior of Bangladeshi IPOs in the five year after going public is also analyzed in this chapter.

Chapter 4 investigates two conjectures about long-run performance of IPOs with data from Bangladeshi Stock market. First, this study examines the proposition that firms can successfully time their initial public offering to take the advantage of "windows of opportunity" created by investor overoptimisim. Second, this study also examines the conjecture that some managers of IPOs actively manage pre-IPO discretionary accruals in reporting enhanced earnings to achieve higher prices at the time of floatation, and it is

mostly these firms following aggressive reporting strategies that subsequently perform poorly in the after market.

Chapter 5 investigates another conjecture that earning forecast error is associated with long-run price performance of those IPOs suggesting that investors regard these forecasts as credible signal. Earnings forecast error is the deviation of actual earning from the forecasted earning published in the prospectuses during floatation. Hence, the conjecture is, larger the earnings forecast error, greater the underperformance of IPOs.

Finally, in chapter 6, summary of research findings and concluding remarks are given.

Chapter 1

The Pricing of Initial Public Offerings

1.1Pricing of IPOs—Theory and Evidence

In the Finance literature it is an extensively documented fact that IPOs are underpriced on an average. Underpricing is a robust phenomenon that occurs across different equity markets and in different time periods. An IPO is said to be underpriced if the price rises above the offer price in the immediate aftermarket. In the corporate finance literature IPO pricing models are referred to as underpricing models. Researchers have documented that there is a systematic increase from the offer price to the first day closing price of IPOs. But this excess positive return is short run phenomenon and excess initial return was attributable to deliberate underpricing.

IPO pricing models can be categorized in three broad groups- asymmetric information model, litigation consideration model, models based on irrationality on the part of market participants. The first two groups contend underpricing as an equilibrium phenomenon in a market where there are some informational asymmetries among the market participant. The explanation of the third group is based on irrational behavior or informational inefficiency and not fully competitive market.

Models based on asymmetric information can be further classified in five sub groups. These models are Adverse Selection Model, Moral Hazard Model, Underwriter's Reputation and Certification Model, Signaling Model, Truthful Revelation Model.

1.2 Models Based On Asymmetric Information:

1.2.1 Adverse Selection (Winner's Curse) Model

Adverse Selection Model was set up by Rock (1986) and he gave the important rationale for underpricing. He assumed informational asymmetry between informed and uninformed investors his argument is based upon the existence of a group of investors whose information is superior to that of the firm as well as that of all other investors The issuing firm and uninformed investors are uncertain about the true value and know only the "unconditional mean value" of the IPO. Rock explains how this informational asymmetry may lead to a "lemon problem", where the uninformed investors end up primarily with the less successful (bad issues) IPOs.

In the Adverse Selection Model Rock has made some assumptions, The assumptions are

- The informed investors have perfect information about the realized value of the new issue.
- Informed investors cannot borrow securities or short sell. they cannot sell their private information.
- Informed demand is not greater than the mean value of the shares offered.
- Uninformed investors have homogeneous expectations about the distribution of the shares.
- All investors have same wealth and same utility.

In Rock's model he assumed that there are two groups of potential investors in the market

a) The so called informed investors, who bears some cost in information production and subscribe to IPO's only when they expect the after market price to exceed the offering price.

b) Uninformed investors who subscribe to every IPO indiscriminately. There is always some uncertainty about the market prices of IPO. If the issuers and their investment bankers attempt to offer the securities at their expected market price, the uninformed investors would end up purchasing disproportionately large shares of the overpriced issues .Thus uninformed investors face a winner's curse problem. So in order to keep the uninformed investors in the IPO market, the investment bankers have to offer the securities at discount from their expected after market price. With systematic underpricing, the uninformed investors would earn a normal expected return on the IPO's allocated to them. That is investor's losses from overpriced allocations would be compensated by the excess returns on the underpriced issues that are allotted to them.

The testable implications of Rock's model are

- Weighting the returns by the probabilities of obtaining an allocation should leave the uninformed investor earning the risk less rate. Due to informational asymmetry more the increase of underpricing less the probability of receiving those shares for uninformed investors.(Rock,1986, page 193)
- Higher initial returns (underpricing) is associated with the higher oversubscription rate of new issues. (Rock,1986, page 199)

- A cross-sectional implication of the Rock's model , developed by Ritter (1984a) , and Beattty and Ritter (1986) , is that riskier issues should have higher initial rerturns, on average, The greater is the ex-ante uncertainty about the value of an issue, the greater is the expected underpricing. (Beatty and Ritter,1986,page216; Rock,1986,page 189)

Beatty and Ritter (1986) extended Rock's model and argued that there is an equilibrium relationship between the expected underpricing of an initial public offering and the ex ante uncertainty about its value. Many initial public offering shoot up in price , many issues also decline in price after floatation. On an average an investor submitting a purchase order cannot be certain about the offering price. So a potential investor incurs costs doing security analysis to find out which security is likely to increase in price. In equilibrium, the investors incurring these costs will earn sufficient profits to cover up their costs. These investors are termed in this paper as informed investors. Those investors who don't incur this cost is known as uninformed investors. The uninformed investors are free riders. Beatty and Ritter called this uncertainty about the value per share as "ex ante uncertainty". They argued that greater the ex ante uncertainty, the greater is the expected underpricing. The second proposition is that the resulting underpricing equilibrium is enforced by investment bankers whose reputatinal capital is at stake and who will be involved in many initial offerings over time. Any investment banker who cheats on the underpricing equilibrium by persistently underpricing either by too little or by too much will be penalized by the market place. Beatty and Ritter provided empirical evidence in support of this proposition. An implication of finding is that, if the level of ex ante uncertainty is endogenous, an issuing firm has an incentive to reduce this uncertainty by voluntarily disclosing information.

1.2.2 Moral Hazard Model:

Baron (1982) presented a theory of the demand for investment banking advising and distribution services. In this model he assumed that an investment banker is better informed than the issuer and the issuer cannot observe the distribution effort expended by the banker. In general investment bankers performs three functions- underwriting, advising and distribution. Baron's main focus was on investment banker's advising and distribution activities. The demand for underwriting activities was eliminated as he assumed that both the banker and issuers are risk neutral. The advising function may be

important to the issuer if the banker is better informed than the issuers. So the issuer can delegate the offer price decisions to the banker so that he can utilize his superior information. Distribution function performed by the banker may be valuable to the issuer to the extent that the banker can generate demand for the issue. The investment banker can do this by two ways. One by persuading the customers to purchase the issue or by certifying the issue to the market by putting his reputation behind the issue. The term "delegation" will be used for the contract under which an issuer engages the services of an investment banker to both distribute the securities and to give advice regarding the offer price. Two special cases of a delegation contract are "pure distribution" contract and "direct sale". In a direct sale, the issuer determined the offer price based on his information and offers the securities to the market without using the investment banker .Baron showed that the value to the issuer of delegating the offer price decision to the banker is an increasing function of the issuers' uncertainty about the market demand for the securities. For delegation and distribution contract, the value to the issuer of the banker's distribution effort is an increasing function of issuers' uncertainty. So greater is the uncertainty greater will be the demand for the advising and distribution services of the banker. The issuer must compensate the banker for the use of his information. Then optimal offer price is below the first best offer price indicating that new issues would be underpriced when the banker is better informed.

The testable implication of baron's model is

- If an issue of unseasoned securities is more uncertain about the market reception of his securities than is an seasoned securities, the issuer of unseasoned securities will accept a lower price and hence underpricing is inevitable.
- In the absence of asymmetric information between the investment banker and the issuing firm, there is no need for compensation in the form of underpricing.

1.2.3 Underwriter's reputation and certification model:

An underwriter is an integral part of capital raising process from the market. Booth and Smith (1986) developed a theory about the role of the underwriter in certifying that risky issue prices reflect potentially adverse inside information. The model is based on the assumption of asymmetric information between insiders who are shareholders and the outsiders who are prospective subscribers to new issues. Booth and Smith hypothesize that an underwriter can be employed to certify that issue price consistent with inside

information about future earnings prospects of the firm. In this model issuing firm's are viewed as effectively leasing the brand name of an investment banker to certify that issue price reflects available inside information. The fundamental problem with issuing equity or risky debt is potential opportunism by insiders/ shareholders with superior knowledge. Generally it is found that insiders have an informatiom advantage that enables them to exploit situations where outsiders have overestimated the future cash flow to be received by investors in a new issue. As the insiders are unable to communicate their belief to the outsider or the outsiders are unable to buy inside information there is probability of market failure. This is the prime motivation for the use of an investment banker to certify the issue price.

Another explanation was given by Carter and Manaster (1990) in this regard. Consistent with the Rock's model they showed that the greater the proportion of informed investor capital participating in an IPO, the greater is the equilibrium underpricing. If investor has scarce resource to invest in information acquisition , they specialize in acquiring information for the most uncertain investment.. Since the informed investor's capital migrates to highly uncertain IPO's , the underpricing and subsequent price increase are higher for these issues. Underpricing is always costly for the issuing firm. Therefore low risk firms always try to reveal their low risk characteristics to the market. One way of doing this is selecting an underwriter with high prestige. Prestigious underwriter, to maintain their reputation, only market IPOs of low dispersion firms. As a result a signal in the form of underwriter reputation is reflected in the market. Carter and Manaster gave empirical support of their theoretical framework that underwriter's prestige is associated with marketing of low risk IPO's.

The above models were extended further by Titman and Trueman (1986). Titman and Trueman added another element to the aforesaid models i.e. the choice of auditors. The prevailing belief holds that the choices of auditors' along with investment banker affect the price of an initial public offering. The model given by Titman and Trueman demonstrates that how the quality of the auditor chosen can rationally be used by investor in valuing new firms. Auditor quality is defined here in terms of the accuracy of the information he supplies to the investors. The information provided by higher quality auditor helps the investors to make a more precise estimate of the firm value. The higher the quality level chosen , the greater will be investor's assessment of the firm's value. The

model provided here gives a theoretical support of the hypothesis but the model was not empirically tested.

Combined altogether the major testable implications are

- The market value of a firm is an increasing function of auditor and investment. On average banker quality.(Titman and Trueman)
- On average, prestigious underwriters are associated with lower risk IPOs. (Carter and Manaster, 1990, 1053).
- On average prestigious underwriters are associated with IPOs that experience less price run ups. (Carter and Manaster, 1990, page1053).
- Initial public offerings when handled by smaller and less established investment banker , would tend to be more underpriced. (Booth and Smith,1986,page277)
- The degree of underpricing is inversely related to the completeness of the certification effort and positively related to the potential impact of adverse inside information. The underpricing of competitive issues will tend to rise relative to negotiated issues as the potential information asymmetry of the issue rises. (Booth and Smith,1986,page277)
- The market value of an IPO firm is positively related to the quality of the auditor and investment banker.(Titman and trueman,1986,page 171)

Kumar and Tsetsekos (1992) developed a conceptual framework employing the reputational capital paradigm. The study posits a hierarchy of investment banking contracts reflecting differential levels of certification. The firm commitment-negotiated arrangement is perceived to have highest quality of certification, followed by firm commitment-competitive, best effort-negotiated and best effort-competitive arrangement in that order. The empirical results show sharp distinction between firm commitment and best effort contracts.

Consistent with the certification hypothesis Megginson and Weiss(1991) provided support for the certification role of the venture capitalists in initial public offering. The presence of the venture capitalists in the offering firm certifies the quality of the issue through their investment in financial and reputational capital. A comparison of VC backed IPO's and a control sample of non VC backed offers from 1983-1987, matched by industry and offering size, indicates that VC backed firms are more significantly younger,

have greater median book value of assets and a larger percentage of equities in the capital structure. By reducing the information asymmetry the venture capitalists reduce the cost of going public. They also found evidence of significantly lower underpricing and underwriter compensation for VC backed IPOs.

1.2.4 Signaling Models:

Signaling model presented by Allen and Faulhaber assume that the firm itself best knows its prospects. Good firms wish to signal investors their superior prospects, and a low IPO price and quantity can be used as such signal. The model is in the spirit of Ibbotson's (1975, p264) conjecture that IPO's are underpriced to "leave a good taste in investor's mouth" so that future underwritings from the same issuers could be sold at attractive prices.Underpricing the firm's IPO is a credible signal that the firm is good to investors, because only good firms can be expected to recoup this loss from after their performance is realized. Good firms find it worthwhile to underprice their IPO's, because by doing so they condition investors to more favorably interpret subsequent result. The owners of bad firms know their expected performance and subsequent market valuation. They know they cannot recoup the initial loss from underpricing and cannot afford to signal. The model therefore provides an explanation for the underpricing of IPO's as an equilibrium signal of firm quality. Closest to the signaling model of Allen and Faulhaber are the models given by Grinblatt and Hwang(1989) and Welch(1989). In those papers, underpricing is a signal that the firm is good. The sequences of of events are similar: a partial offering is made initially, information is then revealed, and subsequently more stock is sold. Therefore by bearing a large initial cost, good firms can credibly signal their type. But there are a number of differences between Allen and Faulhabers model and the two mentioned above: in Grinblatt and Hwang under diversification is combined with underpricing to signal both the mean and variance of return and in Welch there is a direct cost for bad firms to imitate good firms. But the most important is that in Grinblatt & Hwang and Welch's model firm type is fully revealed in some exogenous way. In Allen and Faulhaber's model learning occurs as investor's update their Bayesian priors on the basis of the firm's performance.

The main implications of Allen and Faulhaber's model are

- Hot issue market may occur in specifics industries whenever an exogenous shock substantially improves expected profitability.

- The above mentioned condition continues until the number of firms in that industry adjusts to the new conditions
- Firms that do not have information asymmetry and hence no need to signal , do not underprice
- When others are involved in an IPO , such as venture capitalists, underpricing is more severe.

Grinblatt & Hwang further extended the signaling model and argued that underpricing phenomenon can be a consequence of the actions of the rational agents. In particular they presented a signaling model in which underpricing is an equilibrium outcome. In their analysis of underpricing, an issuer is assumed to have better information about his firm's future cash flow than outside investors. To overcome this asymmetric information problem, the issuer signals the true value of the firm by offering the shares at a discount and by retaining some of the shares of the new issues in his personal portfolio. This model can be regarded as generalization of Leland and Pyle(1977) model . In this model the author assumes the variance and the as well as the mean of the project's cash flow is unknown, so that a second signal, the offering price, is needed to convey the firm's value to the market. In the model's separating equilibrium, a firm's intrinsic value is positively related to the degree its new issue is underpriced.

The testable implications of the model are as follows:

- The variance of the cash flow and the issuers fractional holding are negatively related , given the degree of underpricing.
- The value of the firm is positively related to the variance of its cash flow keeping the issuers fractional holding constant.
- The value of the firm is positively related to the fractional holding of the issuer, holding the variance constant.
- The fractional holding of the issuer is negatively related to the variance holding, the value of the firm constant.
- The degree of underpricing is an increasing function of the variance, given the issuer fractional.
- Given the variance of the firm, the degree of underpricing is positively related to the issuers fractional holding

- Given the issuers fractional holding , firm value is positively related to the degree of underpricing
- Given the variance of the firm, firm value and the degree of underpricing are positively related.

An explanation of the underpricing puzzle popular with investment banker and other practitioners is that underpricing generates publicity about the firm making the IPO and induces investors to learn more about the firm. The experts contend that this leads to a run up in the secondary market share price, and consequently is in the best interest of the, of firms going public. Thomas .J. Chemmanur *(*1993*)* modeled the above hypothesis and developed a scenario in which underpricing is generated by the desire of the firm insiders to induce information production about their firm. In the model insiders have private information about the quality of the firm's projects; outsiders may acquire information at a cost to reduce information asymmetry. The firm sells stocks in the IPO and again in secondary offering. Insiders of high value firms are motivated to maximize outsider information production so that this information will be revealed in the secondary market price of their firm's equity, increasing its expected value. Since information is costly a lower IPO share price will induce more outsiders to produce information . The equilibrium initial offer price, which may involve underpricing to some extent , emerges from this tradeoff. The model illustrate that costly information production by outside investors may be of equal importance in minimizing the impact of private information in IPO's.The empirical implications of the models are

- The IPO's that are oversubscribed to a greater degree will be associated with greater extent of underpricing.This is consistent with the evidence of Beatty and Ritter(1986).
- The greater the cost of information production , the greater the extent of underpricing. Firm that are relatively obscure, or those with projects that are costlier to evaluate , will have a greater extent of underpricing.
- It is in the issuers interest to price equity in the IPO below the highest price at which they can sell , since this results in larger combined proceeds from the initial and secondary offering.

- The greater the probability that the firm is of high value , the smaller the extent of underpricing.There may be time periods and industries in which the proportions of high value firms making the IPOs is larger than it is in others.
- The greater the gross proceeds from the IPO, the smaller the extent of underpricing.

In a subsequent research Zheng and Stangeland (2007) examined the relation between IPO underpricing and post IPO growth rates of accounting performance variable. Zheng and Stangeland (2007) hypothesized that IPO firm with greater underpricing should have higher post- IPO growth rates of accounting performance variables. However, rather than concentrating on growth in earnings, Zheng and Stangeland included growth in EBITDA and growth in sales. Because these latter variables are more difficult for managers to manipulate. Consistent with the hypothesis Zheng and Stangeland found that underpricing is positively related to growth in sales and EBITDA in the five years following an IPO. These results suggest that the IPOs with greater underpricing have higher quality. This result is also consistent with Rock's prediction that greater underpricing will result for firms that informed investors identify as having good quality. Zheng and Stangeland also found that IPO growth rates in earnings are much lower than the growth rates in sales and EBITDA. Further test shows that this inconsistency is likely caused by earnings management at the time of the IPO, which manipulates earnings initially and thus reduces earnings growth rates in subsequent years. This result suggests that earnings growth rates may not be accurate measure of firm quality compared to sales and EBITDA growth rates.

1.2.5 Truthful Revelation Model:

Benveniste and Spindt(1989) developed a theory of underwriting that explains the existence of underwriters as institutions that improve the economic efficiency of the initial public offering market. In the paper Benveniste and Spindt analyzed underwriter's IPO marketing process and showed how the information it yields is used in pricing and allocating an IPO. Two kinds of informational frictions affect IPO pricing One is that issuing firms are not well informed about their IPO reception in the market. Another identified by Rock(1986) investors are also asymmetrically well informed about the factor outside the issuing firm. The main difficulty facing an underwriter wishing to collect information useful to pricing an issue is that investors have no incentive to reveal

positive information before the stock is sold. By keeping those information to themselves until the offering, investors can expect to benefit ; they could pay a low initial price and then they could sell it in at the full information price in the post offering market. To analyze how this incentive may be overcome Benveniste and Spindt (1989) model the pre market as an auction, conducted by the underwriter, in which the investors understand how their indications of interest affect the offer price and stock allotment they receive. Benveniste and Spindt showed that underpricing is a natural consequence of the pre market auction. IPO offer price must be set below the highest price to provide reaqsonable profit to compensate investors for revealing positive information. The amount of compensation depends how much investors may expect to profit by hiding the information i.e. this depends directly on the extent to which withholding positive information results in a lower expected offer price. On the other hand an investor has less incentive to bid low for an issue he/she highly, if doing so jeopardizes his allocation. This is true if the equilibrium after market is fully revealing.

The testable implications are

- Underpricing is directly related to the ex-ante marginal value of investor's privaten information (Benveniste and Spindt ,1989, page353)
- Underpricing is directly related to the level of presales. The higher the level of demand in the premarket from regular investors relative to the number of of IPO shares to be issued, the regular investors will have to be compensated more by way of underpricing as a substitute for larger allocation. (Benveniste and Spindt ,1989, page353)
- Underpricing is minimized if priority is given to orders from investors who indiacte positive information. (Benveniste and Spindt ,1989, page353)
- Underpricing is directly related to the level of investor's interest in the premarket. This implication suggests that those IPOs for which the offer price is revised upwards will be underpriced more than those for which the offer price is revised downwards. (Benveniste and Spindt ,1989, page353)

Taking the essence of Truthful Revelation Model a newer pricing method was introduced in America which is known as **book building** method. Under the book building method, the investment banker solicits indication of interest from institutional investor. Such indications consist of a bid for a quantity of shares and might include a price range or

other details. The investment bank uses this information to gauge the demand of the issue. The issue price is not set according to any explicit rule, but rather based on the bankers' interpretation of investor's interest. The investment banker thus sets the price where demand exceeds supply. With book building method, there will be a preliminary prospectus containing a price range of the issue, and then underwriters and issuers go on a road show to market the company to prospective investors. This road show helps the underwriters to gauge demand as they record "indication of interest "from potential investors. If there is strong demand the underwriter will set a higher price One important feature of book building is that the investment banker has full discretion in allocating shares.

In subsequent research Benveniste and Busaba (1997) compared two mechanism for selling IPOs, the fixed price method and American Book Building Method. Benveniste and Busaba (1997) asserted that fixed price method can create cascading demand but has to lure the investors through underpricing. They found that bookbuilding method generates higher expected proceeds but exposes the issuer to greater uncertainty, and it provides the option to sell additional shares that are not underpriced on the margin. But book building method is not without its vices. Using U.S data Aggarwal, Prabhala, and Puri (2002) found that institutions are favored in share allocation in book building method In her study Aggarwal (2002) proved that underwriters may have private information about IPO value and use it to favor institutions for reasons beyond book building. Such information helps them to participate less in the worse performing issues. So the retail investors get more of the weak performing issues.

The fact that book building reduces under pricing is some what controversial The case of Japan can be cited in this regard. Japan traditionally used auction method for IPO pricing. Since 1997 Japan has introduced book building side by side with auction method Pettway and Kaneko(2003) found that under pricing in Japan has increased following adoption of book building .

1.2.6 Underpricing and Agency Explanation of IPO Management Retention

Ownership retention has occupied an important position in IPO literature. Some of the literature relates ownership retention to IPO value via signaling. But no contribution relates retention to underpricing due to signaling. At the very outset it might appear that

information content of owner retention should affect both the IPO offer price and the aftermarket price equally, so that the degree of underpricing is unaffected. In this context Robinson, Robinson and Peng (2004) presented an agency-theory model of IPO management retention. The model is based upon the entrenchment benefit and IPO generated wealth. It is argued that underwriters and investment public react differently to the agency implication of various degrees of retention. Underwriters however prefer higher levels of retention than the investment public because higher retention protects them from the need to fulfill their contractual obligation for aftermarket price support. On the other hand high level of ownership may induce the fear of entrenchment among investors and low level of ownership may depress equity value due to the fear of management shirking.

These differing reactions result in retention having asymmetric impacts on IPO-offer price and after market price, thereby causing the degree of underpricing to change with ownership retention. The model suggests that IPO underpricing should be a curvilinear hump shaped function of retention. An empirical investigation using a large sample of 3075 IPOs, issued between January 1988 to December 1999 in US market documents these effects. The model incorporates signaling from retention and this signaling occurs for two reasons: (1)higher pre_IPO owner retention signals that management expects higher future revenue, and (2) higher retention indicates higher agency costs associated with entrenchment The theory indicates that aftermarket price should be a hump shaped curvilinear function of retention.

1.2.7 IPO Underpricing and After Market Liquidity:

The underpricing of initial public offering is generally explained with asymmetric information and risk. Ellul and Pagano (2006) tried to complement these traditional explanations with a new theory where investors worry about after market liquidity that may result from asymmetric information after the IPO. Ellul and Pagano (2006) provided a model showing that an IPO that is expected to be more illiliquid and is expected to have higher liquidity risk should feature higher underpricing. Ellul and Pagano's model blends such liquidity concerns with adverse selection and risk as motives for underpricing.They showed that equilibrium stock returns must compensate investors for the losses expected from trading with better informed investors and for associated risk. In the model there are

two types of private information: a signal that becomes public as soon as shares start trading after the IPO and some residual private information that is disclosed at some later date. The first type of information creates the standard adverse selection problem at the IPO stage while the second determines an adverse selection problem in the after market and is reflected in the bid-ask spread. IPO underpricing will impound the cost associated with latter to the extent that some investors expect to liquidate their shares in the after market. Consistent with the hypothesis Ellul and Pagano found that IPO underpricing is higher for shares featuring lower expected liquidity and higher liquidity risk. The effects of liquidity variables are found to be robust. The effects of liquidity variables are found to be robust to the inclusion of other factors traditionally used to explain IPO underpricing, that is, variables capturing asymmetric information (such as venture capitalists presence, underwriter reputation, number and proceeds of recent IPO and insider's option holding) fundamental risk (such as age of firms, , total assets and standard deviation of the after market mid-quote).

1.2.8 IPO Underpricing and Firm Financial Characteristics and Availability of Alternative Finance:

So far most of the previous studies suggest that the presence of bank-lending relationship and venture capital funding reduce underpricing by providing important certification of the offering. While other studies attempted to focus on the question as to why issuers would leave so much "money on the table" by using various proxies for firm quality. But important distinguishing characteristics related to the financial health of the firm remained largely unexplored. Liquidity risk is unique because of its important implication for a firm's bargaining position with the underwriter. Marshall (2004) contributed an additional dimension to the existing literature by examining the combined effects of finance availability and financial characteristics on the level of underpricing.Marshall hypothesized that financial characteristics of the issuing firm along with the availability of the alternative sources of financing , are important determinant of the bargaining position and consequently the level of underpricing.Consistent with his hypothesis Marshall found that firms with greater liquidity concerns ,i.e., poorer financial characteristics at the time of IPO, experience greater underpricing. On the other hand, firms with higher levels of venture capital funding or debt financing are more fully priced or less underpriced.

The model given by Mashall is known as "The Bargaining model". Bargaining consists of a sequence of offers and counter offers over the value of the firm and terms of the underwriting agreement. The issuing firm expects to maximize the proceeds for the fraction of the equity sold. The better the firm's bargaining position with the underwriter, the more likely the firm is to receive a high offer price. On the other hand, the underwriter has an incentive to suggest a lower price. The underwriter's compensation package is not monotonically increasing in the offer price, the expected cost of undersubscription and legal liability cost are both included in offer price. Potential cost of underwriting includes the cost of unsubscribed shares and the potential for legal costs of and liabilities stemming from lawsuits by discontented investors. As the potential cost increases with riskier firms, the underwriters are induced to propose a lower price, thereby shifting the underwriter's compensation to those forms that increase with underpricing. The final outcome of the bargaining game, depends on the potential waiting cost the issuing firm incurs either in finding alternative underwriters or in a lengthy negotiation process. The size of the waiting cost to the issuing firm is assumed to be the function of the financial health and the exit options available. The presence of existing capital sources, evidence of venture capital funding and bank capacity, suggest some exit options of the firm

1.3. Litigation Theory Explanation:

When a firm decides to go public usually there is little or no publicly available information. Even when historical information on operating and financial statistics of the firms are available, theses data do not convey more than some rudimentary information about the quality of the management. Moreover the historical data cannot provide any meaningful indication about the potential agency cost that may accompany the transformation of the organization from a private to a public corporation. it is the function of the investment bankers to perform proper investigation and estimate true value of the firm. And generally investors have to rely on the information produced by the investment banker. The information produced by the investment banker carries credibility for the investors because, by serving as a certifier of the issue, the investment banker is putting the value of its reputation at risk. Beyond the market forces that requires incentive for production and dissemination of information about IPO, the securities regulation have imposed an obligation for every professional involved in the offering to diligently examine, inquire, and ensure that every material fact relating to the operations and affairs

of the issuer that may affect a potential investor is properly examined and disclosed. Securities Act of 1933 mandates investment banker to conduct "due-diligence" investigations to avoid liability for false or misleading information about the prospects of the issuer but for material omission in the registration statement. This act identifies the parties that may be subject to civil liabilities for presenting false or misleading information in the registration statement. A purchaser of an IPO can sue every person who has signed the registration statement, every member of the board of Directors, or partner in the issuing firm, every accountant, engineer, appraiser, or other consultant, and every investment banker that is associated with the offering. The Act specifies that all or any one of these parties would be jointly or severally liable for damages. Litigation theory (Tinic 1988) explains that since the issuers and investment bankers both are vulnerable to legal liabilities , the obvious means to protect themselves is to underprice the offering which may provide the issuer and investment banker with protection against potential legal liabilities.Tinic(1988) demonstrated that gross underpricing serves as an efficient form of protection against legal liabilities and the associated damages to the reputations of both investment bankers and issuers. In other words, it is a form of implicit insurance against potential legal liabilities that may arise from the "due diligence" and disclosure requirements of the securities regulation.

Hughes and Thakor (1992) develop several models for the pricing of IPOs in which there exists potential future litigation risks. The underwriter's pricing decisions trade-off current revenue against expected future litigation costs, both of which are increasing in the IPO price. Their conjecture is that the threat of litigation can induce an underwriter's to purposely sell initial public offering at a discount relative value assessed by the underwriter. However they do not claim that risk of litigation is not the sole cause of underpricing. They derive sufficient conditions to design a model constrained by time consistency and rational expectations requirement, in which IPO underpricing results as an equilibrium underpricing in the legal environment lies an interaction between the manner in which the IPO price influence the probability of a future price decline and the manner in which the ex-post beliefs concerning the price decline due to "bad luck" or "overpricing".

In addition to explaining underpricing, the model generates several other testable predictions

- On average, there is greater underpricing when the IPO is offered directly by the firm itself than when the an underwriter is used.(Hughes and Thakor ,1992, page712)
- The better the reputation of the underwriter , the smaller is the amount of underpricing (Hughes and Thakor ,1992, page712)
- The greater is the variance of cahhflows, the greater is the underpricing. (Hughes and Thakor ,1992, page711)
- Since the compensation of the underwriter and the equilibrium probability of litigation are increasing in the issue price, the lower the undwriter's compensation schedule, the greater the degree of underpricing. (Hughes and Thakor ,1992, page711).

1.4. Models Implying Some Irrationality or Market Imperfections

1.4.1 Underwriter's Price Support or Pegging Hypothesis:

So far numerous theoretical explanations have been offerd for the large initial returns received by investors on new common stock. Majority of these explanations focused on why the underwriters might deliberately underprice new equity shares. But Ruud (1991) came up with new explanations for underpricing. She argues that underwriters do not deliberately underprice IPOs. Instead, they set offering prices at expected market values but support those offerings whose prices fall in aftermarket. She argues that price stabilization, which censors negative returns, accounts for the observed average underpricing documented in previous empirical work. But Ruud overlooked the importance of two implications in her underwriter price support model. First she does not recognize that her model implies that underwriters must make a credible commitment ex ante to stabilize all IPO. Pricing errors are assumed to be random in her model, thus underwriters must commit to stabilize all IPOs during the pre-offer period – otherwise, they would know beforehand which IPO are likely to drop in prices. Second, she does not recognize that price stabilization is a form of compensation. An underwriter's offer to stabilize the price of an IPO is equivalent to giving initial investors a put option , since new issue shares can be sold back to the underwriter at the stabilizing bid. Thus price stabilization can be viewed as a form of deliberate compensation to initial investors. As a

result, Ruud's underwriter price support model implies that underwriters only use price stabilization to compensate initial investors. Later on Chowdhury and Nanda(1994) and Benvineste, Busaba and Wilhelm(1995) contradicted Ruud's theory of price support and suggested that underwriters will use both price stabilization and underpricing to compensate initial purchasers of IPOs for risks associated with informational asymmetries.

The main assumption of the above mentioned theories is that the underwriters use stabilizing bid as price support activities. But in a study Aggarwal R (2000) found that aftermarket activities are less transparent and include stimulating demand through short covering and restricting supply by penalizing the flipping of shares. Underwriter can use a combination of pure stabilization, after market short covering and selective use of the over allotment option , and penalty bids to manage aftermarket activities. Aftermarket short covering allows the investment bankers to absorb shares flipped in the first few days of trading, otherwise flipping would put a downward pressure on the stock price. So in weak offering the underwriters must have a large enough short position to absorb the selling pressure from flipping, otherwise the stock price would fall. Underwriters also try to restrict flipping by including a penalty bid in the underwriter contract. For weak offering, they actually penalize those syndicate members whose clients flip. If flippers do not cause the price to drop, the underwriter can cover the short position up to 15% by exercising the over allotment option.

A study was conducted on 137 IPOs that took place in USA during the period of May to July 1997 to test the hypothesis empirically. The result of the study was interesting. One of the major findings was that pure stabilization does not occur as the prior literature would suggest. This finding is not unique to the sample period taken for the study. A random check was done to find out whether a pure stabilization was done ; not a single offering had these bids. Aggarwal consented that the cause may be it is regulated and it is risky.The forms of aftermarket activities that do occur are aftermarket short covering to stimulate demand and penalty bids to restrict supply. The literature generally assumed that stabilization is needed for offering that are trading at or below the offer price. Aggarwal R found that underwriters are actively supporting the offerings that are traded a little above the offer price.Aggarwal assented that flexible and effective public policy should be designed to be responsive to new and old form of price influencing activities by the underwriters.

1.4.2 Impressario Hypothesis:

Shiller(1990) offers another explanation of underpricing phenomenon from a different dimension. Shiller explained the phenomenon from the behavioral point of view of investors. The theory offered by Shiller is termed as "Impresario Hypothesis". Impresarios are those who manage musicians and other entertainers. According to this theory the Impresarios (Investment bankers) create the appearance of excess demand by trading among themselves at higher prices, creating impressions that people are waiting in long lines to buy the subscription. This impressions will tend to produce greater demand for subsequent events. In the same manner underpricing IPOs will create the high initial returns that leave the impression that the stockbroker is giving good investment decision. By this theory "hot" market appear when some salesman for IPO's discover that some segment of the public is ready for a fad for IPOs. Underwriters then let the high initial returns run for a while to generate publicity and goodwill for the IPO's.

The survey conducted by Shiller showed that investors have great concern for the reputation of the investment banker and their advice in selecting a particular stock is crucial for them.Only 26% of the respondents answered that they have done any prior calculation about the intrinsic value of the share and compare the vague with the offer price. Most IPO investors are repeat purchasers of IPO and communicated extensively with others about IPO's, so that the reputation of the underwriter may have an important influence on the profit of the underwriter. The impresario hypothesis does not imply that underwriters have any control over the investor enthusiasm.Shiller contended that investors behavior is subject to fads which cause initial offerings to be overpriced due to the prevailing over optimism of the investor at the time of offering. The over optimistic investors bid up the price and subsequently the market discovers the true value and corrects the initial overvaluation overtime. This results in long term under performance.Aggarwal and Rivoli (1990) made a comprehensive analysis of the long term after market price behavior of a sample of 1598 common stock IPOs during 1977-87. The return to the investor who purchased the shares at the closing price on day 1 and hold until day 250 are found to be significantly negative after adjusting for market movements. This phenomenon is evident in aggregate and in various cross sectional groupings based on size of issue, offering price, year of issue and underwriter class. Ritter examined the price behavior of IPOs issued during 1975-84 for three years following the offering. He finds that IPO investors underperform the market over the long term, and suggested that the IPO market is subject to fads

1.5. Joint Distribution of Asymmetric Information Model:

It should be noted that so far most of the previous researchers analyzed the IPO abnormal return according to one aspect, rather than a combination of attributes. But this is precisely the way Karaa and Arab (2006) intended to address the problem.Karaa and Arab assumed that the IPO short run abnormal performance is attributed to a combination of both underpricing and noisy trading effects. They contended that if the IPO excess returns are attributed only to the underpricing phenomenon, the IPO aftermarket price reflects the real value of the issuing firm So the fact that the issuers deliberately priced their offerings below the intrinsic value of the firm, confirms the asymmetric information hypothesis. However if it is observed that IPOs are generating excess return in spite of the fact that IPOs are fairly priced, this abnormal performance can be attributed to the noisy trading activities.. So the market overestimates the value of the issuing firm. Some noisy traders buy the IPO shares at price higher than the proposed offer price. The irrational behavior of the market operators invalidates the market efficiency hypothesis. As a consequence, if Karaa and Arab note the presence of deliberate underpricing as well as the market misevaluation of the newly issued stocks, they assume that the IPO short run abnormal performance is a result of combination of both underpricing and noisy trading effects.

In the article stochastic frontier approach was used to detect the presence of deliberate underpricing of new issues and measure its magnitude. Then to assess the abnormal return Karaa and Arab applied modified event study based on Markov switching model. Compared to the traditional event study, Markov switching model accommodates for time varying parameters, cross sectional heterogeneity and distinguishes between two regimes. The empirical results showed by Karaa and Arab seem to confirm the noisy trading and the inefficient market hypotheses. In the light of these results, the abnormalities noted in the early aftermarket can be attributed to both underpricing and the market misevaluation.

1.6 Conclusions

Underpricing of IPOs have been the prime focus of conceptualization and empirical research since the early 1970s. A variety of theoretical explanations have been offered for IPO underpricing .At the root of underpricing is information asymmetry(Adverse Selection Model, Moral Hazard Model, Underwriter's Reputation and Certification Model, Signaling Model, Truthful Revelation Model.) suggest that information

asymmetry in two primary forms. One is IPO issuers are more informed than investors. The second one is that investment bankers are more informed than investors and issuers. Another explanation of IPO underpricing focuses on the behavioral pattern of the investors. This explanations suggest that IPOs are subject to overvaluation (over optimism)or fads in early after market trading. There is huge controversy in the finance literature regarding the underlying explanation of underpricing phenomenon. Some group of scholars are strong supporters of asymmetric information models while others are supporters of irrational behavior models .All of the above mentioned models have later on empirically tested in order to prove their authenticity but none of them was universally accepted. So most important thing is that the premise underlying most IPO related research (Systematic underpricing by underwriters/issuers or over optimism on the part of investors) deserves much closer scrutiny in the future.

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Chapter 2

Cost of Going Public — Underpricing and Floatation Cost: Evidence from the Stock Market of Bangladesh

2.1 Introduction

IPO Underpricing is a widely researched topic in developed market but not much work has been done in the context Bangladesh. The frequent changing regulations of IPO market along with a hot and cold wave over the last one year have made Bangladesh Stock market a very interesting destination for such studies. As such the plausible explanations for IPO underpricing in emerging stock markets like Bangladesh is a major challenge for academicians .Underpricing is a cost to the issuer and has drawn considerable attention in the academic literature over the last three decades. An initial public offering or unseasoned new issue is a first time offering of shares by specific firms to the public. The firms go public primarily to raise equity capital for the firm and to create a public market in which the founder and other shareholders can convert some of their wealth into cash at a future date. But issuing new securities in the market involves some costs. One is direct cost comprises of underwriting, legal, auditing fees. Another one is indirect cost i.e. underpricing.An issue is said to be underpriced if the price rises in the after market above the offer price and the rise up prices have been maintained into equilibrium. The direct and indirect costs have a combined affect on the cost of equity capital.

Empirical studies have documented large underpricing in the primary market of Bangladesh Islam, 1999(116%)]. Investigation of IPO underpricing phenomenon, identifying its extent and categorizing underpricing across different company and industry is of prime importance. Because if the good companies are underpriced and bad companies are priced above their fair value investors' confidence would be devastated. If investors' interest is not protected adequately, investors would be increasingly concerned about the future of their investments. Increased uncertainty would lead to more underpricing in the primary market and thereby make funds more costly to the issuers. As such an optimal amount of regulation is needed in the IPO market to ensure fair pricing.

To determine the optimal policy requirements, a detailed analysis of short run pricing and long run performance is required. Because it will virtually help in the identification of the problems in the capital market and policy measures for solving these problems are of paramount interest for our capital market.

The main focal point of this paper is to investigate the equilibrium price of IPOs being determined on event day in aftermarket for both financial and non financial issues, examine underpricing of IPOs, and degree of underpricing across different industries. In addition, the paper addressees the determinants of underpricing in stock market of Bangladesh and explains overshooting behavior if any.

The regulatory authority in Bangladesh Stock Market allows two basic and distinct issuing techniques – fixed price, and book building. From the day of inception of stock exchange (1956) fixed price method was the only method that had been used by the issuers in Bangladesh. The book building method–two-staged pricing method introduced in 2010 is comparatively new method for the issuers and very few companies have chosen to issue their shares by this method. Hence this study encompasses the effect of IPOs following fixed price method only.

2.2 Floatation Methods around the World:

Various institutional and legal frame works were established for floatation of IPOs across the world. But the most commonly used floatation methods can be broadly categorized as fixed price offer, price-driven offer, and placement across the world. Each floatation method has number of variants. These variants can be viewed and characterized along a number of dimensions like institutional constraints on the offer price, regulatory and price restriction on the allocation, restrictions on information acquisition. Fixed price or the binding regulatory constraints on the choice of offer price are historically the floatation methods in U.K and its formal colonies, several European markets as well as US best effort IPOs Book building has long been the dominant method in the U.S. and Canada and, since the early Nineties, has spread widely in Europe and Asia.

i) Placement: In a placement, the investment bank typically underwrites the whole issue at an agreed price. However, the role of investment banker is not to bear the risk but to act as a distributor. The investment arranges to place the

shares with investors and may use a specialist broker to find these investors as in the case of sub-underwriting. One important feature of placement is that shares are not publicly available; instead they are directly sold to the institutional investors. In the U.K the placing agreement is signed on "impact day", which is normally about five business day before the shares start trading. In practice, placement of the shares will normally be completed within the course of that day.

More recently a variant of this method has been used in which private placement and public offering is made simultaneously. A proportion of new issue is placed with the institution at a fixed price and the rest is offered for sale to private investors through intermediaries.

ii) Fixed price method: In a fixed price offer, shares are offered for sale to the public at predetermined price by an underwriter, on behalf of the firm. In this method potential investor specify the number of shares to which they wish to subscribe at a preannounced fixed price. If the issue is oversubscribed, rationing occurs. The offer price is set in cooperation with one or more underwriter within the framework of underwriting contract. The underwriting contract specifies the services the investment banker provides to the issuing firm and generally includes either "firm commitment" or the "best effort" clause. This method can be further categorized into two groups whether there is premarket price discovery activity or not.

a) Single stage fixed price method:

Single stage fixed price refers to the method where subscription price is fixed without any demand or price discovery effort. This type of pricing method can be further categorized depending upon whether there is any restrictions on allocation i.e. shares can be allocated to the investors either on a even-handed fashion (pro-rata) allocation or in a discretionary allocation scheme. The method with discretionary allocation provision is commonly used in Germany, Switzerland, Sweden, Italy, Australia and Brazil, and to a lesser extent in U.S and Belgium. However there is difference as how the discretionary power

should be exercised e.g. in Belgium it is intended to benefit the small investors while in U.S its aim is to favor the institutional investors. On the other hand the single stage with pro-rata allocation is mostly used in U.K, Finland, Singapore, Netherland, Hong Kong and to a lesser extent France.

b) Two -Stage fixed-price method (Book Building method)

In this method, the final offer price is set after information is acquired from a group of regular investors during the pre selling activity. In the first stage, the underwriter collects nonbinding indications of interest from the regular investors in order to estimate the likely demand of the issue in the aftermarket. The underwriter then using this indication of interest establishes the final offer price and uses his discretion in allocation. This process is known as a two-staged fixed price method in which the offer price and allocation are determined. In this method the price and allocation rules induce regular investors to reveal their private information truthfully.[Benveniste and Wilhelm(1990)]. This two stage method is almost similar to the book building approach and most commonly used in U.S market, Canada and Japan (post April,1989).

iii) Price- driven floatation method:

Price driven floatation method involve auction bidding procedures of selling equity. In price –driven method, the public is invited to tender for the shares at any price over a minimum indicative price either on a static(sealed-bid) or a dynamic (continuous bidding) basis. In principle, in a proper price driven method, the final offer is determined at a level where bids for shares equals the available supply. This method is categorized into two groups, depending on whether there is a static or dynamic process of information acquisition for fixing the final offer price; the simple tender or sealed bid auction and the direct tender or dynamic bidding auction.

a) Simple Tender (ST) or Sealed –bid auction

This method involves a static process of information acquisition in which investors submit a bid with a combination of price and quantity in the offer

period. From the bids, a single striking price (final offer price) is set. This price is below the expected market clearing price to ensure that the entire issue is cleared but also to ensure the resilience of the aftermarket. This method can be characterized by whether there are restrictions on price and allocation. This method of nondiscriminatory pricing is mostly used in France, to a lesser extent, in the U.K. Netherlands and Belgium. The discriminatory pricing auctions of IPOs are used in Portugal, Japan (starting from1989) and Singapore (starting from 1992)[see Loughran, Ritter and Rydqvist(1994)

b) Direct tender or dynamic bidding auction:

This floatation method is a dynamic auction, usually controlled by the security houses. Under this method the final offer price is fixed through the dynamic process of bidding on the first trading day. In this dynamic auction , the offer prices are successfully raised with investors bidding their respective new orders on the very first trading day until a equilibrium is reached . Shares are distributed to the bidders in a nondiscriminatory allocation scheme. This method is widely used in France and Belgium.

2.3 IPO Mechanism in Bangladesh

The Securities and Exchange Commission (Issue of Capital) Rules, 2001 requires that a company intending to raise capital in Bangladesh shall first make an application to the Securities and Exchange Commission for consent. The traditional procedure requires that firms file registration statements that will include preliminary prospectus that specify information about the firm, the securities being offered for sale, and the expected use of proceeds. On receipt of the application, the Commission shall examine it, and if all the requirements are fulfilled, it shall accord consent in writing to the issue of capital in Bangladesh, as prayed for, within sixty days of receipt of the application. If the Commission finds that the application does not fulfill all the requirements, it may, within thirty days of receipt of application, direct the applicant to comply with the requirements within such time as the Commission may determine, and on fulfillment of such requirements the Commission shall accord the consent as prayed for within thirty days of such fulfillment. Once the staff declares registration statements effective, firms are free to price and sell securities, and they typically access the market as soon as possible

thereafter. Following the sale of securities, the SEC requires firms to file pricing supplements within two days of sale to notify market participants of the exact terms of offerings.

After that the issuer should publish an abstract format of the prospectus in four national dailies. The rules also specify the minimum and maximum fees for listing with the Stock Exchange. The most significant provision of the rule is that it reinstates the compulsory dual listing in the market. It is expected that due to reduction of IPO flotation cost reputed entrepreneurs would prefer capital market as a source of financing over bank borrowing.

In Bangladesh there are mainly two IPO floatation methods. One is fixed price method another is book building method.

- **Fixed price Method**: In a fixed price method shares are offered for sale at pre-determined price set by the underwriter on behalf of the issuer. For obtaining the consent of the regulatory authority the issuer apply to the SEC along with some necessary documents namely ten copies of prospectus, audited financial statement of issuer etc.It the offer price is higher than the par value justification of the premium should be mentioned in the prospectus with reference to the fundamentals such as net asset value per share at historical or current cost or earning based value per share calculated on the basis of weighted average of net profit after tax for immediately preceding five years or projected earnings per share for the next three accounting year as per the issuers own assessment duly certified by the auditor of the issuer; average market price per share of similar stock for the last one year immediately prior to the offer for common stocks. If the issue is oversubscribed then rationing occurs.

- **Book Building Method:** In a book building method Issuer shall invite for indicative price offer from the eligible institutional investors through proper disclosure, presentation, document, seminar, road show, etc; Secondly Issuer in association with issue manager and eligible institutional investors shall quote an indicative price which is the average price quotations received by issuer from the eligible institutional investors in the prospectus and submit the same to the Commission. Rationale for the indicative price must be included in the prospectus *i.e.* the issuer is required to disclose in detail about the qualitative and quantitative

factors justifying the indicative price. The indicative price shall be the basis for formal price building with an upward and downward band of 20% (twenty percent) of indicative price within which eligible institutional investors shall bid for the allocated amount of security; No institutional investor shall be allowed to quote for more than 10% (ten percent) of the total security offered for sale, subject to maximum of 5 (five) bids. Institutional bidding period shall be 3 to 5 working days which may be changed with the approval of the Commission. The institutional bidders will be allotted security on pro-rata basis at the weighted average price of the bids that would clear the total number of securities being issued to them. General investors, which include mutual funds and NRBs, shall buy at the cut-off price. There shall be a time gap of 25 days or may be determined by the commission between closure of bidding by eligible institutional investors and subscription opening for general inventors.

Informational Asymmetry, Floatation methods and Underpricing of IPOs.

2.4 Data Description and Research Methodology:

The sample selection procedure, sources of data, data description, variables proxying for *ex ante* uncertainty, and research methodology are described in this section.

Sample Selection procedure and data collection:

All firms (listed in Dhaka stock Exchange) that issued equity shares to the public during 1991 to 2007 were selected as sample for the study. The reasons for selecting 1991 as initial year for research is that complete data set were not available before that period.During that period 167 companies went public by issuing primary shares to the public. But we have taken the data of 160 companies due to non availability of prospectuses.

The data were collected primarily from the following sources:

i) Prospectuses of the IPO firms which contained in detail the nature of firm's activity, offer size offer price, underwriters appointed, estimated floatation cost, financial statement prior to the floatation of the IPOs etc.

ii) Daily DSE All share price indexes of Dhaka stock Exchanges and daily closing stock prices of IPO firms over the period of 52 trading days were collected from DSE database.

When ever any discrepancy was observed, a third source was consulted for crosschecking the inconsistency.

2.4.1 Data Description:

Table 2.1 reports some descriptive statistics for the whole sample. The mean and median gross proceeds are Tk 90.27 million and Tk 42.75 million. At the initial offer date, the median age of the 160 IPO firms in the sample is only 5 years. It reveals the feature that the typical Bangladeshi IPO is recent upstart.

Table 2.1

Descriptive Statistics for the sample of 160 IPOs issued during the period 1991 to 2007

(Fig in million)

Sample Characteristics	Mean	Standard Deviation	Median	Q1	Q3
Gross proceeds (In Million)	90.27	156.80	42.75	23.24	80
Firm Value at offer (In Million)	303.40	658.76	120	71.47	250
Percentage of Equity Offered to the public	36.23	17.61	45.71	23.33	50
Assets (In Million)	3815.52	27010.57	165.30	75.35	343.19
Age (in years)	7.61	7.37	5	2.11	11.1

Notes:

a) Gross proceeds or offer size is defined as the number of shares offered to the market multiplied by the final offer price

b) The firm value at the offer is the total number of shares outstanding valued at the final offer price

c) Age refers to the number of years of existence since the date of incorporation as reported in the issue prospectus.

The whole sample includes purely primary offerings. This indicates that the motive for taking a firm to the public is the desire of existing shareholders to diversify their portfolio

2.4.2 Definition of variables

Several proxies for *ex ante* uncertainty about the value of a new issue have been pointed out in the literature on IPO underpricing.However there is no consensus as to which one is the most appropriate. Hence we have employed five well known and widely used proxies for *ex ante* uncertainty. These proxies for ex ante uncertainty need to be controlled for when underpricing differential hypotheses are tested in regression analysis. Furthermore the variability of IPO firm's operating earnings prior to going to public is a well known proxy for ex ante uncertainty of firm value. But we could not use this proxy because there were26 green field companies in the sample and 84 companies did not publish their financial statement of last two years prior to the floatation .The definition of these proxies for ex ante uncertainty are provided below

i) The standard deviation of daily aftermarket (Amkstd) of IPO over a period of the first 52 trading days in the secondary market has been calculated as an *ex post* measure for *ex- ante* uncertainty.

Amkstd = Aftermarket standard deviation of daily stock returns computed over the 52- day window starting on the first day of trading

ii) Barry and Brown (1984) suggest a positive relation between firm specific information in the equity market and firm size. Larger IPO should be associated with lager firms and thus, according to Barry and Brown's hypothesis, less ex-ante uncertainty. Size is measured by the value of the equity raised or the initial value of the firm. The offersize is proxied by :

LnOsize = the natural logarithm of the equity offered in the IPO

iii) Carter and Manaster (1990) argued that reputed underwriters are associated with IPOs with low dispersion in firm value (less *ex ante* uncertainty).The reputation of the lead underwriter should be measured along a continuum. But developing such measures along a continuum would be difficult. So for this purpose we consider that the value of the underwriters' reputation depends only on its activity in the IPO market. Therefore it is assumed that an underwriter creates reputation by underwriting more and more IPOs over the periods. It is also assumed that an underwriter's reputation is positively related with number of IPOs he underwrites in the market. It is further assumed that

the underwriter's reputation follows a concave function. Thus underwriter's reputation (***Unrep***) has been measured as a square root of the number of IPOs being already underwritten, after the underwriter starts building reputation at the certain number of underwritings.

It is assumed that an underwriter will develop its reputation after he successfully completes underwriting a certain number of IPO issues. The number of underwriting at which the lead underwriter is assumed to start generating its reputation is arbitrarily chosen as 3.Thus, at the number of three or more IPOs being underwritten, the ***Unrep*** proxy variable takes the value of the square root of these number. If the issue is not underwritten the ***Unrep*** proxy variable takes the value of zero and if the same firm underwrites one or two IPO issues it takes the value of unity. The reputation of the underwriter who has underwritten one or two firms is treated identically because at this stage the underwriter is assumed as not being able to develop any sort of reputation at all. According to the above classification ICB, Prime Finance, Green Delta Insurance was found to be the most prestigious underwriters respectively. In short the lead underwriters' reputation can be defined as below;

0 = If the issue is not underwritten
1 = if the lead underwriter has underwritten one or two IPOs
$\sqrt{n}$ = if the underwriter has underwritten three or more (n) IPOs

iv) James and Weir (1990) illustrated both theoretically and empirically, that the existence of borrowing relationship reduces the ex ante uncertainty about the value of the issuing firm's equity in the secondary market. Following James and Weir's hypothesis we employed a dummy variable to indicate whether the issuing firm had a borrowing relationship at the time of borrowing.62.5% companies in the total sample had bank loans or other type borrowings at the time of offering. Again the percentage is 82.8% in case of manufacturing concerns which is even much higher comparing to the financial sectors. The proxy for the existence of borrowing relationship is measured by:

Ltdebt = 1 if the firm had either bank loans or long term debt in its capital structure

0 = Otherwise

v) In the leyland and Pyle (LP) model , the observable information signal given by the entrepreneur is :

$LPSig = \acute{\alpha} = \alpha + \ln(1-\alpha)$

Where $\acute{\alpha}$ is the proxy of the LP signal of a firm's future cash flow, as a function of α, the fraction of ownership retained by the entrpeneurs.Insiders/entrepreneurs' ownership retention (α) is measured by α.

2.4.3 Research Methodology

An event study methodology is employed to measure security price performance around the time of the event of initial public equity offerings. The initial abnormal returns of IPO firms across non financial and financial firms and the immediate aftermarket abnormal returns have been assessed in the event study analysis.

The market- adjusted return method is commonly employed to obtain the abnormal for each IPO over 's' trading day, as follows:

$$AR_{is} = R_{is} - R_{ms}$$

Where, AR_i = the abnormal return for issue i,

R_i = the raw return for issue i.

R_m = the return on DSE All share price index

s = the observed event trading day, where s =1 is the initial normal trading day and event days 2 to 52 are consecutive immediate after-market trading days.

The next step is to compute daily average abnormal returns over the i = 1....n on day 's' as follows

$$AR_S = \frac{1}{n}\sum_{i=1}^{n} AR_{is}$$

This method controls for contemporaneous market movements but assumes a beta coefficient of unity for all IPOs. Underpricing of IPOs on average is measured by the positive average initial abnormal return, and there is no evidence against immediate aftermarket efficiency in the case of non-significant aftermarket abnormal return. The

initial abnormal return is defined as the percentage change of the subscription price from the offer price to the closing price on the *first normal day of trading* minus the corresponding market return DSE all share price index.

We use both the parametric "t-test" and the distribution free "Wilcoxon sign rank test" for finding the significant difference in the floatation cost of financial and non financial firms. Besides univariate tests, multiple regression test have been done to investigate the determinant of underpricing after controlling for industry effects.

Our test procedure is to fit the following cross sectional regression model:

$$\text{Regression Model}^{a}: UP_i = \beta_0 + \beta_1 Unrep_i + \beta_2 Ltdebt_i + \beta_3 Amktstd_i + \beta_4 LnOsize_i + \beta_5 OSubs_i + \beta_6 Freefloat_i + \beta_7 LPSig_i + \sum_{i=8}^{23-1} \beta_i Indum_i + \varepsilon_i$$

2.5 Findings on the Cost of Going Public in Bangladesh

2.5.1 Underpricing – Financial vs. Non financial

In general underpricing is known as the indirect cost of making an IPO.An issue is said to be underpriced when a share is offered to the public at lower than that it could fetch in after market.Underpricing is generally estimated as the percentage difference between the price at which the shares were sold to investors during the IPO and the price at which the share are traded afterwards in the secondary market.Underpricing phenomenon has been empirically researched in more than 40 countries and their result indicate that underpricing is a worldwide phenomenon ;from US to South Korea, Norway to New Zealand, almost all studies documented underpricing but their magnitude differed from country to country. It was generally accepted that high initial returns resulted from deliberate underpricing. This view was supported by most empirical findings that price adjusts rapidly to the high initial return on the first trading day and there after no systematic abnormal returns are realized anymore in the aftermarket specially in the developed market. In appendix 2.1 we present international evidence on the new issue underpricing result compiled from various studies of initial public equity offering. Different factor area identified by researchers in IPO literatures in explaining the underpricing behavior of the issue .These factors can be broadly categorized as(i) firm specific factors [like firm age, price earning ratio, industry] (ii)Issue specific factors [like floatation method used, year of floating the issue](iii) Country specific factors [like institutional support by Govt, regulatory bindings etc].

In this section we have first identified the equilibrium price adjustment day of financial and non financial sector. In doing so we have also examined the degree of underpricing, underpricing differentials across different year, industry

Table 2.2 shows the degree of abnormal holding period return from the offer price over 1, 5, 15, 30, 40, 50 trading days following the offering for the entire sample. Using the offer price as a base, mean excess returns for non financial sector for the first 15th, 30th, 40th, and 50th day are 84.29 %, 89.94.110.48% and 100.88% respectively. And the mean excess return for the financial sector for the 21th,30th day and 40th day are 136.94%, 133.80 % ,133.99 % and 139.06% .Table 2.2 shows that price of all IPOs tends to jump on the first trading day and thereafter it gradually declines and lowest in 15th day incase of non financial and on 30th day in case of financial sector and then again increases till day 50.

Table 2.2

Abnormal Holding period Return of IPO In Bangladesh From 1991 to 2007

Panel A(Non Fin)						
Abnormal Returns (AR_s) from the offering to the event trading day S						
	S=1	**S=5**	**S=15**	**S=30**	**S=40**	**S=50**
Mean	92.54	91.77	84.29	89.94	110.48	100.88
Standard deviation	240.54	217.51	197.06	205.50	325.02	271.59
Median	25.00	33.44	27.85	28.63	27.63	28.63
t-Test	3.87**	4.24**	4.30**	4.40**	3.42**	3.73**
Panel B (Financial)						
	S=1	**S=5**	**S=21**	**S=30**	**S=40**	**S=50**
Mean	146.47	141.67	136.94	133.80	133.99	139.06
Standard deviation	157.86	151.38	150.41	149.59	150.28	158.38
Median	91.07	88.12	86.35	85.79	88.00	92.24
t-Test	7.25**	7.31**	7.11**	6.99**	6.96**	6.86**

Note:

a) Abnormal returns for holding period S are the percentage by which the price appreciation of the IPOs exceeds that of the DSE General Index for a purchase at the offering date and sale at S days.

b) The t-statistics on abnormal returns must be interpretated with caution since the t-statistics are biased upward due to skewness of the abnormal returns.

c)** indicates significance at the 1% level

In order to examine price behavior and identify equilibrium price of IPO on event day , the degree of price adjustment from offer price to the close of the first day of trading , then from the first day closing price to day S where S =2 ...40 , have been calculated These results are presented in Table 2.3

Table 2.3

Price Adjustments of IPOs in Bangladesh

Panel A Non Financial			
	Mean Underpricing%	**t-stat**	**Median%**
Offer price to Day 1	92.54	3.87***	25
Day 2 to Day 3	-1.4	-2.46**	-0.52
Day 2 to Day 15	-1.93	1.04	-3.05*
Day 4 to Day 5	1.44	2.46**	0.2
Day 8 to Day 10	-1.29	-2.28**	-1.07
Day 8 to Day 15	-2.25	-2.29**	-3.06*
Day 9 to Day 15	-1.76	-1.79*	-1.3
Day 12 to Day 15	-1.39	-2.02**	-1.07
Day 15 to Day 16	0	0.01	0
Day 15 to Day 17	-0.29	-0.81	0.05
Day 15 to Day 18	0.18	0.31	-0.46
Day 15 to Day 19	1.13	0.84	-0.83
Day 15 to Day 20	2.16	1.57	-0.01
Day 15 to Day 30	1.8	1.17	-0.28
Day 15 to Day 40	3.57	1.47	1.55

Panel B Financial			
Offer price to Day 1	146.47	7.25***	91.07
Day 2to Day 3	-0.86	-1.26	-1.49*
Day 2 to Day 4	-0.79	-0.82	-0.83
Day 4 to Day 21	-3.11	-1.87*	-2.60**
Day 6 to Day 16	-2.61	-2.52**	-2.56**
Day 8 to Day 21	-3.00	0.67	-2.60**
Day 10 to Day 21	-2.39	-2.30**	-3.61***
Day 15 to Day 16	-0.87	-2.86***	-0.50
Day 15 to Day 21	-1.77	-2.46**	-1.84**
Day 21 to Day 22	-0.07	-0.15	-0.16
Day 21 to Day 23	-0.04	-0.09	-0.36
Day 21 to Day 24	-0.05	-0.09	-0.11
Day 21 to Day 25	-0.25	-0.42	-0.36
Day 21 to Day 30	-1.07	-1.67	-0.96
Day 21 to Day40	-0.88	-0.62	-2.67

Note : ***,**and * indicate significance at the 1%, 5% and 10% level respectively

It is observed from the panel A of Table 2.3 that event day 15 turned out to be the day in which equilibrium price of non financial IPOs was established. It means that if anyone buys the issue on any event day prior to event day 15 and holds it for some time till event day 15 can make significant abnormal return. However none can make significant abnormal return on subsequent aftermarket after the event day 15.In case of financial sector it is the 21st day on which equilibrium price of financial IPO was established. And the t-statistics are significant in all of these cases. In other words, the results show that virtually all price adjustment takes place in non financial and non financial sectors on 15th day and 21st day. The conclusion can also be better comprehended by the figure which illustrates the holding period abnormal return for all IPOs over different trading days.

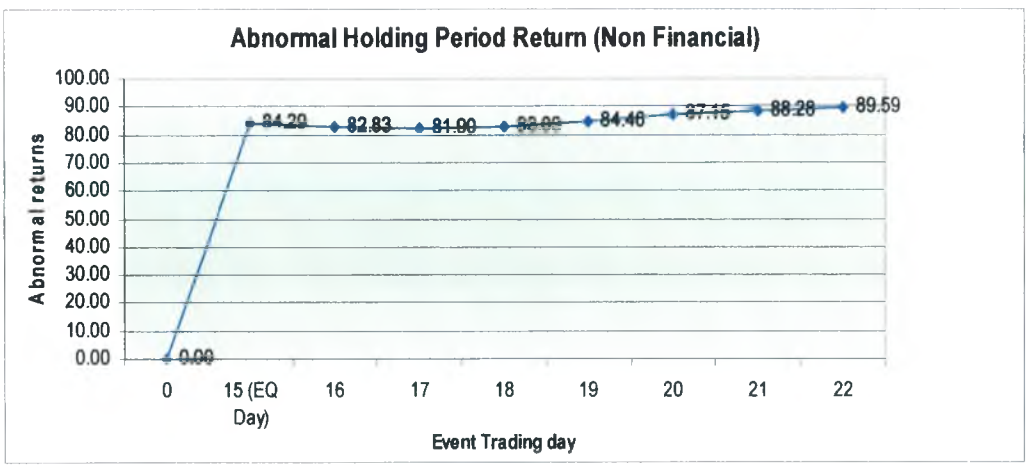

Figure 2.1 Holding Period Abnormal Return (Non Financial)

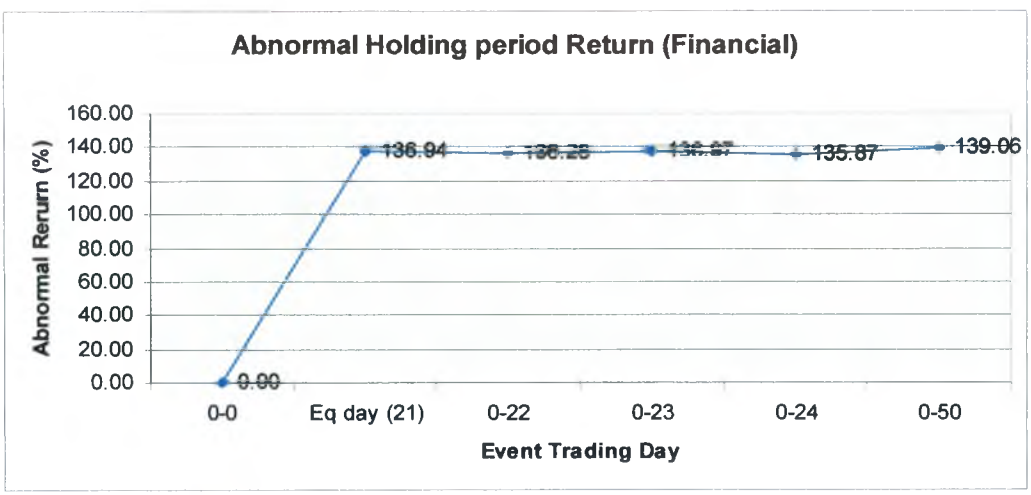

Figure2.2 Holding Period Abnormal Return (Financial)

2.5.1.1 Temporal Underpricing:

The following table illustrates underpricing by year. There is a temporal variation of underpricing of IPOs. The average under pricing was highest and the standard deviation was also highest in 1996 (218.21%). But from 1997 the average under pricing drastically dropped to 41.01%.This particular jump in underpricing can be attributed to the hot issue market of 1996.Generally a hot issue market follows cold issue market. So a sharp decline continued to 1997. This finding is in line with Loughran and Ritter's (2004) findings that showed that during the internet bubble years of 1999–2000 the underpricing increases to more than 65% in the United States and reverting thereafter to 12% in the period 2001–2003.

Table2.4

Underpricing By Year

Year	Average Underpricing (%)	Std Dev of Underpricing	No of IPOs
1991	57.84	38.51	3
1992	34.94	54.92	3
1993	58.42	76.62	4
1994	67.88	56.03	22
1995	73.09	115.32	14
1996	218.21	281.57	20
1997	41.01	91.32	12
1998	153.54	344.35	5
1999	36.71	23.67	11
2000	37.07	24.07	5
2001	39.47	43.81	11
2002	26.52	31.47	7
2003	64.66	46.34	10
2004	165.75	194.03	3
2005	197.12	157.94	14
2006	121.80	52.91	7
2007	148.79	113.48	9

2.5.1.2 Underpricing by Industry

Table 2.5 shows the classification of IPOs according to the industry. But it should be mentioned here that this classification is not according to the Standard Industrial Classification (SIC) code of US. It is a simple sector wise classification made by Dhaka Stock Exchange Authority. And it appears from the table that ceramic industry had highest degree of underpricing. Out of 3 ceramic companies 2 had issued their equity to the public in 1996 which can be termed as "hot issue period." And their average underpricing totaled to 693.00% .It appears from the table that distributions of IPOs are biased by industry.

Table 2.5

Industry wise Underpricing

Industry	Average Underpricing	Std Dev of Underpricing	No of IPOs
Bank	141.97	192.49	16
Cement	48.30	56.62	7
Ceramic	458.99	412.31	3
Engineering	194.65	303.01	10
Food	45.46	76.87	18
Fuel	268.11	N/A	1
Insurance	106.33	121.86	29
IT	65.68	38.02	7
Jute	-13.37	N/A	1
Misc	104.34	78.86	6
NBFI	180.65	107.18	16
Paper	35.92	43.81	2
Pharmaceutical	39.19	44.33	11
Service	13.27	40.68	2
Tannery	120.13	161.71	6
Textile	25.63	52.97	25

In the popular IPO literature it is often mentioned that underpricing increases with uncertainty. This phenomenon can be observed in the following table which reports uncertainty by industry. Here the mean aftermarket standard deviation of the return of the industry is the proxy for uncertainty. It is found that the ceramic industry is characterized by highest uncertainty (96.22) followed by engineering industry. This result conforms the hypothesis that mentioned at the beginning of the paragraph.

Table 2.6

Uncertainty Measured by Mean of

Aftermarket Standard Deviation Across Industry

Industry	Mean of After-Market Std Dev
Bank	2.71
Cement	2.44
Ceramic	6.22
Engineering	5.48
Food	3.84
Fuel	4.17
Insurance	3.19
IT	2.29
Jute	5.77
Misc	4.47
NBFI	4.66
Paper	2.97
Pharmaceutical	3.97
Service	3.84
Tannery	5.04
Textile	3.66

2.6 Floatation Cost of IPO

The direct floatation cost of going public firms across non financial and financial sectors is reported in Table 2.7. The floatation cost include legal and administrative cost like; registration, printing, advertising, legal, underwriting commission, bank charge, listing fees with DSE etc.It should be mentioned that the direct floatation cost are expressed as a percentage of gross proceeds of the share issued at the offer. The direct cost of non financial sector is higher than financial sector. The mean direct cost for non financial sector is 8.47% of the gross proceeds and those on the financial sector is 5.07%.And these 3% difference in the direct cost of non financial sector over financial sector is statistically significant at the 1% level .Both parametric Paired sample *t*- test and non parametric Wilcoxon rank sum test confirms the statistically significant difference in mean and median direct cost of two groups of floatation cost. The direct cost for all 160 IPOs are 8.28% which is quite higher than Belgium [Osman, 1996 (3.81%)] and lower than USA [Ritter,1987 (14.03%)].This is result also higher than the findings of Hossain and Siddiquee in Bangladesh. [Hossain and Siddiquee,2009(5.44%)]

Table 2.7

Direct Costs of IPOs as a percentage of Gross Proceeds (1991 -2007)

Criteria	No of Issues	Floatation Cost as % of Equity Raised			Wilcoxon Rank Sum Test (Wc) (P-Value)	Paired Sample Test (T) (P-Value)
		Mean	Median	STD		
Non Financial	99	8.47	7.32	4.31	-4.816*** (*000*)	-6.223*** (000)
Financial	61	5.07	4.48	2.89		
All Offers	160	8.28	6.62	9.19		

In Table 2.8 the direct costs of the IPOs are classified by the quartile of the offer size. Several empirical studies dealing with U.S and European market confirms that higher the size the lower is the floatation cost as a percentage of the gross proceeds, Direct costs are inversely related to the size of the issue as a consequence, economies of scale should exist. The existence of economies of scale in floating an issue is evident from the table 2.8

Table 2.8

Direct Cost of IPOs by the Offer Size

Offer Size (Tk in million)	Average floatation cost (%)	Std Deviation of floatation cost	T- Test
≤30 million = Q1	14.54	15.58	5.97
30 million - 50.8 million = Q2	7.54	3.84	
50.8 million - to 102.75 = Q3	6.83	3.74	
102.75 million≥ =Q4	4.03	2.09	

2.7 Determinants of underpricing

In order to find out the determinant of underpricing we have used a cross sectional regression model. After controlling for industry effects we have incorporated the five well known proxies for, reputation of lead underwriter, information signaling, ex-ante uncertainty, size, and excess demand and ownership. The well known proxies for underpricing determinants are i) ***Unrep***- the reputation of the lead underwriter [Carter and Manaster,1990]ii) ***Ltdebt***- Longterm debt.The dummy variable equals one if the IPO firm had either bank loan or long term debt in its capital

structure prior to the offer[James and Wier (1990)]iii) ***Amktstd*** – the standard deviation of daily returns estimated over the first 52 days in the aftermarket [Ritter(1984,1987), Brennan and Franks(1997)] iv) ***LnOsize***- the log of the gross proceeds [Beatty and Ritter (1986), Ibbotson (1984), Kaneko and Pettway (2003)]. v) ***OSubsPer*** – the amount of subscription over offer size in percentage [Singh and Kumar (2008).vi) ***FreeFloat*** – the percentage of shares available in the hand of public only excluding private placement and owners portion. vii) ***LPSig*** – LP signal for (ownership retention) for the cash flow [Leland and Pyle(1977), Grinblatt and Hwang (1989)

Our test procedure is to fit the following cross sectional regression model:

$$\text{Regression Model}^{a}: UP_i = \beta_0 + \beta_1 Unrep_i + \beta_2 Ltdebt_i + \beta_3 Amktstd_i + \beta_4 LnOsize_i + \beta_5 OSubs_i + \beta_6 Freefloat_i + \beta_7 LPSig_i + \sum_{i=8}^{23-1} \beta_i Indum_i + \varepsilon_i$$

Table 2.9

Results of cross sectional regression of Underpricing

Explaining Underpricing Determinants

Explanatory Variables	Model 1 (All IPOs)		Model 2 (Non Financial IPOs)		Model 3 (Financial IPOs)	
	OLS	WLS	OLS	WLS	OLS	WLS
Constant	305.503	289.787	211.08	261.132	-192.82	-184.24
	(1.388)	(1.363)	(1.549)	(1.960)	(-.844)	(.811)
Unrep	-11.332	-10.749	-6.324	-7.574	18.626	16.088
	(1.320)*	(-1.29)	(-1.113)	(-1.274)	(.728)	(.627)
Ltdebt	36.823	34.288	.451	6.604	47.533	48.089
	(1.151)	(1.099)	(.020)	(.290)	(1.314)*	(1.338)*
Amktstd	8.996	9.255	13.962	14.086	3.835	4.218
	(1.774)**	(1.873)**	(4.038)***	(3.975)***	(.567)	(.625)
LnOsize	-15.483	-14.955	-8.265	-11.062	8.996	8.025
	(-1.319)*	(-1.321)*	(-1.211)	(-1.662)*	(.497)	(.447)
OSubsPer	.028	.027	.014	.014	.027	.025
	(2.864)**	(2.8)**	(2.334)**	(2.380)**	(1.946)**	(1.858)**
FreeFloat	1.354	1.458	-.907	-.764	2.628	2.829
	(1.512)*	(1.662)**	(-1.696)**	(-1.350)*	(2.628)**	(2.193)**
LPSig	-12.554	-16.999	5.168	5.988	-103.708	-109.993
	(-.276)	(-.397)	(.193)	(.233)	(-1.401)*	(-1.472)*
Control Variables of Industry Dummies	*Results not reported*					
N	160	160	99	99	61	61
Adj R^2	.239	.232	.341	.395	.112	.107
Overall F	3.362	3.269	3.670	4.369	2.066	2.010
(Prob >F)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(.064)*	*(.071)*

Note: a) Cross sectional regression is based on sample of total of 101 IPOs in Bangladesh over the period 1991 to 2007with the dependant variable being the equilibrium abnormal return defined as the percentage change of the share price from the offer price to the equilibrium day minus the percentage change in the DSE index.

b) ***, **and * Indicates significance at the 1%, 5% and 10% level respectively.

We report regression result after controlling the industry effect. In addition to OLS (Ordinary Least Square), we also used WLS (Weighted least Square) to control for possible heteroskadasticity.

Heteroskedastiticity may be present in an ordinary least square cross sectional regression of underpricing on the explanatory variables. Since firm value and ex-ante uncertainty tend to vary inversely, we multiply all variables by log of market value (market capitalization at the close of the first day of trading). This weighting procedure is expected to produce homoskedastic disturbances and in the spirit of Beatty and Ritter (1986). The results are presented in the second, fourth and sixth column along side OLS of table2.9 and are qualitatively identical to those on the OLS. However the WLS results are more reliable and robust.

The findings of the cross sectional regression of underpricing:

- Oversubscription in percentage or ***OSubsPer*** is a proxy for the degree of excess demand. Higher the oversubscription for an IPO, higher rationing will take place in the allocation of IPO shares hence results in more underpricing in the aftermarket. The coefficient estimates of ***OSubsPer*** were found to be significantly positive in our study. Oversubscription variable is found to be one of the major determinants of underpricing in our study. Higher oversubscription implies higher excess demand for IPOs that pushes the price of the IPO higher in aftermarket and hence causes higher underpricing.

- The intuitive argument of the inverse relationship of **free float** with underpricing is that higher the free float of an IPO, higher the supply of that instrument in the market to address demand in determining the price and hence the higher free float percentage will cause less underpricing . The coefficient of ***FreeFloat*** (percentage of shares available for investment and trading, not held for strategic holding) is significantly positive in model 1 and model 3 contrary to the intuition. But for non financial IPOs'(Model3) coefficient is negative and statistically significant suggesting that the observed inverse relation of free float supports the intuitive argument.

- One of the implications of Rock's model is that more uncertain issues should have higher initial return hence more underpriced. The coefficient of ***Amktstd*** (aftermarket standard deviation) is positive in all regression but becomes more highly statistically significant in Model1 and Model2. This result is consistent with Beatty&Zajac(1994) and Welbourne &Cyr(1999) Ljungqvist(2007)findings that firms with greater degree of uncertainty are likely to experience higher underpricing.

- It is observed that underpricing decreases with underwriters' reputation. Underwriter's reputation may also be a factor in IPO firm's performance. Reputed underwriters may signal less uncertainty surrounding IPO and thereby reducing uncertainty (Carter,Dark and Singh,1998;Carter and Manster,1990; Megginson &Weiss,1991;Logue et al.,2002). Prestigious underwriters as such will have prior experience in taking firms public and will have reputations as effective underwriters to protect them. Both of these factors operate as signals to potential investors that the underwriters are interested in the success of the IPOs both in long-term and in short-term. So the majority of the studies support that the underwriter's reputations will be negatively associated with underpricing as it is observed from Model 1 and Model 2. However it is marginally significant in Model 1 at 10% level of confidence taking all IPOs – both financial and non financial.

- The coefficient of ***Ltdebt***(Long term debt) is positive in all regression though not significant implying that it may not provide signal of value. James and Weir (1990) and Marshall (2004) found evidence that firms with previously established borrowing relationships are underpriced substantially less than other IPOs. Their model suggests that the existence of the lending relationship provides the signal of value and hence more fully priced. But we did not find that expected negative relationship in our study.

- The coefficient estimate ***LPSig*** is a proxy for ownership retention. The empirical result of coefficient estimate of ***LPSig*** is mixed in our regression

model. The retained equity signals to investors the confidence that management and owners have in the future prospects of the firm, thereby reducing underpricing.

- The ***LnOsize*** (The offersize) of an IPO are regularly included as a variable in IPO research. Gross proceeds are a function of the total number of shares in an IPO multiplied by the offer price. Larger IPOs will normally be offered by more established firms, which should reduce the perceived risk of the offering (Carter, Dark and Singh, 1998; Dunbar, 2000; Jain & Kini, 2000.Kaneko and Pettway, 2003. Ranjan and Madhusoodanan, 2004) and consequently reduce unerpricing.Further smaller offerings are, on average, more speculative than larger issues. Hence smaller issues will trigger underpricing. Consistent with above literature we found offersize to be negatively associated with underpricing as in the case of Model 1 (all IPOs) and Model 2 (non financial IPOs) The mean offersize is larger in financial sector and these issues were also offered by more established and mature firms and the ***LnOsize*** coefficient is positively related with underpricing in case of Model 3.

2.8 Overshooting Behavior

Financial researchers belonging to behavioral finance have often adhered to the after market inefficiency theory of underpricing.The inefficiency theory is based on the irrational behavior of the investor and not fully competitive market. It is possible that the aftermarket is not immediately efficient in valuing newly issued securities and that the abnormal returns that accrue to IPO investors are the result of temporary overvaluation by investors. This explanation suggests that IPOs may be subject to mean reverting fads [Aggarwal and Rivoli (1990)]. A fad is defined as temporary overvaluation caused by over optimism on the part of investors [Cemerar (1989), DeBondt and Thaler(1985), Shiller(1981)].A number of factors causes the fads in the IPO market.

Fads are more likely to occur if estimation of true intrinsic value is difficult or if greater uncertainty surrounds intrinsic value. Again investors in IPO market are expected to be more speculative than other group of investors and there is evidence that more speculation leads to higher level of price volatility. In our study we have tried to assess

whether there is any existence of fads in the market. In doing so we have made another cross sectional regression of overshooting behavior. Overshooting return is defined as the difference between 1st day price and equilibrium price, expressed as a percentage of IPO offer price and hence is calculated as follows

$$ER_i = AR_{i1st} - AR_{ied}$$

Where,

ER_i = Overshooting return

AR_{i1st} =Abnormal return on the first day

AR_{ied} = Abnormal return on the equilibrium day.

If the excess return is positive then it is assumed that overshooting exists.

We have employed two independent variables in the cross sectional regression analysis i.e. Oversubscription in percentage and Green field dummy as proxy for excess demand and uncertainty.

Our test procedure to fit the following cross sectional regression model for explaining overshooting behavior is

$$Regression\ Model: Overshootingreturn = \beta_0 + \beta_1 Osubsper + \beta_2 GFdummy$$

(I)OsubsPer – Oversubscription in percentage explains overshooting behavior and overreaction. Oversubscription is a proxy for excess demand and also over optimism which causes speculation Overreaction on the part of investors drives the price higher than the equilibrium price. Overshooting has a positive impact on the IPO return. Higher the oversubscription higher the overshooting.

(ii) *GF Dummy* – Green field Dummy is proxy for uncertainty. Green field companies are those companies that didn't start their operation yet. So these companies do not have any prior history of operation. So estimation of true intrinsic value is more difficult and hence greater uncertainty surrounds it. So more speculation will take place in case of green filed companies. So GF Dummy should have a positive effect on the overshooting behavior.

Table 2.10

Results of cross sectional regression of overshooting behavior

Explanatory Variables	Model 1(OLS)	Model 2(WLS)
Constant	(-4.262)	(-5.130)
Osubsper	.006(2.16)**	.006 (2.34)**
GF Dummy	12.80(1.74)**	14.06 (1.82)**
Adj.R^2	.04	.05
Over all F(*Prob >F)*	3.26(.04)	3.69(.03)

Note:

a) Cross sectional regression is based on sample of total of 99 non financial IPOs in Bangladesh over the period 1991to 2007 with the dependant variable being the overshooting return.

b) ** Indicates significance at the 5% level.

In above regression table 2.10 it is observed that ***Osubsper*** coefficient is positive and significant in both OLS and WLS regression model. The ***GF Dummy*** *coefficient* is also positive and significant in all regression. According to the above mentioned formula the calculation for excess demand can be given below:

Average abnormal return on the first day ($\overline{AR_{1st}}$) = 92.54% (Table 1.2)

Average abnormal return on the equilibrium day ($\overline{AR_{ed}}$) = 84.29% (Table 1.2)

Overshooting Return (ER_i) = 8.25%

The overshooting behavior can be better comprehended from the following figure :

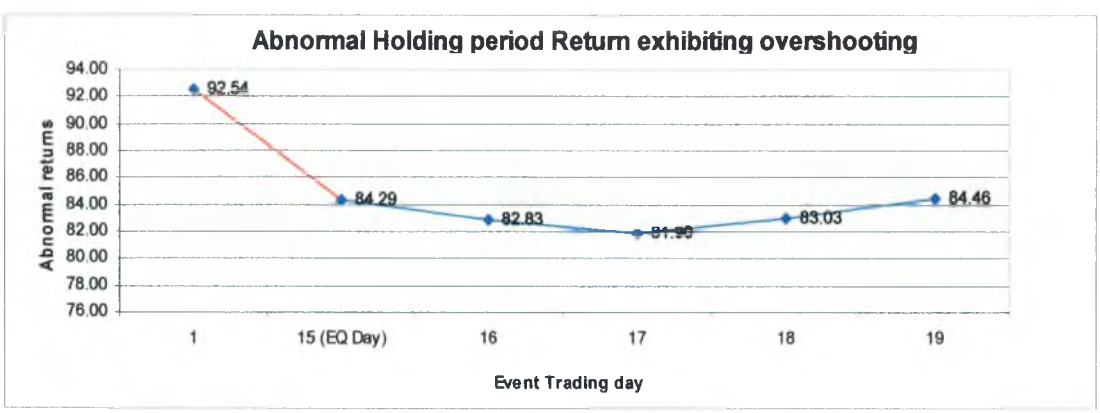

Figure 2.3 Overshooting Behavior

It is observed that both **oversubscription and green field** variables have significant impact on underpricing and as the **excess demand** was found to be positive in our study we can conclude that overshooting behavior exist in our market.

2.9 Conclusion:

In this chapter we have analyzed degree of underpricing In doing so we have first identified the equilibrium price adjustment day of financial and non financial sector and also examined the degree of underpricing, underpricing differentials across different year, industry, determinants of underpricing, floatation cost of nonfinancial and financial sector, overshooting behavior etc.It conclusions can be summarized as below:

1) The degree of underpricing on the initial day from the offer price for non financial sector was found to be 92.54% and in case of financial sector it is 146.47%.The equilibrium price adjustment day was found to be 15th day in case of non financial sector and 21st day in case financial sector. The degree of underpricing on equilibrium price adjustment day were 84.29% and 136.94% respectively.

2) It was observed in our study that the average under pricing was highest and the standard deviation was also highest in 1996 (218.21%) which can be termed as hot issue period.

3) It was also found from our study that ceramic industry had highest degree of underpricing. Out of 3 ceramic companies 2 had issued their equity to the public in 1996 which is the "hot issue period." in our capital market history. And their average underpricing totaled to 693.00%.

4) We have made an effort to calculate the floatation cost for both the sectors The mean floatation cost for non financial sector is 8.47% of the gross proceeds and those on the financial sector is 5.07%.And these 3% difference in the direct cost of non financial sector over financial sector is statistically significant at the 1% level .Both parametric Paired sample t- test and non parametric Wilcoxon rank sum test confirms the statistically significant difference in mean and median direct cost of two groups of floatation cost. It was found that floatation cost is decreasing function of offersize i.e. floatation cost decreases as the offersize increases.

5) In order to find out the determinant of underpricing we have used a cross sectional regression model. Controlling for industry effects and incorporating some well known proxies for, reputation, information signaling, uncertainty, size and excess demand, **oversubscription, free float, offersize** and **aftermarket standard deviation**, were found to be the significant determinants of underpricing.

6) In our study we have made a small endeavor to assess whether there is any existence of fads in the market. In doing so we have made another cross sectional regression of overshooting behavior. After making the cross sectional regression analysis we have found the existence of overshooting behavior in the market and according to our calculation **the percentage of overreaction is 8.25%.**

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Appendix 2.1

International Evidence on IPO Underpricing

	Study	Country	Period	Sample Size	Average Underpricing
1	Megginson and Weiss(1991)	US	1983-1987	320	7.10%
2	Kunz and Aggarwal(1994)	Switzerland	1983–1989	42	35.80%
3	Wasserfallen and Wittleder (1994)	Germany	1961–1987	92	17.58%
4	Ljungqvist (1997)	Germany	1970–1993	189	9.20%
5	Hameed and Lim (1998)	Singapore	1993–1995	53	19.52%
6	Su and Fleisher (1999	China	1987–1995	308	948.60%
7	van Hoeijen and van der Sar (1999)	Netherlands	1980–1996	81	7.80%
8	Kutsuna and Smith(2000)	Japan	1995–1999	484	31.48%
9	Kooli and Suret (2002)	Canada	1991–1998	878	20.57%
10	Hunger (2003)	Germany	1997–2002	435	42.34%
11	Jog and McConomy(2003)	Canada	1983–1994	258	7.40%
12	Engelen (2003)	Belgium	1996–1999	33	14.32%
13	Osman (1996)	Belgium	1984-1993	32	7.02%
14	Loughran and Ritter (2004)	US	1980–2000	5980	18.90%
15	Hauser et al. (2006	Israel	1992–1996	94	10.40%
16	Dawson (1987)	Malaysia	1978-1983	21	166.60%
17	Rahnema et al (1992)	Spain	1985-1990	71	35.40%
18	Kim, Krinsky and Lee (1993)	Korea	1985-1990	275	79.00%
19	Levis (1993)	US	1980-1988	712	14.30%
20	Dolvin and Jordan (2008)	US	2001–2004	390	10.99%
21	Chahine (2008)	France	1997–2000	172	22.70%
22	Dimovski and Brooks	Australia	1994–2004	114	13.30%

Note : a) Methodology may differ but average underpricing is generally defined as the equally weighted average percentage change from the offer price to the immediate aftermarket closing price . However the length of this period may vary from study to study, with one day to one or two week being the usual time frame . It should be noted that this average initial return is not annualized.

Chapter 3

Long-run Price Performance of Initial Public Offerings in Bangladesh

3.1 Introduction

The aim of this chapter is to investigate the aftermarket long term price performance of IPOs in Bangladesh during 1991-2007 in the 60 months after going public. There is number of studies that have documented the two main anomalies of initial public offering (IPOs).One of which is high initial return that investors may earn between subscription and equilibrium price adjustment day price in aftermarket. This phenomenon is known as "underpricing". Another one is subsequent poor long run performances. Considerable work has been done on short-run underpricing. Recently long-run underperformance has been the subject of a focused research. The evidence for the long-run performance appear to be mixed across the markets, but the underpricing fact shows robust result. Long run under performance is prevalent in some of the developed markets of the world. Poor aftermarket performance was first documented by Ritter(1991) and further explored by Lougran and Ritter (1995).Among others a similar under performance of IPOs has also been detected in other countries as well [Levis (1993) for the U.K, Keloharju(1993) for Finland, Aggarwal *et al* .(1993) for Brazil,Osman (1996) for Belgium, Ljungqvist(1993) for Germany].later on Ritter extended his study and further documented that[Ritter and Welch (2002)] in US (IPOs that came in between 1981-2001) the IPOs underperformed the market by about -23% in the first three years of listing. Schuster(2003) investigated the aftermarket performances of IPOs in France, Germany, Italy, Netherlands, Spain, Sweden and Switzerland and found that IPOs under performed from -12% to -42% in the first three years of listing. Apart from the obvious implications for the functioning of the capital markets and investors, the evidence of long-run underperformance has reopened the debate about the nature of the high initial returns i.e. whether or not the high initial returns are a consequence of rational and deliberate underpricing or a consequence overoptimisim by investors and hence initial overpricing in the aftermarket.

Long-run underperformance of IPO is not as common as short-run underpricing and hence it can't be generalized across countries. hence this chapter attempts to shed some further light on the generality of the long-run performance phenomenon across countries and on the question posed concerning the relation of long-run underperformance to the short-run underpricing.Hence this chapter attempts to find a relationship between long

run underperformance and short term underpricing. Investigation of long-run performance of IPOs, identifying its extent and categorizing underperformance pattern across different industry and year is of prime importance. So the foremost motivation of the study is:

- To document empirically the long-run price performance of IPOs in Bangladesh and whether the underperformance pattern is different from international price behavior.
- To investigate whether long-run performance has any consistency with short-run price behavior or behavior that is documented in other countries.
- To investigate whether this phenomena has any cross sectional or temporal pattern.

To be more specific the objectives of this paper are

i) to measure the aftermarket price performance of IPOs in Bangladesh in 60 months after the offering date.
ii) to analyze any systematic pattern in the aftermarket performances of these issues.
iii) to investigate the risk behavior of initial public offering in the five years after going public.

Our sample of 99 IPOs underperformed the market benchmark in the five years after going public. This underperformance is 10.19% per year. The magnitude of underperformance implies that based upon holding period realized return, an investor would have to invest 50.48% more money in the IPOs than market portfolio to have the same wealth five years after the offering date.

While examining the systematic risk profile of IPOs in secondary trading in our sample, we find that IPO firms, on average, have a cross-sectional beta lower than one (0.91). We do not find any beta-bias with respect to the market portfolio, confirming the robustness of the long-run IPO underperformance vis-à-vis to the market benchmark.

We find that there are some variations in IPO performances year to year and across industries. Initial returns have no systematic relationship with long-run performance implying that no long-run reversals have been observed. We also find that companies with highest initial return quartile have done worst in the aftermarket. This finding is consistent with Shiller's "fads hypothesis" which states that companies with highest initial return should subsequently have lowest returns. The general pattern of underperformances in the market of Bangladesh does exist irrespective of size, industry, and year of issuance.

3.2 Sample Data and Methodology

During 1991 to 2007 101 manufacturing firms went public. But we used a sample of 99 IPOs for the purpose of studying long-run performance. Data on firms going public during 1991-2007, information regarding final offer price, price series, dividend payment, monthly closing price, capital change of IPOs were collected from Dhaka stock exchange data base. Month end all share price index was also collected from Dhaka Stock exchange data base.

In figure 3.1, we present the annual volume of IPOs in our sample for each year during 1991-2007.

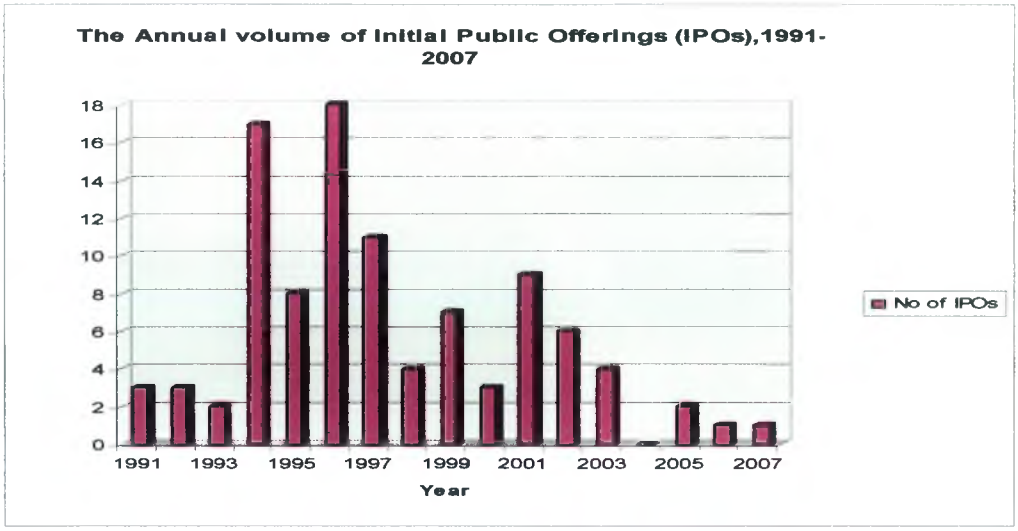

Figure: 3.1

To evaluate the long-run performance of IPOs, two measures were employed: 1) the average cumulative abnormal return metric ($CAR_{s,T}$) with implicit reweighting event "portfolio" every month, and (2) average buy-and-hold return in excess of the benchmark buy-and-hold returns.

A traditional event study performance analysis was conducted over the post IPO (also referred to as the seasoning) period. The raw returns are adjusted for general movements using a standard "market" adjustment which reflects conservatively the assumedly high risk of IPO shares;

$$ar_{it} = r_{it} - r_{mt}$$

where ar_{it} is the abnormal return for stock i in month t, r_{it} is the raw return on stock i in the month t, and r_{mt} is the corresponding return on the market index during the same time period. This approach of market adjusted return is equivalent to using standard version of

the Capital Asset pricing Model (CAPM), with beta assumed to be unity, as the return generating model. The DSE all share price index was used as market benchmark.

Each issuing firm was followed from the first day of trading until the earliest of its delisting date, the end of 60 post-IPO seasoning month, or April 2011.The monthly return series are adjusted for capital changes[1]. The return during the first month of seasoning is the return measured from the equilibrium trading day to the last trading calendar day of the first trading month less the equivalent market index return. Hence the time interval of the first month market adjusted return varies from 1 to 30 calendar days. The average abnormal return for month t following the IPO is :

$$AR_t = \frac{1}{n_t}\sum_{i=1}^{n_t} ar_{it}$$

where n_t is the number of issues present in the cross section in post –IPO month t. The average cumulative abnormal return metric [Dimson and Marsh (1986)] from the month s to month T is the cross-sectional average of the individual cumulative compounded abnormal return[2] .:

$$CAR_{s,T} = \frac{1}{n}\sum_{i=1}^{n}\left[\prod_{t=s}^{T}(1+ar_{it})-1\right]$$

The use of $CAR_{s,T}$ implicitly reweight our event "portfolio" every month.[3]Since such a portfolio strategy is difficult to implement, we also analyze buy –and - hold returns alternatively. The buy-and- hold return for firm i is defined as :

$$R_{iT} = \prod_{t=1}^{\min(T,delist)}(1+r_{it})-1$$

where $\min(T, delist)$ is the earlier of its delisting date or the end of the five year window. For firms that went public near the end of our sample period, the delisting date is no later than April, 2011, since the return interval is truncated on this date.

[1] All price series were adjusted for dividends, splits, right offering and other capital changes.
[2] Alternatively, the Cumulative Abnormal Return can be cumulated by summing up over time the AR_t. But this is bias because it does not compound the AR_t. and monthly cumulate the estimation errors in single period return, as pointed out by Conrad and Kaul(1993).
[3] This reweighting implies reducing the holding of stock which have apparently appreciated and increasing the holding in stock which have apparently depreciated and hence it does not realistically represent a typical investor's behavior.

Following Ritter (1991) and Loughran and Ritter (1995), we also compute wealth relative as a performance measure, which can be defined as :

$$WR = \frac{1 + \text{averge 5-year buy and hold return of IPO}}{1 + \text{averge 5-year buy and hold return of market}} = \frac{1 + \frac{1}{n}\sum_{i=1}^{n} R_{it}}{1 + \frac{1}{n}\sum_{M=1}^{n} R_{MT}}$$

A wealth relative (WR) of greater than one (WR>1) indicates that IPOs are outperforming the market benchmark, while a wealth relative of less than one (WR<1) indicates IPO underperformance.

It is difficult to determine the risk of individual securities when no prior market price information exists. In this study we report abnormal return that are not adjusted for systematic risk (beta). To examine the robustness of the aftermarket performance, however, we have calculated cross-sectional betas of IPOs with the RATS model specification, adapted from Clarkson and Thompson (1990). This model specification is as follows:

$$r_{it} = \acute{\alpha}_j + \beta_j r_{mt} + \varepsilon_{it}$$

where r_{it} is the raw return for securities *i* for period *t*, r_{mt} is the return on the value weighted DSE all share price index, and *j* denotes the month of seasoning.

3.3 Long- Run Aftermarket Performance

Table 3.1A, Table 3.1B and Table 3.2A, Table 3.2B report the aftermarket performance of the IPOs for the 60 months following the IPO, excluding the initial equilibrium return (15 event day return) using the measure of (i) average cumulative abnormal returns metric ($CAR_{s,T}$) and (ii)abnormal holding period ($HP_{s,T}$) return. According to these tables, the Bangladeshi firms going public during 1991-2007 underperformed, on average, the market. It is evident that our sample significantly underperforms the market benchmark by cumulative 31.41% (with a *t*-value of -2.68) and 47.09% (with a *t*-value of -3.11) in the three years and five years respectively after going public. While the market adjusted holding period return, accruing to an investor who bought the issues on their respective fifteenth day of trading (equilibrium day) and held them for five years is -50.48% with an associated one tail *t*-statistics of -1.85. The evidence indicates that the level of underperformance is economically and statistically significant.

Table3.1A

Abnormal Returns for Initial Public Offerings in 1991-2007

The long term performances of IPOs in Bangladesh from 1991 to 2007 over first 60 months of trading is documented and measured as average abnormal monthly returns (AR_t) and average cumulative abnormal return metric ($CAR_{s,T}$), in percent excluding the initial equilibrium return. The Benchmark used here is value weighted All Share Price Index of Dhaka Stock Exchange. The t-statistics on average cumulative benchmark adjusted return metric in month

$T, CAR_{s,T} = 1/n \sum_{i=1}^{n} [\prod_{t=s}^{T} (1 + AR_{it}) - 1]$ is computed as $CAR_{s,T}/\sqrt{var}$ (CAR_{sT}) (cf Dimson and Marsh (1986) pp 124-125) where var(CAR_{sT}) is equal to [T* var(CAR +2 * (T-1)*cov(CAR),where var(CAR_{tt})] is estimated from the single period performance , $CAR_{tt} = CAT_t - CARtt_{-1}$ and cov (CAR_{tt}) is the first order auto covariance of the CAR_{tt} series and T=t-s+1 is the length of the holding period over which performance is measured. The var (CAR_{tt}) values are .000787(7.87percent squared) for the market benchmark and the equivalent cov(CARtt) value is -.000201 representing auto-correlation coefficient of -0.258.

Month of seasoning	Number of firms Trading	Market Adjusted Returns			
		AR_t		$CAR_{s,T}$	
		%	t-stat	%	t-stat
1	99.00	3.96	0.93	3.96	
2	99.00	2.57	1.34	5.06	1.80
3	99.00	-2.03	-1.34	1.96	0.57
4	99.00	-3.12	-1.78	-0.83	-0.21
5	99.00	-0.17	-0.10	-0.24	-0.05
6	99.00	3.92	1.09	3.18	0.66
7	99.00	-0.83	-0.41	-0.09	-0.02
8	99.00	5.59	1.39	1.78	0.32
9	99.00	-3.27	-1.78	-3.24	-0.55
10	99.00	-2.29	-1.16	-4.43	-0.72
11	99.00	3.14	1.54	-2.28	-0.35
12	99.00	2.35	0.81	-3.32	-0.49
13	99.00	-0.58	-0.24	-1.44	-0.20
14	99.00	4.85	0.94	-1.72	-0.24
15	99.00	11.39	1.55	1.52	0.20
16	99.00	0.84	0.26	3.89	0.50
17	99.00	6.01	0.72	1.90	0.24
18	99.00	22.97	0.94	-0.33	-0.04
19	99.00	2.63	1.19	-1.24	-0.15
20	99.00	-1.68	-0.60	-2.69	-0.31
21	99.00	17.79	1.19	5.00	0.56
22	99.00	-4.90	-2.92	-4.94	-0.54
23	99.00	-3.07	-1.79	-10.39	-1.11
24	99.00	-1.23	-0.75	-12.82	-1.34
25	99.00	-1.38	-0.83	-14.45	-1.48
26	99.00	1.02	0.55	-13.36	-1.34
27	99.00	-3.23	-1.82	-17.00	-1.67
28	99.00	-1.32	-0.59	-16.98	-1.64
29	99.00	-0.16	-0.08	-17.00	-1.61
30	99.00	-3.47	-1.57	-22.73	-2.12

Table 3.1B

Abnormal returns for Initial Public Offerings in 1991-2007

The long term performances of IPOs in Bangladesh from 1991 to 2007 over first 60 months of trading is documented and measured as average abnormal monthly returns (AR_t) and average cumulative abnormal return metric ($CAR_{s,T}$), in percent excluding the initial equilibrium return. The Benchmark used here is value weighted All Share Price Index of Dhaka Stock Exchange. The *t*-statistics on average cumulative benchmark adjusted return metric in month

$T, CAR_{s,T} = 1/n \sum_{t=1}^{n} [\prod_{t=s}^{T} (1 + AR_{tt}) - 1]$ is computed as $CAR_{s,T}/\sqrt{var}$ (CAR_{sT}) (cf Dimson and Marsh (1986) pp 124-125) where var(CAR_{sT}) is equal to [T* var(CAR +2 * (T-1)*cov(CAR),where var(CAR_{tt})] is estimated from the single period performance , CAR_{tt} =CAT_t - CARtt $_{-1,}$ and cov (CAR_{tt}) is the first order auto covariance of the CAR_{tt} series and T=t-s+1 is the length of the holding period over which performance is measured. The var (CAR_{tt}) values are .000787(7.87percent squared) for the market benchmark and the equivalent cov(CARtt) value is -.000201 representing auto-correlation coefficient of -0.258.

Month of seasoning	Number of firms Trading	Market adjusted Returns			
		A_{rt}		Car_{st}	
		%	t-stat	%	t-stat
31	99.00	-0.63	-0.41	-25.52	-2.34
32	99.00	-2.83	-1.81	-27.35	-2.47
33	99.00	8.96	1.24	-26.81	-2.39
34	99.00	2.93	0.79	-27.44	-2.41
35	99.00	27.73	1.48	-23.63	-2.04
36	99.00	-4.78	-2.86	-31.41	-2.68
37	97.00	1.31	0.42	-30.19	-2.54
38	97.00	-1.37	-0.78	-33.15	-2.75
39	97.00	0.10	0.04	-33.17	-2.72
40	97.00	6.70	0.97	-32.31	-2.61
41	97.00	-2.48	-1.37	-33.99	-2.72
42	97.00	1.12	0.46	-34.94	-2.76
43	96.00	10.05	1.32	-33.89	-2.64
44	96.00	1.69	0.93	-35.75	-2.76
45	96.00	0.69	0.50	-34.79	-2.65
46	96.00	-2.00	-1.27	-36.78	-2.78
47	96.00	0.70	0.42	-37.88	-2.83
48	96.00	-2.21	-1.37	-39.60	-2.93
49	96.00	-0.86	-0.42	-41.66	-3.05
50	96.00	1.63	0.90	-40.46	-2.93
51	96.00	-6.04	-3.35	-44.18	-3.17
52	96.00	-0.82	-0.40	-44.25	-3.14
53	95.00	4.48	1.16	-43.44	-3.05
54	94.00	18.53	0.99	-43.45	-3.03
55	94.00	-2.86	-1.84	-45.25	-3.12
56	94.00	0.62	0.24	-44.04	-3.01
57	93.00	0.46	0.14	-45.40	-3.08
58	92.00	7.30	0.71	-45.40	-3.05
59	92.00	-0.56	-0.13	-47.99	-3.20
60	92.00	6.72	0.70	-47.09	-3.11

Table 3.2A

The long-run Performance of Bangladeshi Initial Public Offerings

The long-run performance of Bangladeshi IPO in 1991-2007 for the first 60 month of seasoning is measured as average holding period abnormal return (HP_{st}) which measures the total return from a buy and hold strategy where a stock is purchased at the 15 th day equilibrium closing price after going public and held after T holding period, in excess of the buy and hold return on the benchmark. The benchmark used here is the value weighted DSE all share price index. As the holding period abnormal returns are will not be normally distributed, especially when measured over long periods, the statistical significance of HP_{st} is evaluated using the following measure suggested by Dimson and Marsh(1986): $V_{st} = R_{st} - B_{st}$,where $R_{sT} = \ln\left(1 + \overline{R_{sT}}\right)$ and $B_{sT} = \ln\left(1 + \overline{R_{mT}}\right)$ where the bar Signifies the equally weighted mean holding period return over all N securities. The t-statistics for the transformed holding period abnormal return (V_{st})is computed $V_{st} / \sqrt{\text{var}(V_{st})}$ where $\text{var}(V_{sT}) = [T * \text{var}(V_{it}) + 2 * (T-1) * \text{cov}(V_{it})]$ where $\text{var}(V_{it})$ is estimated from the single period abnormal performance $V_{sT} = V_{sT} - V_{sT-1}$, and $\text{cov}(V_{it})$ is the first order auto covariance of the V_{st} series, and T=t_s+1 is the length of the holding over which performance is measured. The var(V_{it}) value is .001525 for the market , and the equivalent cov(V_{it}) values are -.00029 representing autocorrelation coefficient of -0.18939

Month of seasoning	Number of firms Trading	Market adjisted return		
		HP_{st}	V_{st}	*Sig*
		%	%	*t*-stat
1	99.00	4.02	3.83	1.60
2	99.00	6.37	5.98	1.53
3	99.00	3.72	3.46	0.70
4	99.00	1.73	1.62	0.28
5	99.00	4.01	3.75	0.57
6	99.00	10.85	9.71	1.33
7	99.00	4.79	4.27	0.54
8	99.00	4.21	3.82	0.45
9	99.00	1.63	1.48	0.16
10	99.00	-4.04	-3.69	-0.39
11	99.00	-2.07	-1.91	-0.19
12	99.00	0.14	0.13	0.01
13	99.00	1.08	1.00	0.09
14	99.00	1.37	1.24	0.11
15	99.00	5.80	5.10	0.43
16	99.00	11.23	9.06	0.74
17	99.00	8.31	6.63	0.53
18	99.00	7.30	5.85	0.45
19	99.00	10.31	8.13	0.61
20	99.00	5.16	3.93	0.29
21	99.00	3.15	2.46	0.18
22	99.00	-6.56	-5.32	-0.37
23	99.00	-12.76	-10.31	-0.70
24	99.00	-16.37	-13.39	-0.89
25	99.00	-19.53	-15.58	-1.02
26	99.00	-19.61	-15.14	-0.97
27	99.00	-21.71	-17.06	-1.07
28	99.00	-13.41	-10.39	-0.64
29	99.00	-13.65	-10.59	-0.64
30	99.00	-22.95	-18.86	-1.12

Table 3.2B

The long-run Performance of Bangladeshi Initial Public Offerings

The long-run performance of Bangladeshi IPO in 1991-2007 for the first 60 month of seasoning is measured as average holding period abnormal return (HP_{st}) which measures the total return from a buy and hold strategy where a stock is purchased at the 15 th day equilibrium closing price after going public and held after T holding period, in excess of the buy and hold return on the benchmark. The benchmark used here is the value weighted DSE all share price index. As the holding period abnormal returns are will not be normally distributed, especially when measured over long periods, the statistical significance of HP_{st} is evaluated using the following measure suggested by Dimson and Marsh(1986): V_{st} =R_{st}-B_{st} ,where $R_{sT} = \ln\left(1+\overline{R_{sT}}\right)$ and $B_{sT} = \ln\left(1+\overline{R_{mst}}\right)$ where the bar Signifies the equally weighted mean holding period return over all N securities. The t-statistics for the transformed holding period abnormal return (V_{st})is computedas $V_{st}/\sqrt{\text{var}(Vst)}$ where $\text{var}\left(V_{sT}\right) = [T * \text{var}\left(V_{it}\right) + 2*\left(T-1\right)*\text{cov}\left(V_{it}\right)]$ where $\text{var}(V_{it})$ is estimated from the single period abnormal performance $V_{sT} = V_{sT} - V_{sT-1}$, and $\text{cov}(V_{it})$ is the first order auto covariance of the V_{st} series, and T=t_s+1 is the length of the holding over which performance is measured. The var(V_{it}) value is .001525 for the market , and the equivalent cov(V_{it}) values are -.00029 representing autocorrelation coefficient of -0.18939

Month of seasoning	Number of firms Trading	Market adjisted return		
		HP_{st}	V_{st}	Sig
		%	%	*t*-stat
31	99.00	-24.31	-20.91	-1.23
32	99.00	-27.60	-24.15	-1.39
33	99.00	-23.28	-20.08	-1.14
34	99.00	-24.79	-21.56	-1.21
35	99.00	-17.67	-14.38	-0.79
36	99.00	-31.71	-27.48	-1.49
37	97.00	-25.80	-22.95	-1.23
38	97.00	-27.98	-25.20	-1.33
39	97.00	-24.40	-21.54	-1.12
40	97.00	-24.09	-20.88	-1.08
41	97.00	-28.17	-24.44	-1.24
42	97.00	-23.81	-20.68	-1.04
43	96.00	-24.43	-21.93	-1.09
44	96.00	-24.96	-22.36	-1.10
45	96.00	-22.56	-19.99	-0.97
46	96.00	-21.87	-18.60	-0.89
47	96.00	-24.76	-20.06	-0.95
48	96.00	-27.45	-21.21	-1.00
49	96.00	-23.60	-17.74	-0.83
50	96.00	-28.21	-21.96	-1.01
51	96.00	-33.10	-26.41	-1.20
52	96.00	-33.05	-26.40	-1.19
53	95.00	-38.36	-30.12	-1.35
54	94.00	-43.82	-35.53	-1.57
55	94.00	-46.78	-39.12	-1.72
56	94.00	-44.62	-36.94	-1.61
57	93.00	-45.13	-37.43	-1.61
58	92.00	-41.01	-34.55	-1.48
59	92.00	-48.25	-42.48	-1.80
60	92.00	-50.48	-43.94	-1.85

Dimson and Marsh (1986) assume both the realized return and its expectations are log normally distributed. However by the central limit theorem, the CAR_{sT} are approximately normally distributed. As the holding period abnormal return will not be normally distributed, especially when measured over long periods, the statistical significance of HP_{sT} is evaluated using the following measure suggested by Dimson and Marsh (1986)

$$V_{sT} = R_{sT} - B_{sT}$$

where $R_{sT} = \ln\left(1 + \overline{R_{isT}}\right)$ and $B_{sT} = \ln\left(1 + \overline{R_{msT}}\right)$ and where the bar signifies the equally weighted mean holding period returns over all N securities. In the case of CAR_{sT}, V_{sT} is equated to CAR_{sT} (Average cumulative compounded annual return). The variance of this performance measure is estimated from the single period abnormal performance $V_{sT} = V_{sT} - V_{sT-1}$. It is equal to

$$\text{var}\left(V_{sT}\right) = [T * \text{var}\left(V_{it}\right) + 2 * \left(T - 1\right) * \text{cov}\left(V_{it}\right)]$$

where $\text{cov}\left(V_{it}\right)$ is the first order auto covariance of the V_{sT}, and $T=t-s+1$ is the length of the holding period over which performance is measured. The following statistics is used to measure whether the observed performance is significantly different from zero:

$$Z_{sT} = V_{sT} / \sqrt{Var(V_{sT})}$$

It is assumed that the performance measure represent drawings from a stationary normal distribution. The Z_{sT} statistics is therefore student-t distributed with $t-s$ degrees of freedom.

Figure 3.2 plots raw holding period return, market adjusted holding period return and cumulative market adjusted return for the 60 months after the IPO, excluding the initial equilibrium return. Focusing on the raw return, it shows a mixed pattern, demonstrating a maximum increase to 33.7% in the raw holding period return in month 20 and by the end of month 60, it drops down to -3.1%. When return are adjusted using the market benchmark, performance appears to be quite different. There is a clear downward pattern in the cumulative market adjusted return and market adjusted holding period return. By the end of month 60, both the cumulative market adjusted return (-46.4%) and market adjusted holding period return (-48.9%) are showing clear-cut underperformance.

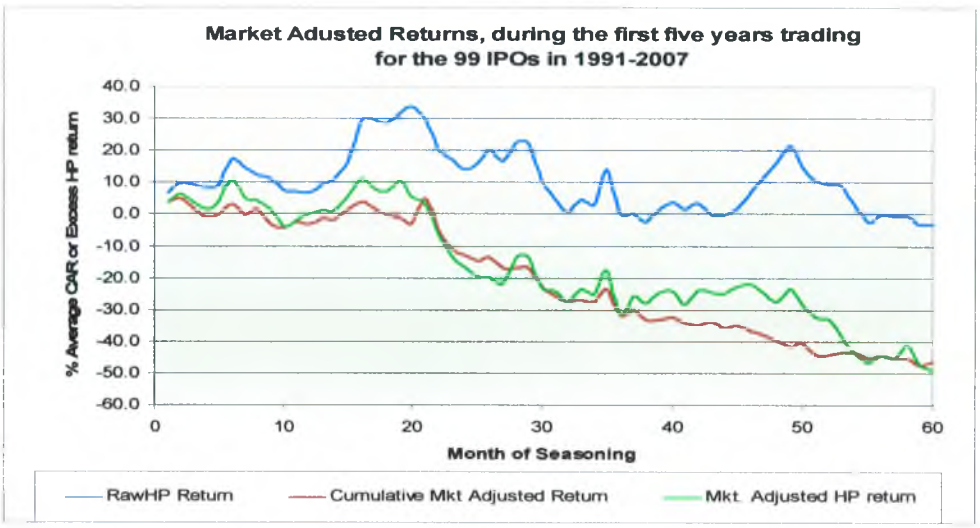

Figure 3.2

The Table 3.3 provides further insight into the long-run performance of IPOs .The table reports distributions of five year buy-and-hold total return for both 99 IPOs and the market. The mean five year IPO buy-and-hold return is 12.57% and for the market is 65.45%. It is reported in the table that, the median five year holding period return is -45.07% and 15.26% for the market, reflecting the skewness in the distribution of five-year buy-and-hold returns. However, the distribution of IPO five-year holding period return is more skewed than that of the market. The histogram of five year buy-and-hold returns both for IPOs and the market is shown in appendix -2.1.

Table 3.3
Distributions of five years buy- and- hold returns, exclusive of initial returns, for 99 IPOs and market in 1991-2007.

Five year buy-and-hold return are calculated as, $\prod_{t=1}^{\min(60,delist)}(1+r_{it})-1$,where r_{it} is the monthly return on stock i for time t The total return is thus computed from the 15th aftermarket trading day closing price until the earlier of its delisting date or 60 months of trading after the IPO. The market return is calculated over the same truncated return interval.

Rank	5 Year buy and hold total return, in percent	
	Initial Public Offerings	Market
1 (Lowest)	-98.42	-54.89
5	-96.51	-35.93
10	-86.89	-55.74
20	-74.87	-22.08
30	-65.99	80.17
40	-57.68	22.55
50	-45.19	104.99
60	-21.44	-38.39
70	-7.24	105.27
80	44.06	266.81
90	168.66	104.99
99 (Highest)	1012.15	163.78
Median	-45.07	15.26
Mean	12.57	65.45

3.4 Time - series and cross sectional analysis in Long- run Performance

The time-series and cross-sectional analysis was performed to give an insight about the generality of the aftermarket long-run performance of IPOs in Bangladesh. In the following sections we have attempted to focus light on those aspects of time series and cross sectional pattern.

3.4.1 Time-Series Evidence

We computed the average equally weighted holding period returns both the firms issuing in calendar year τ and their benchmark, with the average T year buy-and-hold return measured as

$$R_{\tau,T} = \frac{1}{n}\sum_{i=1}^{n} R_{iT}$$

where R_{iT} is the buy-and-hold return on firm *i* for holding period *T*. We also computed wealth relatives for each calendar year.

A. Equally weighted Buy-and-Hold Returns

In Table 3.4, we report buy-and-hold returns and their wealth relatives based upon three and five year holding periods for the 99 firms going public between 1991 and 2007. Focusing on the five-year returns, the overall five-year mean wealth relative is 0.66. In other words, a strategy of investing in IPOs on the fifteenth trading day and holding it for five years would have left investors with only 66 taka relative to one hundred taka from investing in a market portfolio. The median of five-year IPO holding period return is -18.10% contrasted with the 95.27% for the market, revealing a median wealth relative of 0.49. This median wealth relative is much lower to its mean based counterparts.

Wealth relatives vary depending on the year of issuance. In each sample years except three (in five-year holding period), however they are less than one, implying that overall observed underperformance is not due to issue clustering in calendar year.

When the sample is divided in two groups according to the IPO issuance year, before (pre-crash) and after (post-crash) 1996, the pattern of underperformance in terms of three-year buy-and-hold return seems to be robust to the period of pre and post crash period.

B. The Required Investment to achieve the same terminal wealth levels:

The five year buy-and-hold return pattern depicted in Table 3.4 can be used to measure the investment in IPO firms that is required to have the same wealth five years later as would be produced by an investment in market portfolio. The average five-year buy and hold return on market portfolio is 45.74% implies that Tk100 invested in market portfolio

rises to 145.74 after five years. Because the average five-year buy- and- hold return on IPO is only -3.15%, an investment of taka 150.48 is required to receive the same Tk 145.74 at the end of the holding period (.9685*Tk150.48=Tk145.74).

Thus an investor buying IPOs in aftermarket equilibrium trading price (15th day price) , would have to invest 50.48% more money, than if market portfolio were purchased at the same time in order to achieve the same terminal wealth five years later.

Table 3.4

Long-Run Performances by year of issuance for Initial Public Offerings in 1991-2007

Buy-and- hold return for companies going public in calendar year τ are computed using the 15th trading day closing price as the purchase price. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period, and the summation are over the N observations in each calendar year.

Calendar year	Number of IPOs	3 years mean buy and hold returns			5 Years mean buy and hold return		
		IPOs	Market	Wealth Relatives	IPOs	Market	Wealth Relatives
1991	3	18.39	118.29	0.54	-24.76	212.62	0.24
1992	3	152.49	149.55	1.01	568.50	133.35	2.86
1993	2	92.61	438.64	0.36	0.16	61.55	0.62
1994	17	-18.48	10.78	0.74	-35.89	-31.38	0.93
1995	8	-17.10	-17.42	1.00	-31.22	-22.67	0.89
1996	18	-58.97	-64.71	1.16	-37.16	-50.02	1.26
1997	11	-26.37	-23.88	0.97	-45.68	3.90	0.52
1998	4	-12.07	8.13	0.81	-39.49	29.73	0.47
1999	7	15.33	58.24	0.73	11.77	213.15	0.36
2000	3	-58.69	57.31	0.26	-52.72	90.40	0.25
2001	9	-43.84	135.80	0.24	-11.44	100.15	0.44
2002	6	11.06	58.39	0.70	-2.15	152.62	0.39
2003	4	162.97	48.05	1.78	286.73	145.61	1.57
2005	2	57.24	67.32	0.94	53.98	426.68	0.29
2006	1	406.02	159.96	1.95			
2007	1	405.71	198.50	1.69			
1991- 1996	51	-15.97	10.98	0.76	-9.51	-13.24	1.04
1997 -2007	48	17.56	54.32	0.76	4.11	112.95	0.49
1991-2007	99	0.29	31.99	0.76	-3.15	45.74	0.66

C. Annualized Returns

In Table 3.5 and Figure 3.3, we present the annual return on IPO and market during the first five years after the offerings. To compute an average annualized compound return, we implemented the following procedure .The portfolios are rebalanced on each anniversary date so that the annual returns weight each firm equally.

Average IPO returns are lower than that of the market during each of the five years after the offering of IPOs. There is severe underperformance in all five years except first and fourth year and the degree of underperformance is extreme in the third year. No specific pattern is noticed during the five years of observation. In the last column, the geometric average annual return is reported during the first five seasoning years for IPO firms and the market. The average return for IPO firms is 3.18% per year and 13.37% for the market as well. So the underperformance is 10.19% per year.

In row 3 of table 3.5, the *P*-values are reported for the null hypothesis that the difference in annual returns between the IPO firms and the market is zero. The *P*- value for second year and third year is significant, implying that the difference in annual returns between IPO firms and the market for second and third year, and year 1-5 is economically and statistically significant. The *P*- values are calculated using the standard deviation of the mean of the difference in returns for each of IPO firm and the market, assuming independence of the observations.

Table3.5

Average Annual Percentage return during the five years after issuing for IPOs during 1991 to 2007 and market

The equally weighted average buy and hold return for the year after the offering is calculated , using the 15th day aftermarket trading day closing price , for the IPO firms and the market. On each anniversary of the issue date, the portfolios are rebalanced to equal weights and the average buy and hold return during the next year for all the surviving issuers and the market is calculated. Returns are calculated until 30/04/2011. The p- values fir the differences in returns are calculated using the difference in returns for each IPO and market, and assume independence of the observations.

	First Year	Second Year	Third year	Fourth year	Fifth year	Geometric mean Years 1-5
IPO firms (%)	6.96	8.11	-11.96	12.94	1.74	3.18
Market	7.32	22.99	5.85	15.00	16.59	13.37
P values for difference	0.96	0.02	0.01	0.79	0.18	0.03
Sample Size	99	99	99	96	93	99

Figure3.3: The average annual return for 99 IPOs in 1991-2007 and market benchmark during the five years after the issue. Using the fifteenth day closing market price, the equally weighted average buy and hold returns for the year after the issue is calculated for the IPO firms and market. On each anniversary of the issue date, the equally weighted average buy and hold return during the next year for all of the surviving IPOs and the market is calculated.

3.4.2 Cross-Sectional Patterns in the Long-Run Performance of IPOs

A. Long-Run performance by industry

Table 3.6 shows the long-run performance of IPOs according to the industry. But it should be mentioned here that this classification is not according to the Standard Industrial Classification (SIC) code of US. It is a simple industrial sector wise classification made by Dhaka Stock Exchange Authority. It should be noted that the long-run underperformance is present in all except for two industry classifications. The food, tannery, paper, miscellaneous and the textile industries are the worst long-run performers. The pharmaceutical and service industry that outperformed the market are one of the industrial sectors with lowest average initial equilibrium return, while some of the industrial sectors with high average initial returns –tannery and miscellaneous– are among the worst long run performers. This evidence is consistent with the U.S. findings documented by Ritter (1991).

Table3.6

Long-Run Performance Categorized by Industry

Buy- and- hold returns for the companies going public in an industry are computed using the 15th day closing price as the as the purchase price. Market adjusted initial returns are calculated as the percentage change of the share price from the offer to the closing price of the 15th day minus the corresponding return on the market. [$(r_{ipo} - r_{market})$ over the initial return interval)] Wealth relatives are calculated as $[(1/N\sum(1+R_\pi))/1/N\sum(1+R_{mt}))]$, where R_π is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mt} is the holding period return on the market over the same holding period, and the summation are over the N observations in an industry.

Industry	No of IPOs	Average Market Adjusted Initial Returns	Avg 5 year buy- and- hold return		
		(%)	IPOs (%)	Market (%)	Wealth Relatives
Food	18	809.10	-982.62	38.44	-6.38
Cement	7	48.30	30.35	40.92	0.92
Ceramic	3	458.99	-54.38	-35.17	0.70
Engineering	10	278.45	65.76	93.44	0.86
Fuel	1	180.28	79.49	109.08	0.86
IT	7	65.68	131.09	209.25	0.75
Jute	1	-2.35	-20.44	6.92	0.74
Misc	6	104.34	-16.88	89.43	0.44
Paper	2	35.92	-38.73	85.95	0.33
Pharmaceutical	11	39.19	131.95	68.78	1.37
Service	2	13.28	7.87	-24.18	1.42
Tannery	6	120.13	-67.40	44.06	0.23
Textile	25	25.05	-4.13	41.54	0.68
All firms	99	167.41	-3.15	45.74	0.66

B. Long-Run Performance by Size

In Table 3.7 the sample is split according to issue– and firm size so that each class contains equal number of IPO firms. The wealth relatives for all firm size are less than one. It is evidence to the generality of the long-run underperformance. The finding is also in contrast to the findings of U.S [Ritter (1991)] and South Africa[Reyneke(1997)]that the negative aftermarket performance is concentrated in small companies. Further Jelice(2006), Corhay *et al* (2002) and Zaluki & Campbel (2006) found the opposite that the smaller company IPOs perform better than larger IPOs. Again long-run performance may depend on the amount of money raised in an IPO [Bessler and Thies, 2007]. As such our findings is in partial testimony of their claims

Table3.7

Long -Run Performance Categorized by Size

Issue size (gross proceeds) and firm size in terms of equity value (defined as the number of shares outstanding at the time of IPO, valued at the subscription price) . The five year buy and hold return for firms going public is calculated excluding initial return. Market return are calculated as the percentage change of the share price from the offer to the closing price on the 15th day aftermarket trading day minus the corresponding return on the market.[i.e.over the initial return interval]. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period , and the summation are over the N observations in each size category. Return is truncated at April, 2011

Size	No of IPOs	Market adjusted initial return (%)	Average 5 year buy and hold return		
			iPOs (%)	Market (%)	Wealth Relative
Panel A : Offer Size					
Small	33	96.84	12.68	90.82	0.59
Medium	33	103.55	-4.17	25.21	0.77
Large	33	57.76	29.02	81.13	0.71
Panel B: Firm Size					
Small	33	67.02	16.00	39.90	0.83
Medium	33	80.85	4.81	72.80	0.61
Large	33	110.06	16.54	81.47	0.64
All firms	99	167.41	-3.15	45.74	0.66

C. Long-Run Performance by Initial Returns

To furnish direct evidence on the relation between short-run initial returns and long-run performance and to test whether the IPO market is subject to fads, IPO firms are categorized in four groups according to their market adjusted initial returns quartiles. The pattern of the wealth relatives suggests that initial return have no systematic relationship with long-run performance, implying that no long-term reversals have been observed. However, we find that companies with highest market adjusted initial return have done worst in the aftermarket. This evidence is consistent with the Shiller's 'fads hypothesis', which states that companies with highest initial returns should have the subsequent lowest return, and is in line with evidence documented by Ritter's [1991], Aggarwal and Rivoli[1990] and Carter *et a l*[1998].

Table3.8

Long-Run Performance Categorized by Initial Return Quartiles for 99 IPOs in 1991-2007

The five buy-and-hold return for firms going public is computed excluding initial return. Market adjusted initial returns (IR) are computed as the percentage change of the share price from the offer to the closing price on the 15th trading day minus the corresponding return on the market.[i.e. $(r_{ipo} - r_{market})$ over the initial return interval]. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period, and the summation are over the N observations in each IR quartile .Return is truncated at April, 2011.

Market Adjusted Initial Returns Quartiles	Number of IPOs	Average 5 Year buy and hold return		
		IPOs %	Market %	Wealth Relative
-43.06 ≤ IR < 9.44	25	.91	39.03	.73
9.44 ≤ IR < 28.67	25	29.89	100.27	.65
28.67 ≤ IR <79.41	24	42.58	99.81	.71
79.41 ≤ IR <1357.49	25	-22.82	22.51	.63

3.5 Examination of Systematic Risk in Post-IPO seasoning Months

Usually long-run performance studies do not adjust for betas. The presumption of high risk of IPO shares, having beta greater than one, supports the claim of conservative nature of the market adjustment when investigating post-IPO performance. Ritter (1991) suggests that risk mis-measurement is a possible, although unlikely, alternative explanations for his long-run underperformance results. Besides reporting the average for

IPOs in excess of one, Ritter uses different benchmark portfolios designed to get around the risk mis-measurement problem. Nevertheless Ibbotson (1975), Chan and Lakonishok (1992), Clarkson and Thompson (1990) all reported that IPO firms generally have cross-sectional beta greater than one, and average beta decline with the time following the post IPO seasoning months and the average difference in betas between the IPOs and market becomes too small to have any significant effect on the result.

In this section, we examine and evaluate the cross-sectional systematic beta in post–IPO seasoning period following Clarkson and Thompson (1990). In estimating beta we ignored the first month due to the fact that in our case, all sample IPOs differ from one another with respect to varied trading days in this first month as described in methodology part.

3.5.1 Cross Sectional Holding Period Beta Estimate

Table 3.9 shows the systematic risk (beta) of all IPOs for holding period of month 1 to month 60. It should be noted that the beta is below one in most of the seasoning months following the offerings and average adjusted cross sectional beta is 0.91 and the difference is not significantly different from one. Hence beta-bias may not be present with respect to the market portfolio. Consequently risk measurement is not a problem in this case, confirming the robustness of the long-run IPO underperformance vis-à-vis the benchmark of market portfolio.

Table3.9

Cross Sectional Post-IPO Holding Period Beta (Systematic Risk)

Post IPO month	Cross Sectional Raw Beta	Cross Sectional Adjusted Beta	Post IPO month	Cross Sectional Raw Beta	Cross Sectional Adjusted Beta
2	0.68	0.89	32	0.48	0.83
3	0.86	0.95	33	0.49	0.83
4	0.85	0.95	34	0.47	0.83
5	1.27	1.09	35	0.36	0.79
6	2.30	1.43	36	0.31	0.77
7	1.27	1.09	37	0.58	0.86
8	0.83	0.94	38	0.55	0.85
9	0.94	0.98	39	0.65	0.89
10	0.53	0.85	40	0.56	0.85
11	0.49	0.83	41	0.50	0.83
12	0.70	0.90	42	0.74	0.91
13	0.75	0.92	43	0.58	0.86
14	0.81	0.94	44	0.67	0.89
15	0.82	0.94	45	0.78	0.93
16	1.06	1.02	46	0.94	0.98
17	0.92	0.97	47	0.83	0.94
18	0.84	0.95	48	0.83	0.94
19	1.48	1.16	49	1.26	1.09
20	1.23	1.08	50	1.15	1.05
21	0.59	0.86	51	0.98	0.99
22	0.58	0.86	52	0.92	0.97
23	0.56	0.85	53	0.52	0.84
24	0.50	0.83	54	0.38	0.80
25	0.47	0.82	55	0.48	0.83
26	0.43	0.81	56	0.58	0.86
27	0.47	0.83	57	0.61	0.87
28	0.92	0.97	58	0.58	0.86
29	0.78	0.93	59	0.48	0.83
30	0.53	0.85	60	0.44	0.82
31	0.53	0.84			
Cross Sectional Raw Beta			**Cross Sectional Adjusted Beta**		
Minimum		**0.31**	**Minimum**		**0.77**
Maximum		**2.30**	**Maximum**		**1.43**
Mean		**0.74**	**Mean**		**0.91**
STD		**0.33**	**STD**		**0.11**

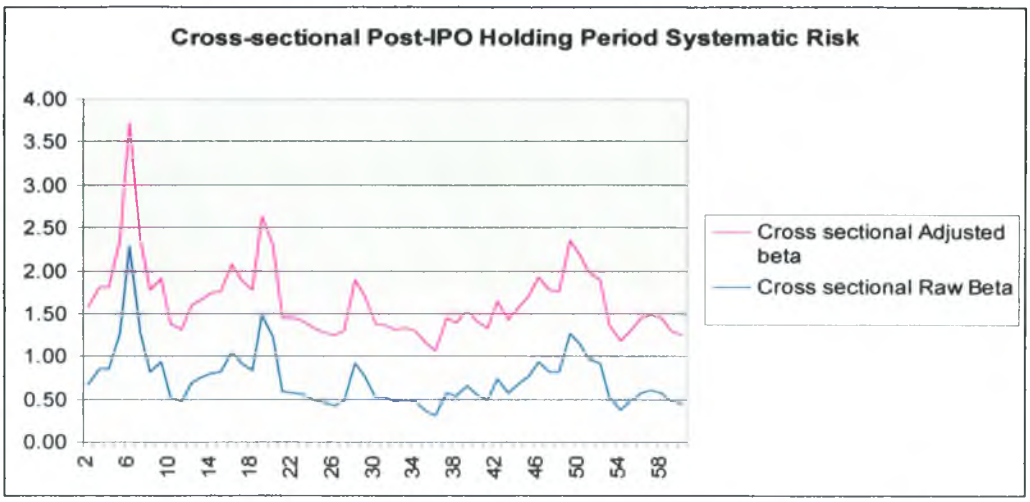

Figure: 3.4 Cross sectional beta over the Post-IPO seasoning month for IPOs in 1991-2007

3.6 Conclusion and Policy Implication

We have made a petite effort to make a comprehensive analysis of the long-run performance of firms going public in Bangladesh during 1991 -2007 .We find a general pattern of underperformance in our market after five years of going public. We find that during the five years after IPO issuance the, there is an underperformance effect of 10.19% per year for investing in IPOs relative to the market.

The magnitude of underperformance implies that based upon holding period realized return, 50.48% percent more money need to be invested in the IPOs than the market portfolio to be left with the same wealth three years later.

We observed that there are some temporal variations and some variations across industries in long-run performance of IPOs. We find that initial return have no systematic relationship with long-run performance. However in our research we do not find evidence that favors the "fads" hypothesis of Shiller.

In the cross sectional analysis the general pattern of underperformance of IPOs seem to be robust to offersize, company size at the time of floatation,

While examining the systematic risk profile of IPOs in secondary market in our sample, we found that IPO firms on average, have a cross-sectional beta lower than 1.The cross sectional adjusted beta is 0.91 As such the market adjustment procedure may not necessarily be as conservative in rising market as was previously assumed in

underperformance studies. To the extent that IPOs underperform the market benchmark , the non-presence of beta-bias with respect to market benchmark allows us to rule out the risk mis-measurement problem as a possible explanation for the long-run underperformance. We are left with puzzle in attempting to explain such poor performance of the IPOs.

The existence of the long-run underperformance of IPOs certainly raises the question that is what causes this behavior. Can the phenomenon be attributed to (a) the ability of the issuer to time their offerings and take advantage "windows of opportunity in the sense of Ritter (1991), or (b) unanticipated post-IPO decline in operating performances [Jain and Kini (1994) and [Imam and Amin (2010)] or (c) earning management by IPOs prior to going public [Imam and Jaber (2010)], that leads to disappointment hypothesis.

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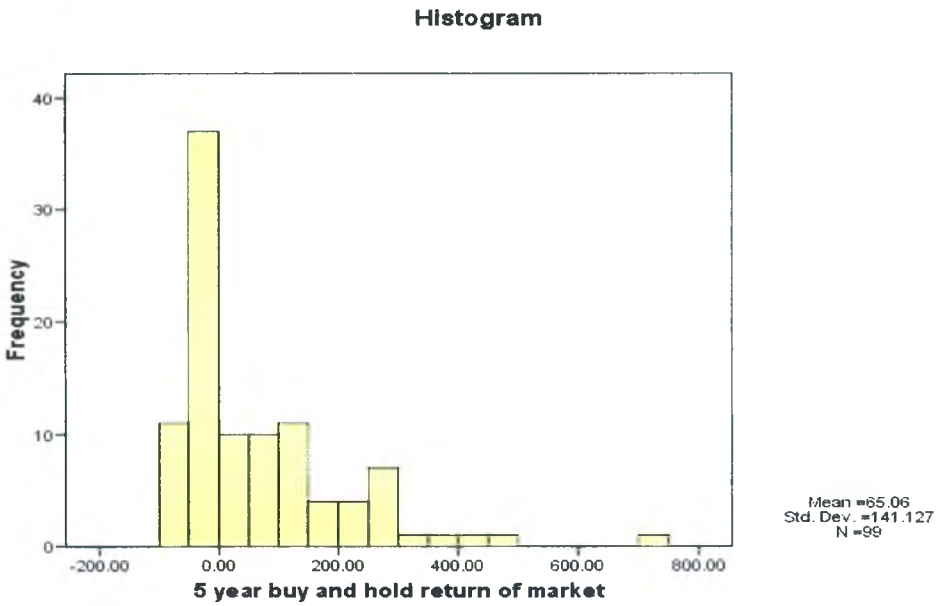
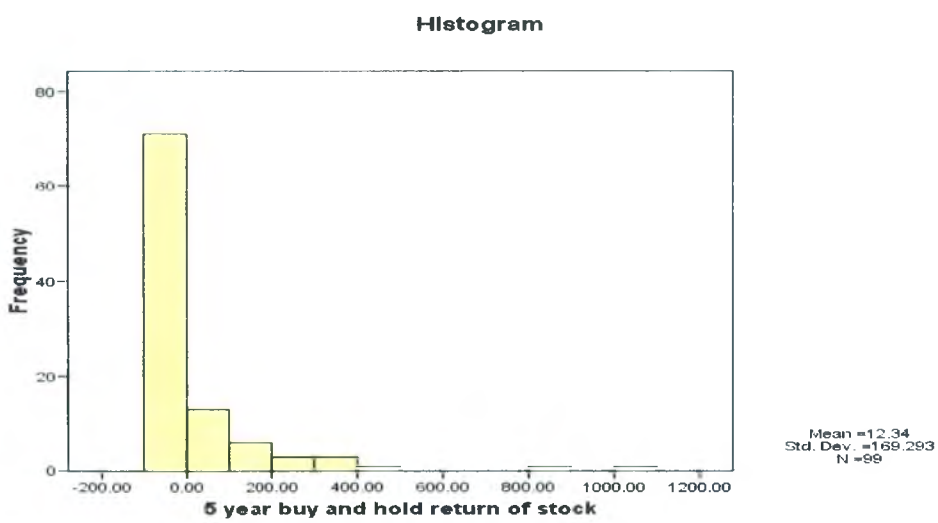
Appendix 3.1





Appendix 3.2

International Evidence on IPO Underperformance

Country	Study	Sample Period	Under performance	Underperformance upto
U.S	Aggarwal & Rivoli(1990)	1977-1987	-13.70%	36 months
U.S	Ritter (1991)	1975-1984	-29.10%	36 months
U.K	Levis (1993)	1980-1988	-23.00	36 months
U.K	Espenlaub *et al* (2000)	1985-1995	-15.00	60 months
Germany	Schuster (1995)	1988-1992	-28%	60 months
France	Derrien & Womack (2003)	1992-1998	-0.06%	24 months
Spain	Alvarez &Gonzalez (2005)	1987-1997	-27.80%	36 months
Portugal	Almeida & Duque (2000)	1992-1998	-13.80	12 months
Switzerland	Drobetz *et al* (2005)	1983-2000	Not significant	120 months
Finland	Keloharju,M(1993)	1984-1989	-0.21	36 months
Belgium	Osman (1996)	1984-1993	-54.89%	36 months
Australia	Finn & Highams (1988)	1966-1978	-6.52	12 months
Brazil, Chile & Mexico	Aggarwal , Leal & Hernandez(1993)	---	-47.00% ,-23.7% -19.6%	36 months 36 months 12months
China	Chan *et al* (2004)	1993-1998	+25.00*	36 months
India	Sahoo and Rajib (2010)	2002-2006	+41.91%*	36 months
Pakistan	Sohail & Nasr (2007)	2000-2006	-38.10%**	12 months
Hong Kong	Aggarwal *et al* (2008)	1993-1997	-48.03%	36 months

* + (ve) implies IPOs outperforming the benchmark used.

Chapter 4

Earning Management, Timing Ability and Long-Run Underperformance of IPOs

4.1 Introduction

Firms that went public in Bangladesh in the 1991-2007 periods significantly underperformed the market benchmark, in the five years after going public. In a sample of 99 IPOs during the period of 1991-2007, the average return on firms going public was 3.18% per year compared to 13.37% per year for market benchmark. The underperformance effect amounted to 10.19% per year. It certainly raises the question about the causes of this behavior.

Using IPO data from the Bangladeshi market, this chapter investigates two conjecturers about the long-run poor performance of IPOs. Firstly, we examine the firms' timing ability proposition , put forward by Ritter (1991) and Lougran,Ritter and Rydqvist(1994), that firms can successfully time their initial public offerings to take the advantage of "windows of opportunity" created by investor overoptimisim, resulting in abnormally poor long-run returns.

Secondly we examine the conjecture that some managers of IPOs actively manage pre-IPO discretionary accruals in reporting enhanced earnings to achieve higher prices at the floatation, and it is mostly these firms following aggressive reporting strategies that subsequently perform poorly in the aftermarket. This type of activities aimed at overstating the current earnings to deceive stakeholders is known as earning management. Earnings management can be defined as the "alteration of firms' reported economic performance by insiders to either mislead some stakeholders or to influence contractual outcomes." (Leuz, Nanda &Wysocki, 2002).

Teoh, Welch and Wong (1998 a &b) report that firms manipulate earnings prior to initial and seasoned public offerings. Previous studies, such as Sloan (1996) and Chan, Jegadeesh and Lakonishok (2002), show that high earnings management firms underperform low earnings management firms in the cross section. The predictability of stock returns implies that the market is initially fooled by manipulated earnings.

Shang (2003) empirically proved that corporate executives attempt to manipulate stock prices by inflating earnings when they sell their company stocks or exercise options and deflating earnings when they buy company stocks or delay option exercises. Leuz, Nanda &Wysocki, (2002) presented comparative evidence on corporate earning management on 31 countries. Hence it can be inferred that earning management may be pervasive in nature but its magnitude may vary from country to country.

In our study we do not find any evidence that supports the timing ability proposition of Ritter. We find that bullish-market issues are doing better than bear-market issues in the long-run, suggesting that firms might not have timing ability. However, the difference in the performance between bullish-market issues and bearish-market issues is not statistically significant. Considering the Cumulative Abnormal return we also find that in the long-run, IPOs have poor stock return when managers aggressively manage pre-IPO discretionary accruals of these firms when they manage pre-IPO discretionary accruals conservatively.

The unexpected accruals of IPOs as a proxy for earnings management are extracted from an extension of the cross-sectional Jones' (1991) model. The unexpected accruals are deemed unusual and thus termed as discretionary (managed). To measure abnormal stock return performance, we use market adjusted returns. The results are consistent with Earning Management Hypothesis. Using the market adjusted return, the most conservative quartile firms (firms with the lowest pre-IPO accruals) underperformed the marker benchmark by a cumulative -55.68% in the five years after going public. In contrast, the most aggressive quartile firms (firms with highest pre-IPO accruals) significantly underperformed by a cumulative -67.64% in the five years after going public. Thus our evidence indicates that investors failed to use all information contained in the discretionary pre-IPO accruals, and instead they appear to value firms going public based on the expectation that pre-IPO earnings performance will continue in future. Under this interpretation, the failure to adjust for the pre-IPO accrual component of earning led investors to have high initial expectations of firms' future earnings growth. Subsequent revelation about the appropriateness of the accruals in post-IPO financial statement caused a downward correction in stock price.

4.2 Methodology and Estimation Procedure

4.2.1 Estimation Procedure of Unexpected Scaled Accounting Accruals

Following Teoh, Wong, and Rao (1998), an extension of the cross-sectional Jones' (1991) model has been used for this purpose. Accruals are decomposed into two components: discretionary accruals and nondiscretionary accruals. Nondiscretionary accruals are the asset-scaled proxies for unmanipulated accruals dictated by business conditions. Discretionary accruals are the asset-scaled proxies for manipulated earnings determined at the discretion of management. Given the earlier discussion, it is expected that discretionary accruals (DAC) are the superior proxy for earnings management. The Jones model has been used widely in the Accounting literature. For example, Dechow (1994), and Dechow, Sloan and Sweeney (1995), use the Jones model to detect whether earnings management exists. Sloan (1996) and Colins and Hribar (2000) use the Jones Model to show that the market appears to overestimate the persistence of the accruals components of earnings, and hence stock prices initially overreact to news on accruals.

Imam and Jaber find evidence, using modified Jones model, powerful accrual testing methodology, that entrepreneurs of IPOs coming to the market during 1991-2000, behaved myopically in boosting earnings in the year prior to going public. They have shown that mean and median managed accruals of sample IPO firms account for 6.0% and 4.24% of the total assets under the Modified Jones' Model. The magnitudes of mean and median managed accruals are not only statistically significant but also economically significant. Thus Modified Jones' Model of discretionary accruals test does detect a significant portion of managed accruals, which indicates an evidence of earnings manipulation by entrepreneurs of IPOs in the year prior to going public. It is also documented in that study that earnings management had a positive impact on initial firm's value.

Selection of the Sample

This study observed all IPO firms came to the public between January 1991 and December 2000 excluding Banks, Insurances and other non-banking Financial Institutions. IPOs of Banks, Insurances and other non-banking Financial Institutions are excluded from the sample because their nature is different from non-financial institutions

and post-IPO industry data of those financial institutions are not readily available. All IPOs (of non-financial institutions) within this period, which provide adequate data, have been taken into the sample. It is found that a total of 79 IPOs went into public within this period. In those IPO firms 26 were green field, so that those firms are not considered into the sample because they do not have required data and management of those firms have no scope of manipulating earnings. Three IPO firms are excluded from the sample because of inadequate data in prospectus of 2 firms (Wata Chemical Ltd.-1992 and National Oxygen Ltd.-1991) and could not make available prospectus of one firm (Texpick Industries Ltd.-1991). Another three firms are also excluded from the sample which went on public in 1991 because cross-sectional regression is conducted with IPO data and industry data, in which industry data is also collected from 1991 to 2000 and changes in cash flow from operation and changes in adjusted revenue are calculated with those data, so regression for IPOs of the year 1991 has not conducted for lacking of data. At last 47 IPO firms are included in the sample which have prospectus with required data of at least two years prior to going public with information of current assets, cash in hand and at bank, accounts receivable, current liabilities, gross property plant and equipment, depreciation of the year, total asset, net sales, net income, EBIT, proportion of ownership shares, offer price per share, total number of issues, and the name of issue manager(s).

A summary status of data of IPO firms is given in Table 5.1.

Table 4.1

Status of Data of IPO Firms

IPO Period – January 1991 to December 2000	
IPOs Came into Public	79
Green Field IPOs	26
Inadequate Data in Prospectus	02
Unavailable Prospectus	01
IPOs of 1991	03
Sample Size of the Study	***47***

Table 4.2 shows the distribution of sample according to the industry classification. According to Bangladesh Bank's "Balance sheet Analysis of Joint Stock Companies", industries are classified into ten categories within which there is no accepted IPO in Fuel and Power, and Cement categories. There are highest numbers of IPOs in miscellaneous category followed by food and allied products, and textile categories respectively.

Table 4.2

Distribution of Sample IPOs across Industry

Industry	Frequency	%	Cum. Freq.	%
Engineering	3	6.38	3	6.38
Food and Allied Products	12	25.53	15	31.91
Jute	1	2.13	16	34.04
Textile	11	23.40	27	57.45
Pharmaceuticals and Chemicals	4	8.51	31	65.96
Paper and Printing	1	2.13	32	68.09
Services and Real Estate	2	4.26	34	72.34
Miscellaneous	13	27.66	47	100.00
Total	***47***	***100.00***		

Table 4.3 shows the distribution of accepted sample IPOs according to the year of going public. In 1992 total of 3 IPO firms came into public in which prospectus of one IPO had inadequate data and the rest were green field. Hence the sample of IPOs in the year of 1992 turns out to be zero. The largest number of IPOs floated in the year of 1994 followed by the year of 1996 and 1997 respectively.

Table 4.3

Time Distribution of Sample IPOs

IPO Year	Frequency	%
2000	3	6.38
1999	5	10.64
1998	2	4.26
1997	8	17.02
1996	11	23.40
1995	4	8.51
1994	13	27.66
1993	1	2.13
1992	0	0.00
Total	***47***	***100.00***

Collection of Data

IPO data are collected from the published prospectus of IPO firms. Calculation of discretionary accruals needs to run the regression with IPO data and cross-sectional industry data. Those industry data for the same period between January 1991 and December 2000 are collected from the "Balance Sheet Analysis of Joint Stock Companies" of 1998, 2001 and 2002 issues published by the Bangladesh Bank. Because of limited access to the original annual reports of the public listed companies, Bangladesh

Banks' data is preferred. Moreover in some cases original annual reports and data from Dhaka Stock Exchange are used when required.

Data on discretionary accruals-a proxy for earning management are obtained from the paper "Earning Management of IPOs in Bangladesh-Test of Value Relevance Hypotheses: Evidence from Dhaka Stock Exchange" (Imam & Jaber,2010). The detail of the model and its calculation of discretionary accruals is given the appendix 4.1.

4.2.2 Test-Methods for Market Timing Ability

To test the issuers' timing ability proposition offered as an explanation of IPO long-run underperformance, we examine the effect of pre-IPO market conditions on the long-run after market performance of IPOs. If the firms are able to time the issue, IPOs that come to the market during the its relative pre-IPO bullishness must have poor aftermarket stock price performance. One of the proxies for pre-IPO market conditions is market run –ups prior to the offer date, which captures market upswings.[1]This proxy is based on observable data and backward-looking event time. hence this event time supposed to have less stringent information about firms' timing ability than those of LRR (1994) who credit issuers with the ability to forecast market peak[2].The market run-ups variable will be defined over the sixty six trading days (66 days) prior to the IPO offering day. An IPO is then defined to have occurred in a relatively period if the market return index on the offering day is at higher level than the past-quarter (66 trading day) average of the market return index preceding the offering day (i.e.$MI_{off} > MI_{avg66}$).Otherwise , the issue is defined to have been priced in a relatively bear market.Thus, the market condition is proxied by a dummy variable as follows:

$$MktimingD = \begin{cases} 1 & \text{if the market is "bull" at the time of an IPO} \\ 0 & \text{otherwise, i.e. "bear" market} \end{cases}$$

[1] The underlying assumption here as well as in LRR(1994) is that market condition and investors' overoptimisim are highly positively correlated, making this a joint test of the timing ability and the validity of the proxy.

[2] LRR (1994) and Logrhran and Ritter (1993) provide timing proposition based on inference about issuers forecasting ability made from observations' that the number of IPOs is negatively related to long-run performance and positively related to market peaks.

The conjecture about earnings management we examine is whether the pre-IPO discretionary accruals are systematically related to future stock price performance.We consider the predictability of pre-IPO accruals for post-IPO stock price performance in section. For our test, we divide IPO firms into four quartiles according to their pre-IPO discretionary accruals and compare the five year market adjusted returns for the IPOs in different quartiles. Quartile 1 represents the smallest discretionary accruals, and it is referred to as conservative quartile. Quartile 4, represents the largest discretionary accruals, and referred to as the aggressive quartile. We also analyze differences in post-IPO stock returns between two portfolios of IPO firms classified by the median size of pre-IPO discretionary accruals. Table4.4 presents the cut-offs, means and standard deviation for discretionary accruals for four quartiles in panel A . In panel B two median portfolios are formed on the basis of the cross-sectional variation in pre-IPO accruals (DAC). There is a substantial variation in the earnings management measures between the aggressive and conservative quartile. Mean discretionary pre-IPO accrual is -5% of total assets in the conservative quartile (Q1), and 14% in the aggressive quartile (Q4).

Table 4.4

Quartile and Median Cut-offs of Pre-IPO Accruals

This table presents cut-offs and mean/standard deviations of the four quartile portfolios in panel A, and two median portfolios in panel B, both formed by sorting on pre-IPO discretionary accruals(DAC_1). Pre-IPO discretionary accruals (DAC_1) are discretionary accruals in the fiscal of IPO. Quartile 1 is the most conservative portfolio with the lowest discretionary accruals, where as quartile 4 is the most aggressive portfolio with the highest discretionary accruals.

Panel B : Pre-IPO unexpected accruals quartiles cut-offs				
	DAC set	**Mean**	**Std.Dev**	**No**
Quartile 1 (Q1)	less than -0.0215	-0.10	0.07	12
Quartile 2 (Q2)	-0.0215 to 0.0391	-0.001	0.02	12
Quartile 3 (Q3)	0.0391 to .0979	0.06	0.02	11
Quartile 4 (Q4)	Greater than 0.0979	0.15	0.07	12
Panel B : Pre-IPO unexpected accruals median cut-offs				
Below Median	Less than 0.0391	-0.04	0.06	24
Above Median	Greater than .0391	0.13	0.07	23

4.3 Predicting Post-IPO Stock Returns with Market conditions, Pre-IPO accruals

4.3.1 Effects of Market Conditions on Long-Run Performance

In this sub-section, we examine the relation between our measures of relative bullishness of the market and the subsequent long-run performance. For this test, firms are categorized in two groups according to pre-IPO market conditions (MktimingD). In table 4.5, the wealth relatives for the IPOs coming in both bullish and bearish market are well below 1.00. This indicates that both types of market condition issues underperformed, on average, the market benchmark.

Table 4.5

Long-Run Performance Conditional on Market Conditions at the Time of Floatation

IPO firms in our sample are categorized according to market conditions at the time of floatation. An IPO is defined to have occurred in a relatively bull market period if the market index on the offering day is greater than the past-quarter(66 days trading day) average of the market index preceding the offering day (i.e.MI_{off} >MI_{avg66}). Otherwise, the issue is defined to have been priced in a relatively bear market. The five-year buy-and-hold return for firms going public is calculated excluding the initial return. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period, and the summation are over the N observations in each calendar year. Return is truncated on Aprill, 2011.

Market Condition at the Time of Floatation	No. of IPOs	Average 3-year buy-and-hold returns			Average 5-year buy-and-hold returns		
		IPOs	Market	Wealth Relatives	IPOs	Market	Wealth Relatives
		%	%		%	%	
Bear Market	41	-11.43	21.96	0.73	-5.18	59.88	0.59
Bull Market	58	8.57	39.08	0.78	30.03	68.71	0.77
All Firms	99	0.29	31.99	0.76	-3.15	45.74	0.66

Figure 4.1 plots the average cumulative abnormal return time series performance of bullish-and bearish market issues. The figure also shows that both bullish- and bearish-market issues significantly underperform the market benchmark by a cumulative -40.63% and -46.67% respectively in five years after going public. To asses the

statistical significance, we compute a mean and standard deviation[3] across the time-series realization of each market condition issues. The monthly mean (standard deviation) returns on the bullish-market issues and bearish market issues are -0.775(3.01) and the bearish market issues are -1.11(3.95) respectively. The t-statistics against the null hypothesis that multi year excess return are zero are -1.97 and -2.16 allowing us to infer that both market condition issues experienced significantly negative post-IPO performance. As can be seen from the Table that the bearish market issues performed more poorly than those issued during bullish market. This suggests that underperformance is more prevalent among firms that went public under relatively bearish market condition. This appears to be inconsistent with firms' timing ability which claims that IPOs perform worse if issued in a buoyant market. Thus it can be concluded that Bangladeshi IPOs do not behave in the same manner as the premise of the timing ability proposition would have us believe. However, parametric means of difference '*t*-test' test fail to reject to the null hypothesis that the difference in the performance of bullish- and bearish –market issues is zero. The fact that we find no difference in the post-issue performance between bullish-and bearish market issues casts doubt on the timing ability of Bangladeshi IPO firms

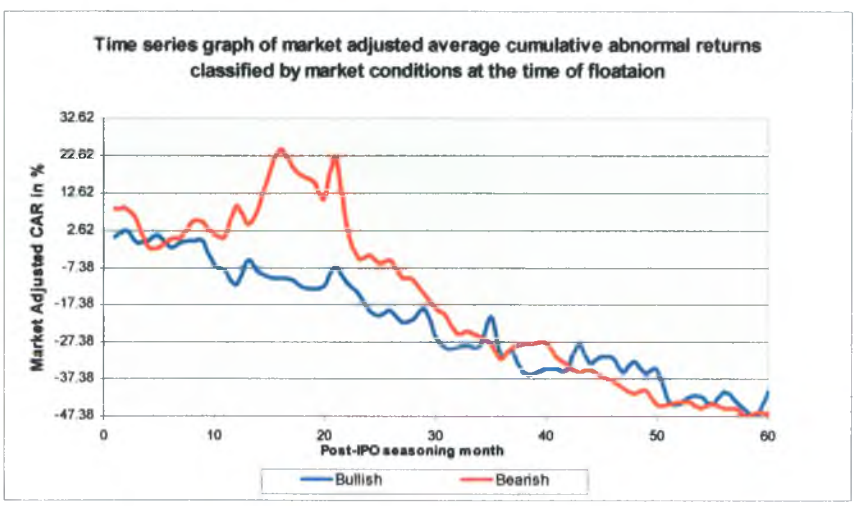


Figure4.1: Time-series graph of market adjusted Average Cumulative Abnormal return classified by Market Conditions at the time of Floatation. An IPO is defined to have occurred in a relatively bull market period if the market index on the offering day is greater than the past-quarter(66 days trading day) average of the market index preceding the offering day (i.e.$MI_{off} > MI_{avg66}$). Otherwise, the issue is defined to have been priced in a relatively bear market. Returns are adjusted using the market benchmark.

[3] While computing standard deviation, first-order auto covariance of monthly return series is also accounted for.

4.3.2 Post-IPO Returns by Pre-IPO Accruals Quartiles (Median)

The key issue we investigate is whether the pre-IPO discretionary accruals explain the observed post-IPO abnormal return performance. In this sub-section, we examine the conjecture that issuers often report unusually high earning by adopting discretionary accounting accruals adjustments that raise reported earnings relative to actual earning. As information about the firm is revealed over time by the media and analysts' report and the subsequent financial reports, investors may realize that earnings are not maintaining the momentum, and investors thus may loose their overoptimisim. So other thing being equal the greater the earning management at the time of offering, the larger the ultimate price correction.

For our tests, IPO firms are classified into four quartiles according to their pre-IPO accruals (DAC) and post-IPO stock price performance for the IPOs in the different quartiles are compared and analyzed. In panel A of table 4.6 we report five year and three year buy-and hold return and wealth relatives for the portfolios of pre-IPO accrual quartiles. The wealth relatives of four quartiles show that all the quartiles are showing clear-cut underperformance. In addition to the quartile classification, we report post-IPO return performance of two portfolios in panel B of Table 4.6,where the cut-offs for these categories is the sample median value of pre-IPO accruals. The result indicates that in the long-run above median portfolio (more aggressive portfolio) performed better than below median portfolio (less aggressive portfolio).

Table 4.6

Long-Run Performance Categorized by Pre-IPO Accruals (DAC)

Unexpected accounting accruals (DAC) are discretionary accruals in the fiscal year. IPO firms are classified into four quartiles (1 being conservative, 4 being aggressive managers) in panel A, and into two portfolios in panel B where the cut-off for these two categories is the sample median value of pre-IPO accruals. The five-year buy-and-hold return for firms going public is calculated excluding the initial return. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period, and the summation are over the N observations in each calendar year. Return is truncated on April, 2011.

Pre-IPO Accruals(DAC)	No. of IPOs	Average 3-year Buy-and-hold return			Average 5-year Buy-and hold return		
		IPOs	Market	Wealth Relative	IPOs	Market	Wealth Relative
Panel A: Quartile Cut-offs							
Quartile 1 (Q1)	12	-11.19	7.82	0.82	-38.13	31.91	0.47
Quartile 2 (Q2)	12	-40.15	0.66	0.59	-46.45	13.28	0.47
Quartile 3 (Q3)	11	-44.25	-26.72	0.76	-63.89	-9.16	0.40
Quartile 4 (Q4)	12	-36.34	-5.16	0.67	-44.81	-6.32	0.59
Panel B: Median Cut-offs							
Below Median	24	-25.67	4.24	0.71	-42.29	22.59	0.47
Above Median	23	-36.89	-15.47	0.75	-53.94	-7.67	0.50

Figure 4.2 presents a simple time-series graph of the average cumulative time-series performance of four portfolios, classified by the pre-IPO accrual (DAC) quartiles. Cumulative returns for the quartiles portfolios are computed as follows: we first cumulate the monthly abnormal market adjusted returns of individual stocks by compounding over time, and then take the cross-sectional average in the quartile to obtain the time-series portfolio returns.

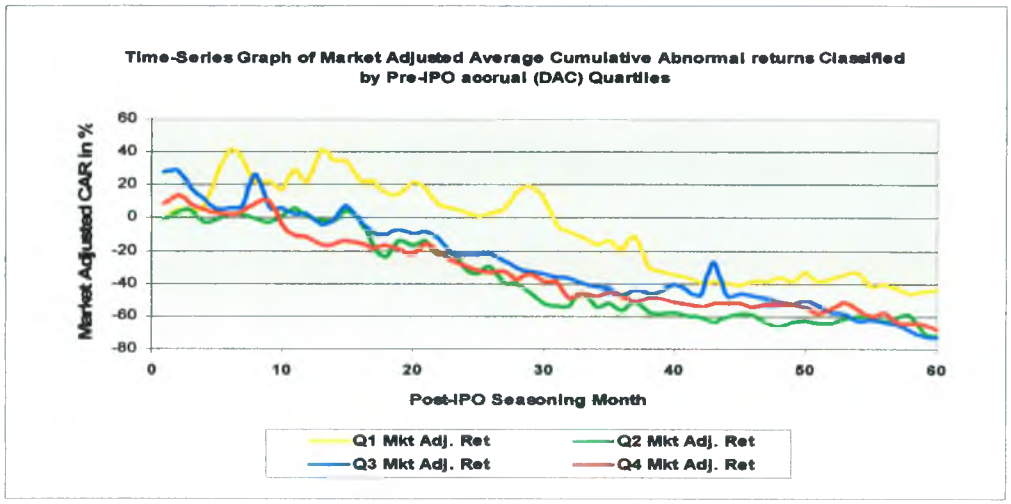


Figure 4.2: Time-series Graph of market Adjusted Average Cumulative Abnormal return classified by Pre-IPO accruals (DAC) quartiles. Unexpected accounting is discretionary accruals in the fiscal year. IPO firms are classified into four quartiles (1 being conservative, 4 being aggressive managers), and cumulative abnormal returns are plotted for each quartile over the 60 month following the IPO. Returns are adjusted using the market benchmark return.

The figure shows that using the market adjusted return, firms with lowest pre-IPO accruals (the conservative quartile portfolio) underperformed by a cumulative of -43.54% in the five years after going public. Where as firms with highest pre-IPO accruals (the aggressive quartile portfolio) underperformed by a cumulative -67.79%. We compute the mean and standard deviation of across the time series realization of each quartile portfolio. The monthly mean (standard deviation) return on the four quartile portfolios are -1.02(6.73), -1.02(4.12), -2.43(8.45) and -1.57(4.49).Thus, the t-statistics against the null hypothesis that the multi –year excess returns are zero -1.16, -1.91, -2.21 and -2.68. This indicates that the conservative quartile portfolio managers experienced insignificant negative post-IPO return, where as the second quartile portfolio managers experience marginally significant negative return and the rest quartiles (relatively more aggressive portfolios) experienced significantly negative post-IPO performance. It implies that when managers manage pre-IPO accruals more aggressively, those firms are more likely to underperform in future.

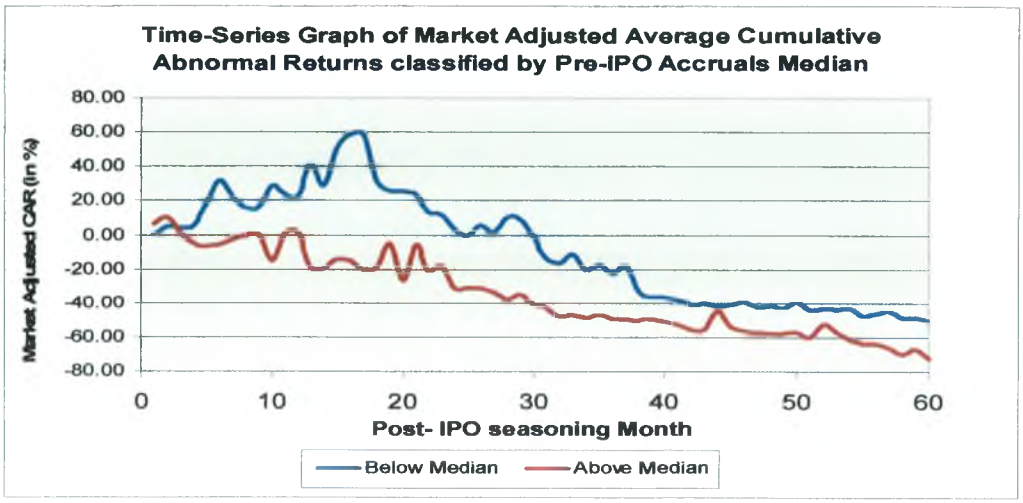


Figure 4.3: Time-Series Graph of Market-Adjusted Average Cumulative Abnormal Returns classified by Pre-IPO Accruals (DAC) Median. Unexpected accounting accruals (DAC) are discretionary accruals in the fiscal year. IPO firms are classified into two portfolios, where the cut-off for the two portfolios is the sample value of median pre-IPO accruals, and cumulative abnormal returns are plotted for each portfolio over the first 60 months following the IPO. Returns are adjusted using the market benchmark return.

In figure 4.3, we also report a plot of the average cumulative time-series performance of the portfolios of blow-and-above-median pre-accruals. The monthly mean (standard deviation) on the time series realization of below-and-above median accrual portfolio are -.949 (6.18) and -2.17 (3.50). The *t*-statistics against the null hypothesis that multi year excess returns are zero are -1.18 and -4.76; suggesting that only more aggressive above median accrual portfolios experienced significantly negative post-IPO returns.

As can be also seen, the portfolio of above median pre-IPO accruals, relatively more aggressive portfolio, significantly underperformed more than the portfolio of below median pre-IPO accruals, relatively less aggressive portfolios.[4] Thus it appears that the overall poor post-IPO performance can, at least partially, be explained by the unusually pre-IPO earnings management by IPO firms.

Table 4.7 reports the cumulative performance of two extreme quartile portfolio and median portfolio by pre-IPO discretionary accruals (DAC), analogous to figure 4.2 and figure 4.3.

The table shows that the returns differential between the conservative pre-IPO accrual quartile 1 (low accruals) portfolio and the aggressive pre-IPO quartile 4 (high quartile) portfolio is 90.03.

[4] Parametric means of difference "*t*-test" show that the difference in the aftermarket performance of these two portfolios is significant from zero at 5% level.

Table 4.7

Average Cumulative Return by pre-IPO Accruals (DAC)

This table documents cumulative return by two extreme pre-IPO accrual quartile portfolios and median accrual portfolios over the first 60 months of seasoning after going public.Q1 refers to the conservative pre-IPO discretionary accrual quartile and Q4 refers to the aggressive pre-IPO discretionary accrual quartile. While below M and above M refer to the below median and above median pre-IPO discretionary accruals respectively. The CAR series is one for return adjusted by the benchmark of the portfolio of the firms. Returns are compounded and cumulated event-monthly, and the 15th day (equilibrium) return is excluded.

Post IPO Month	Market Adjusted Return			
	Below M	Above M	Q1	Q4
10	5.20	-5.70	22.39	3.87
20	10.17	-29.41	10.37	-24.11
30	-13.25	-44.74	7.35	-35.40
40	-44.13	-54.17	-42.41	-54.05
50	-44.90	-59.91	-43.92	-58.50
60	-55.71	-73.02	-55.68	-67.64

4.3.3 Regression of Post-IPO Returns on Accruals and Market Conditions

Table ...presents the results from OLS regression of post-IPO stock price performance on pre-IPO accruals and market conditions. The dependent variable is post-IPO abnormal stock return measured, using the market benchmark, from the 15th trading day closing price to the earlier of five year anniversary or its delisting date. We investigate whether pre-IPO discretionary accruals (***D_accruals***), Unmanaged accruals (***UMA***), short-run Underpricing (**UP**),market conditions(**MkttimingD**), sales growth(**Sales_g**) are systematically related to the long-run performance of IPOs. The results are reported in Table 4.8 of column (i).All the negative coefficients of the variables except sales growth indicates that all these variables negatively affect long-run performance of the IPOs.

Table 4.8

Regression result on Post-IPO Return on Accruals and Market Condition

The dependent variable is the five year post-IPO abnormal returns computed using the 15th day aftermarket trading day closing price as purchase price. Monthly returns for each IPO firms are adjusted by subtracting the market benchmark, and then compounded and cumulated for five years. The independent variables are pre-IPO discretionary accruals, unmanaged accruals, short-run underpricing, and market timing dummy. To adjust for some cross-sectional contemporaneous correlation between securities cumulative return , we include but do not report a complete set of industry dummy and log of offer size.

Independent Variable	**Market Adjusted Return**			
	(i)	**(ii)**	**(iii)**	**(iv)**
Intercepts- (*t*-/Heteroskedasticity corrected-*t*/) (P/ Heteroskedasticity corrected-*P*/)	-36.41 (-2.86/-2.83) (0.003/0.003)	-59.59 (-2.33//-1.30) (.013/.000)	-26.69 (-0.53/-0.81) (0.30/0.212)	-19.91 (-0.38/-0.60) (.351/.276)
D_accruals (*t*-/Heteroskedasticity corrected-/) (*P*-/Heteroskedasticity corrected-P/)	-129.95 (-1.41*/-1.07) (0.083/0.147)	-153.49 (-1.55**/-1.30*) (.065/0.100)	-153.75 (-1.56**/-1.28*) (-.064/.104)	-151.95 (-1.53**/-1.28*) (0.067/0.105)
UMA (*t*-/Heteroskedasticity corrected-*t*) (*P*-/Heteroskedasticity corrected-/*P*)	-85.55 (-.092/-.076) (0.181/0.23)	-189.81 (-1.76**/-1.52**) (0.044/.069)	-164.49 (-1.51**/-1.37*) (.069/.091)	-172.39 (-1.57**/-1.37*) (.063/.089)
UP (*t*-/Heteroskedasticity corrected-*t*/) (*P*-/Heteroskedasticity corrected-/*P*)	-.019 (-0.51/-0.92) (0.306/0.183)	-.029 ((-.063/-0.94) (.265/.177)	----- ----- -----	-.036 (-0.77/-1.08) (.223/.143)
MkttimingD- (*t*-/Heteroskedasticity corrected-*t*/) (*P*-/Heteroskedasticity corrected-/*P*)	-3.106 (-0.17/-0.16) (0.43/0.44)	-8.99 (-0.45/-0.44) (0.33/.033)	-15.209 (-0.75/-0.86) (0.228/.198)	-12.56 (-0.61/-0.65) (0.273/0.261)
Sales_g (*t*-/Heteroskedasticity corrected-*t*/) (*P*-/Heteroskedasticity corrected-/*P*)	5.57 (1.48**/3.20***) (0.074/0.001)	6.42 (1.52**/2.85***) (0.069/0.003)	6.74 (1.61**/3.18***) (0.059/.001)	6.33 (1.49**/2.97***) (0.073/.002)
Industries Dummies **Ln offsize** (*t*-/Heteroskedasticity corrected-*t*/) (*P*-/Heteroskedasticity corrected-*P*)	-- --	Full set not reported	Full set not reported	Full set not reported -9.238 (-0.88/-1.19) (0.192/0.121)
R^2 **Adj. R^2** ***F*-statistics** **N**	-0.119 0.0120 0.369 47	0.2426 -0.0247 0.549 47	0.2600 -0.0315 0.569 47	0.2600 -0.0315 0.569 47

Note : ****, ** and * indicates significance at 1%, 5% and 10% level respectively.

The findings of the cross sectional regression of accruals and Market Conditions:

- ***D_accruals:*** Discretionary accruals (D_accruals) are the proxy for earning management. Higher the earning management by the managers higher the long-run underperfromance.The coefficient estimate is negative in all the models of the regression and significant. So discretionary accruals has significant impact on long-run performance.

- ***UMA*** : *UMA* is the proxy for unmanaged accruals. Given the business conditions typically faced by the firm in the industry, some accrual adjustments are appropriate and necessary, and so are expected by investors. Nondiscretionary accruals or unmanaged accruals are the asset-scaled proxies for unmanipulated accruals dictated by business conditions. So it is expected that unmanaged accruals should have negative relationship. The coefficient estimate is negative in all the models of the regression and significant in model (ii),(iii) and (iv).So it can be inferred that higher the unmanaged accruals higher the long-run underperformance.

- ***UP***: *UP* is the proxy for short-run underpricing.The coefficient estimate is negative in all three models but not significant.

- ***MkttimingD***: *MkttimingD* is the proxy for market condition. The negative coefficient of MkttimingD implies that in the long-run, there is a weak tendency among bullish market issues performing poorly compared to bearish market issues. Note that the coefficient is not significant.

- ***Sales_g***: The sales growth (*Sales_g*) coefficient is significantly positive in all the regression model. It implies that sales growth has strong positive impact on long-run underpricing. Higher the sales growth higher will be the stock returns.

In model (ii), (iii) and (iv) we do not report, but include a set of control variable to demonstrate that discretionary accruals, unmanaged accruals, market condition and sales growth effect is unique and novel. As in Ritter (1991) and Loughran and Ritter(1995) , that there is a variation in the post-IPO performance across industries. Consequently we

include a complete set of industry dummies. In model (iii), the underpricing (*UP*) dummy variable is dropped considering the notion that its effect would probably be captured by the introduction of industry dummies. Furthermore log of offersize variable is added for controlling firm characteristics in our regression, model (iv).We report only the coefficient estimate and statistics associated with pre-IPO discretionary accruals, unmanaged accruals, underpricing, market timing dummy and sales growth, log of offersize variable.

Our regression result indicates that discretionary accruals, unmanaged accruals and sales growth are statistically significant. This implies that firms that aggressively managed pre-IPO accruals aggressively in boosting pre-IPO earnings performed significantly worse in the aftermarket. The strong significant positive sales growth coefficient implies that higher the sales growth superior will be the performance of that firm in future.

4.4 Conclusions

This chapter has investigated the firms' timing ability proposition that has been offered as one of the explanations for long-run underperformance of IPOs.We find that bearish market issues performed poorly than those issued in a relative bullish market. It suggests that underperformance is more prevalent among firms that went public under relatively bearish market conditions. This phenomena is not consistent with the firms' timing ability proposition put forward by Ritter (1991) and Lougran,Ritter and Rydqvist(1994).

However, the fact that we find no significant difference in the post-issue performance of IPOs issued either in a buoyant market or in a sluggish market. It sheds some doubt on the ability of the Bangladeshi IPO firms to time their offerings in order to take advantage of 'windows of opportunity'.

This chapter has also examined whether pre-IPO earning management, measured by discretionary accruals, can explain the long-run post-issue return underperformance of IPOs. In previous study conducted by (Imam & Jaber) found that entrepreneurs of IPOs coming to the market during 1991-2000, behaved myopically in boosting earnings in the year prior to going public. But their objective of the study was to test the value relevance hypothesis in IPOs which states that ***"Pre-IPO earnings management by issuers is***

positively related to firm's initial value." But in this study we have aimed to test whether there exists any relation between subsequent firms under performance and earnings management i.e., the long-run market performance of initial public offering firms, which is termed as disappointment hypothesis.

We find that in the long run, IPOs performed poorly when managers aggressively manage pre-IPO discretionary accruals of these firms to report high pre-IPO earnings than when they manage pre-IPO discretionary accruals conservatively. Using the market adjusted return, the most conservative quartile firms (firms with lowest pre-IPO accruals) earned a five year insignificant return of -55.68%.In contrast, the most aggressive quartile firms(firms with the highest pre-IPO accruals) earned a five year significant cumulative abnormal return of -67.64%. Notably, we find that pre-IPO discretionary accruals are good predictors of the post-IPO return performance of Bangladeshi IPOs.

Our evidence suggests that investors failed to properly adjust for pre-IPO discretionary accruals component of earnings and hence their valuations appear related to pre-IPO earnings performance that they naively extrapolated to the future. Under this interpretation, the failure to adjust properly for pre-IPO accrual component of earnings led investors to have high initial expectations of firms' future earning growth, and subsequent revelation about the actual accruals caused a downward correction in stock price.

There is a common view about earnings management and stock issues. The view holds that some firms opportunistically manipulate earnings upward before stock issues. According to this opportunism hypothesis, investors are deceived and led to form overly optimistic expectations regarding future, post-issue earnings. Thus, offering firms would be able to obtain a higher price than they otherwise would for their stock issue, but subsequent earnings would tend to be quite unsatisfactory. This view emphasizes the incentives that entrepreneurs, venture capitalists, and managers have to maximize issue proceeds, given the number of shares offered. Ritter (1991) provided empirical evidence that IPO firms' stock returns are significantly less than those of a matched sample of non-IPO firms over the three-year period after offering. One possible explanation for this finding is that entrepreneurs mislead investors by earnings management. Jain and Kini

(1994) examined accounting measures of operating performance of IPO firms. They found that firms exhibit a decline in operating performance after their IPOs. They suggested that potential investors may initially have high expectations of future earnings growth that are not subsequently fulfilled.

Teoh and Wong (1997) interpreted abnormal accruals as a measure of earnings management, reported evidence that is consistent with analysts being misled by opportunistic earnings management by new equity issuers (both IPOs and SEOs). Teoh, Welch and Wong (1998a) compared the level of accruals of IPO and non-IPO firms around the issuing date. They found a significant difference in the level of accruals between both categories. DuCharme *et al* (2002) find that accruals are abnormally high around stock offers. These accruals tend to reverse after stock offers and are negatively related to post-offer stock returns. Xie(2001) reports that abnormal accruals are negatively correlated with subsequent stock returns in the population of firms. Therefore, the relationship between abnormal accruals and post-offer stock returns appears to be part of a more general empirical regularity.

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Appendix 4.1

Empirical Model to Test the Earnings Management Detection Hypothesis

Researchers have investigated two venues of earnings management: (i) the choice of accounting methods, and (ii) the management of accruals.

This paper focuses in management of accruals approach because accruals reflect not only the choice of accounting methods but also the effect of recognition and timing of revenues and expenses, asset write-downs and changes in accounting estimates. In this study total accruals are analyzed separating into two parts – discretionary (managed) accruals and non-discretionary (unmanaged) accruals.

Jones (1991) suggested cross-industry approach as well as time series approach to decompose accruals into normal (unmanaged) and abnormal (managed) components. DeFond and Jiambalvo (1994) used both Jones' time series model and a modified cross-industry model in their investigation of earnings management near to debt covenant violations. They reported that the magnitudes of the coefficients from the cross-sectional models were quite similar to those obtained from the time-series models, and that their conclusions were the same under either estimation method.

Accruals depend upon the economic conditions faced by firms (Kaplan, 1985). The cross-industry models control for economic factors that influence accruals using the same independent variables as Jones' time-series model. For each relevant industry, accruals are regressed on the control variables taking data from one year prior to the IPO. This regression model provides the benchmarks for the unmanaged or normal accruals. These benchmark coefficients along with the data of the IPO firm give us the unmanaged accruals of the IPO firm. We then get the managed accrual by subtracting unmanaged accruals from total accruals. The standardized cross-sectional model that was used by Teoh, Welch and Wong (1998) is as follows:

$$TAC_{iy}/TA_{iy-1} = a_{oj}\,[1/TA_{iy-1}] + a_{1j}\,[\Delta REV_{iy}/TA_{iy-1}] + a_{2j}\,[PPE_{iy}/TA_{iy-1}] + e_{iy} \qquad [1]$$

Where,

TAC_{iy} = Total accruals (net income before extraordinary items minus cash flow from operations) in the year 'y' for the 'i-th' firm in the industry group matched with offering firm 'j'.

TA_{iy-1} = Total assets prior to the year 'y' for the 'i-th' firm in the industry group matched with offering firm 'j'.

ΔREV_{iy} = Change in revenues in the year 'y' for the 'i-th' firm in the industry group matched with offering firm 'j'.

PPE_{iy} = Gross property, plant and equipment in the year 'y' for the 'i-th' firm in the industry group matched with offering firm 'j'.

e_{iy} = Regression disturbances, assumed cross-sectional uncorrelated and normally distributed with mean zero.

We get the values of the coefficients from regression of the model. Then putting the data of the IPO firms with these coefficients' values and subtracting from total accruals we get the managed portion of accruals as a fraction of total assets. The following model is called by DuCharme, Malatesta and Sefcik (2000) as the 'Forecast Error Model'.

$$TAEM_{jy} = [TAC_{jy}/TA_{jy-1}] - a_{oj}\,[1/TA_{jy-1}] - a_{1j}\,[(\Delta REV_{jy} - \Delta REC_{jy})/TA_{jy-1}] - a_{2j}\,[PPE_{jy}/TA_{jy-1}] \quad [2]$$

Where,

$TAEM_{jy}$ = Managed component of total accruals.

ΔREC_{jy} = Changes in accounts receivable.

The term ΔREC_{jy} is subtracted from the change in revenues because offering firm may inflate sales through easy credit policies.

Dechow (1994) showed that accruals are negatively associated with contemporaneous components of cash flow from operation. Her results suggested that cash flows are useful in determining expected accruals and she concluded that future research should consider inclusion of cash flows in models identifying them. Therefore, if we include operating

cash flow from operation among the variables in 'Forecast Error Model' we get the 'Cash Flow Model' to estimate managed accruals.

$$TAC_{iy}/TA_{iy-1} = a_{oj}\,[1/TA_{iy-1}] + a_{1j}\,[\Delta REV_{iy}/TA_{iy-1}] + a_{2j}\,[PPE_{iy}/TA_{iy-1}] + a_{3j}\,[\Delta CFO_{iy}/TA_{iy-1}] + e_{iy} \quad [3]$$

Where,

ΔCFO_{iy} = Changes in cash flow from operation.

Chapter 5

Earning Forecast Error and Long-Run Underperformance

5.1 Introduction

Two well documented anomalies related with initial public offerings are short term underpricing and long-run underpricing. In earlier chapters we have documented the short-run underpricing and its determinants and long-run underpricing phenomena. While documenting the long-run underperformance in the prior chapter we found that firms experience usually low stock return in the five years following equity offerings in Bangladesh. The long-run underperformance effect is 10.19% per year. But the causes of this long-run underperformance are an unresolved issue. Competing explanations include risk mis measurement, research design biases, and overly optimistic expectations about future firm performance. Rajan and Servaes (1997) documented over optimism in analysts' long-term forecasts around initial public offerings (IPOs) and find that the firms with the highest forecast experience the greatest post-IPO under performance. However, Rajan and Servaes do not attempt to explain the post-IPO under performance with the over optimism in firms' earning forecasts.

But in this section, we examine the conjecture that managerial earning forecast error is associated with long-run price performance of those IPOs suggesting that investors regard these forecasts as credible signal (e.g. Penman, 1980, Waymire, 1984, Pownall and Waymire, 1989). Forecast error is the deviation of actual earning from the forecasted earning published in the prospectuses during floataion. Hence the conjecture is, larger the forecast error greater the underperformance of IPOs. Bangladeshi Companies making Initial public offerings during 1991-1998 in Bangladesh often included earning forecast of the next three to five years' performance in their IPO prospectuses. The forecast is used by the investors to help them value the company; decide whether to subscribe in the new issue. The accuracy of the forecast is very crucial if the forecast is to be used as credible signal. Firth (1998) demonstrates that profit forecasts can be an extremely important signal of company valuation, and public disclosure of forecasts can reduce information asymmetry between managers and investors, and hence lower agency costs. Profit forecasts are the major valuation parameter for IPOs and so knowledge of the general level of forecast accuracy is important for investors, regulators, and policy

makers. Hence the motivation of this section is to measure the extent of forecast error or the extent of deviation in Bangladeshi IPOs and investigate whether this forecast error can explain the for long-run underperformance phenomena. No prior research has been done to measure the accuracy of the forecast in Bangladeshi IPOs and a need to make a new study is warranted to shed more light on the issue.

In our study we find the evidence that firms with highest forecasting error quartile performed worst in three years after going public. Our result shows that the mean absolute forecast error of IPO profit forecasts in Bangladesh is 90%.This implies actual profits are 90% greater than forecast or 90% lower than forecast. This finding is lower than the forecast error in New Zealand (100%) [Firth & Smith (1992) and Mak (1989)]. Lee et al. (1993) reported larger forecast errors in Australian IPOs. The mean absolute forecast error was 994%[1].Keasey and McGuinness (1991) found that, on average, profit forecasts in British prospectuses were more accurate than in Australia and New Zealand. Pedwell et al.,(1994) shows that in Canada the mean absolute IPO forecasts error is 88%.Chan et al. (1996) and Jaggi (1997) using data from Hong Kong reported that the mean absolute forecast errors of 18% and 12.86%.Hence the magnitude of forecast error is mixed across the world.

Using the market adjusted returns of Bangladeshi firms from 1991-1998[2], the most conservative quartile firms (firms with the lowest forecasting errors)) outperformed the market benchmark by a cumulative 8.75% in the three years after going public. In contrast, the most aggressive quartile firms (firms with highest forecasting error) significantly underperformed by a cumulative -61 50% in the three years after going public. Thus our result indicates that there is an incentive for the management of Bangladeshi companies to inflate the earnings forecasts disclosed in the IPO prospectus. A significant overestimate of earnings forecast may mislead investors. But over time when actual information is revealed in the financial statements it causes a downward correction in the stock price. Hence the result indicates that greater the forecast errors greater the underperformance of those companies after floatation.

[1] The very large mean errors were due in part to small profit forecasts used to scale the errors (i.e.small denominator).
[2] Profit forecast were not published in the IPO prospectuses that came in the market after 1998.And the in most of the cases the companies published profit forecast for three years.

5.2 Methodology and Estimation Procedure

5.2.1 Estimation Procedure of Earning Forecast Error

Adopting the methodology of Chen *et al* (2001) the absolute forecast error (AFE) is defined as the actual earning minus the forecasted earnings, scaled by forecasted earning; the sign of the error is ignored when computing AFE. AFE represents the magnitude of the error while the average forecast error (inclusive of sign) measures the bias in forecasts The forecast error for company (i) for the year of the IPO (t) is calculated as:

$$FE_{it} = (AP_{it} - FP_{it}) / |FP_{it}|$$

where FE is profit forecast error for the company i ; AP, actual profit for the company; FP, profit forecast as given in the IPO prospectus. The mean forecast error (MFE) measures the bias in forecasts. A positive value for MFE implies that on average IPO companies have a pessimistic bias (firms' under-forecast) while a negative value for MFE represents an optimistic bias (firms over-forecast). Taking the absolute value of the forecast errors (FEs) gives the absolute forecast error (AFE) for each IPO. AFE is the major metric used to evaluate forecast accuracy. The mean of the absolute forecast errors, denoted as MAFE, represents the overall accuracy of IPO profit forecasts.

The conjecture about earning forecast error is that whether the forecast errors are systematically related to future stock performance. We judge the predictability of forecasting errors for post-IPO performance. While estimating the earning forecast error, we have taken net earnings (NI) as a proxy for earnings of the IPO issuing firms.

5.2.2 Predicting Post-IPO returns with Earning Forecast Error through Panel Regression Analysis

We have computed the earning forecast error for successive 3 years period for each firm after floatation. As we are dealing with panel data we want to measure whether there is any impact of earning forecast on post-IPO market adjusted return. In other words we are testing the following proposition "can the poor long-run performance of IPO be attributed to earning forecast error?"

The panel data model is applicable where number of observation is large, and number of time period is small. In our case, number of observation is 55 and time period is 3 years.

Basic Equation: $Y_{it} = X_{it}\beta + Z_{it}\gamma + \alpha_i + \eta_{it}$

Where, Y_{it} = Long-Run Market Adjusted Performance

X_{1t} = Forecast Error.

X_{2t} = Size

Z_{it} = Industry Dummies

ε_{it} =Disturbance term = $\alpha_i + \eta_{it}$

We assume that $\acute{\eta}_{it}$ is uncorrelated with X_{it}. α_i is called an individual effect. In Fixed effect model, α_i varies across individuals or the cross sectional unit but is constant across time. Here α_i is correlated with X_{it}.

In random effect model, α_i is uncorrelated with X_{it}. And $\acute{\eta}_{it}$ varies unsystematically across time and individuals.

We have shown relation between forecast error and long-run underperformance using both the models. Besides Generalised Least Square (GLS) for panel data is also run for predicting post-IPO returns with earning forecast error.

5.2.3 Data and Sample Characteristics

99 Bangladeshi firms (IPOs) went public during 1991-2007. However, we use a sample of 55 firms going public in Bangladesh during this period for the purpose of study of this chapter. This reduction of sample size from 99 to 55 is due to non availability of forecasted earnings in the prospectuses.

Earning forecast error has been estimated by taking the difference between the forecasted earnings and actual earnings for three years subsequent to the IPO issuing period. The sample characteristics of firms after three years of going public are reported in table 5.1.

Table 5.1

Descriptive Characteristics of Earning Forecast Error for the sample of 55 IPOs during the period 1991-2007

Earning Forecast Error of Firms	Post IPO Offering Year		
	1	2	3
Mean	0.77	0.78	0.90
Median	0.75	0.81	0.89
Standard Deviation	0.40	0.40	0.41
Maximum Value	2.04	1.70	2.21
Minimum value	0.06	0.05	0.04

The Table 5.1 reports that mean and median earning forecast error is gradually increasing over the years under observation. It indicates longer the firm's forecast horizon greater the forecast error In the third year it is 0.90 and the standard deviation is also very consistent along with the result.

Table 5.2 reports the actual and forecasted EPS of IPO firms three years after going public.

Table 5.2

Descriptive Characteristics of Actual and Forecasted EPS.

Particulars	Actual EPS			Forecasted EPS		
Post IPO Offering Year	1	2	3	1	2	3
Mean	12.46	13.52	9.27	24.99	44.47	58.22
Median	7.20	8.08	3.75	22.46	37.27	45.27
Standard Deviation	16.67	24.58	31.38	17.69	35.95	56.00
Maximum Value	85.23	106.27	142.84	68.62	259.48	348.55
Minimum value	-7.64	-23.29	-91.25	-27.00	1.73	0.00

It is observed in the table 5.2 the mean forecasted EPS is increasing more than the increase in actual EPS along with the years. It indicates that managers of IPO firms exhibited over optimism in their forecasts in longer horizon while selling their issues.

For our test, we divide IPO firms into four quartiles according to their forecast errors and compare them with three year market adjusted returns for the IPOs in different quartiles. Quartile 1, represents the firms with smallest forecast error, and referred to as

conservative quartile. Quartile 4, represents the firms with largest forecast error, and referred to as aggressive quartile. We also divide the post-IPO returns classified by the median of the forecast error. Table5.3 presents the cut-offs, means and standard deviations for four quartiles in panel A formed on the basis of the cross-sectional variation in forecast errors. The mean absolute forecast error for most conservative quartile (Q1) is 46%, and for the aggressive quartile (Q4) it is 142%.

Table 5.3

Quartile and Median cut-offs of Earning Forecast Error

This table presents the cut-offs and mean/standard deviation of the four quartile portfolios in panel A, and two median portfolios in panel B, both formed by sorting on forecast error. Absolute forecast error (AFE) is defined as the actual profit minus the forecast profit, scaled by forecast profit; the sign of the error is ignored when computing AFE. Quartile 1 is the most conservative portfolios with lowest forecast error, whereas quartile 4 is the most aggressive portfolio with the highest forecast error

Panel A : Earning Forecast Error(AFE) quartile cut-offs				
	Earning Forecast Error	**Mean**	**Std.Dev**	**No**
Quartile 1 (Q1)	Less than 0.71365	0.46	0.21	15
Quartile 2 (Q2)	0.71365 to 0.8944	0.83	0.06	14
Quartile 3 (Q3)	0.8944 to 1.0329	0.94	0.04	13
Quartile 4 (Q4)	Greater than 1.0329	1.42	0.39	13
Panel B : Earning Forecast Error(AFE) median cut-offs				
Below Median	Less than 0.89280	0.64	0.24	28
Above Median	Greater than .89280	1.17	0.37	27

5.3 Post-IPO Returns by Earning Forecast Error

Earnings forecast contained in prospectuses for initial public offerings (IPOs) provide useful information about future firm performance (Firth, 1998). Kim and Ritter (1999) show that the forecasted accounting information has higher explanatory power compared to the historic information. Other studies show there is a positive relationship between the earnings (historic and forecasted) and the share price. Therefore, there is an incentive for the management to inflate the earnings forecasts disclosed in the IPO prospectus Management often may have incentives to overestimate earnings forecast for the purpose of raising more proceeds from an IPO. A significant overestimate of earnings forecast may mislead investors. Thus the credibility of management earnings forecast contained in IPO prospectuses has been a major concern for market participants.

As such, we examine another conjecture that managerial earning forecast is associated with long-run price performance of those IPOs. In doing so we have measured the extent of forecast error in Bangladeshi IPOs (1991-1998) and investigate whether this forecast error can explain the for long-run underperformance phenomena.

For our tests, IPO firms are classified into for quartiles according to their earning forecast error and post-IPO stock price performance for the IPOs in the different quartiles are compared and analyzed. In panel A of Table 5.4, we present three year buy-and hold returns and wealth relatives for the portfolios of earnings forecast errors. The wealth relatives indicate that the fourth quartile(Q4) IPOs i.e. IPOs with highest earning forecast errors performed worst in three years after going public. In addition, we report the post-IPO return performance of two portfolios in panel B of Table 5.4 where the cut-off point is the sample median value. The result indicate that the in the long-run, above median portfolio (more aggressive portfolio) performed better than below median portfolio(less aggressive portfolio).

Table 5.4

Long-Run Performance Categorized By Earning Forecast Error

Absolute forecast error is the deviation of actual earnings from the forecasted earnings published in the prospectuses during floatation in the third year after floatation. IPO firms are classified into four quartiles (1 being conservative, 4 being aggressive managers) in panel A, and into two portfolios in panel B where the cut-off for these two categories is the sample median value of absolute forecast error. The five-year buy-and-hold return for firms going public is calculated excluding the initial return. Wealth relatives are calculated as $[(1/N\sum(1+R_{\pi}))/1/N\sum(1+R_{mT}))]$, where R_{π} is the holding period return from the 15th day closing price until the earlier of the delisting date or the five year anniversary of the IPO. R_{mT} is the holding period return on the market over the same holding period, and the summation are over the N observations in each calendar year. Return is truncated on April, 2011.

Forecast Error (NI)	Number of IPOs	Average 3-year Buy-and-hold return		
		IPOs	Market	Wealth Relative
Panel A: Quartile Cut-offs				
Quartile 1 (Q1)	**15**	-4.01	48.94	0.64
Quartile 2 (Q2)	**13**	-15.48	-18.36	1.04
Quartile 3 (Q3)	**13**	-11.78	-23.88	1.16
Quartile 4 (Q4)	**14**	-70.48	-37.09	0.47
Panel B: Median Cut-offs				
Below Median	28	-7.33	21.63	0.76
Above Median	27	-42.27	-29.05	0.81

Figure 5.1 presents a simple time-series graph of the average cumulative time-series performance of two portfolios, classified by the earning forecast errors quartiles.

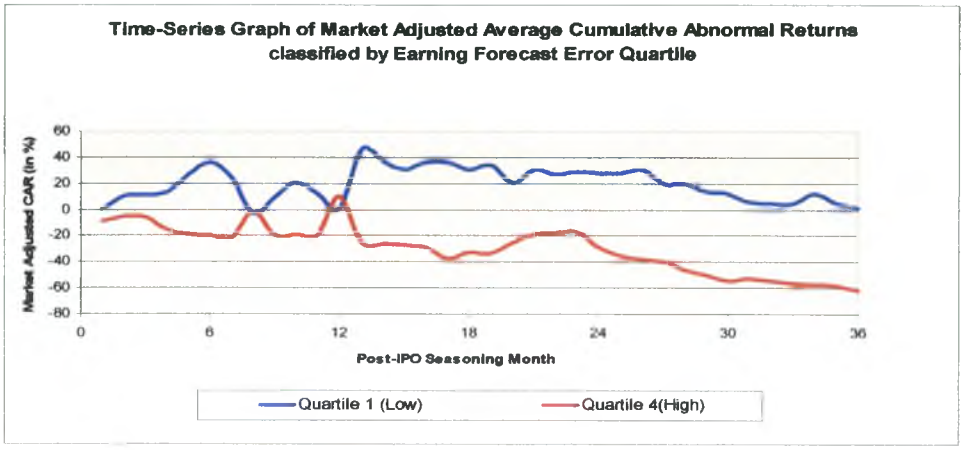
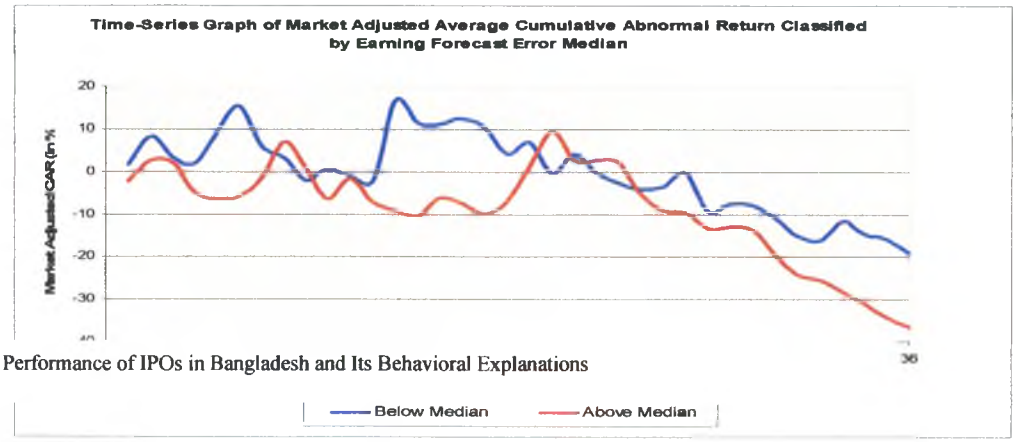


Figure5.1: Time-Series graph of Market Adjusted Average Cumulative Abnormal Returns classified by Earning forecast Error Quartiles. Earning forecast error is computed as the deviation of actual earning from the forecasted earning published in prospectuses during the time of flotation.

The figure shows that using market adjusted return firms with lowest earning forecast error(AFE) outperformed the market by a cumulative 1.76% in the three years after going public, where as firms with the highest earning forecast error underperformed by a cumulative -61.49%.The monthly mean (standard deviation)[3]n return on the lowest and highest quartile portfolios are 0.542(8.10) and 1.79(7.36).Thus the *t*-statistics against the null hypothesis that multi-year excess returns are zero are 0.401 and -1.46. However, we have also calculated the monthly return for second and fourth quartile. As the results are not statistically significant we do not report the result in this chapter



Price Performance of IPOs in Bangladesh and Its Behavioral Explanations

Figure5.2: Time-Series Graph of Market-Adjusted Average Cumulative Abnormal Returns classified by earning forecast error Median. Earning forecast error is the deviation of actual earnings from the projected earnings in the third fiscal year. IPO firms are classified into two portfolios, where the cut-off for the two portfolios is the sample value of absolute forecast error (AFE) median, and cumulative abnormal returns are plotted for each portfolio over the first 36 months following the IPO. Returns are adjusted using the market benchmark return.

[3] While computing standard deviation, first-order auto covariance of monthly return series is also accounted for.

In figure 5.2 we also report a plot of the average cumulative time-series performance of the portfolios of below-and-above-median earning forecast error. The monthly mean (standard deviation) on the time series realization of below-and-above median forecast error portfolios are -0.521 (3.87) and -1.11 (5.31). The *t*-statistics against the null hypothesis that multi year excess returns are zero are -0.652 and -1.26, suggesting that the portfolios with higher forecast error (above median portfolios) experienced higher negative underperformance after three years of floatation but the result is not significant.

As can be also seen, the portfolios of above median forecast errors, underperformed more than the portfolio of below median forecast errors i.e. relatively less aggressive portfolios.

The table 5.5 reports the cumulative performance of two extreme quartile portfolios and median portfolio by Earning Forecast Error (AFE).The table shows that the return differential between the conservative earning forecast error quartile (Q1) portfolio and aggressive earning forecast error quartile (Q4) portfolio is 70.25%.

Table 5.5

Average Cumulative Return by Earning Forecast Error

This table represents average cumulative return by two extreme Earning Forecast Error (AFE) quartile portfolio and median accrual portfolios over 36 months of seasoning after going public.Q1 refers to the conservative Earning Forecast Error quartile and Q4 refers to the aggressive Earning Forecast Error quartile. While below M and above M refer to the below median and above median earning forecast error respectively. The CAR series is one for return adjusted by the benchmark of the portfolio of the firms. Returns are compounded and cumulated event-monthly, and the 15th day (equilibrium) return is excluded.

Post IPO Month	Market Adjusted Return			
	Below M	Above M	Q1	Q4
6	15.50	-5.83	35.90	-19.75
12	-2.46	-7.15	9.83	-23.41
18	4.27	-7.01	30.95	-32.43
24	-1.99	-5.03	34.21	-28.39
30	-8.67	-19.47	18.11	-54.21
36	-16.40	-36.41	8.75	-61.50

5.3.3 Regression of Post-IPO Returns on Earning forecast Error

To investigate whether there is any systematic relation between long-run performance of IPOs and forecast error we used several panel regression models .The results of those regression models are provided below. For running the regression we have used panel

data. Panel data is used where number of observation is large and number of time period is small. In our case number of observation is 55 and time period is 3.

The dependent variable in the regression model is post-IPO abnormal stock return measured, using the market benchmark, from the 15th trading day closing price to the three year anniversary. And the independent variable is earning forecast error of IPO firms and size.

The following tables present the panel regression estimate from Random –effect GLS model , Random- Effect ML model, Fixed effect Model and Cross-sectional time-series FGLS model. Table 5.6 presents panel regression estimates of Earning forecast error and size on post-IPO market adjusted return using random effect GLS model after controlling for industry dummies. The size variable have been proxied by the log of market capitalization

The coefficient estimate of earning forecast error is negative implying that higher the forecast error of earnings in the three successive periods after going public will result in lower the performance of IPOs in long-run. And the positive coefficient of size suggests that larger the size higher the return of IPO firms in the after market.

Table 5.6

Panel regression estimates using Random Effect GLS Model

Variables	**Coefficient**	***t*-value**	**P>ItI**
Forecast error	-22.33	-2.42	0.015
Size	14.23	2.20	0.028
Industry Dummies	Not reported		
Constant	-90.14	-1.80	0.071
R squared within 0.1314		Number of observation:165	
R squared between .2642		Wald $chi^2(11)$:30.96	
R squared overall .2345		Prob>chi^2 :0.001	

Table 5.7 reports panel regression estimates of Earning forecast error and size on post-IPO market adjusted return using Random Effect Maximum Likelihood Model. In this model we have also controlled the industry dummies. The regression result shows that the forecast error coefficient is significantly negative and the size coefficient is significantly positive. The interpretation is that forecast error has strong negative impact on the post-IPO return and size has significant positive impact on post-IPO return

Table 5.7

Panel regression estimates using Random Effect Maximum Likelihood Model

Variables	Coefficient	*t*-value	P>ItI
Forecast error	-22.78	-2.51	0.012
Size	12.56	1.97	0.049
Industry Dummies	Not reported		
Constant	-81.178	-1.72	0.085
Num of observation: 165 LR chi^2 (11)) : 31.31 Prob>chi^2 : 0.0011			

Table 5.8 reports Cross-sectional Time-Series FGLS Regression and forecast error coefficient [z value -2.09(p-0.037)] is negative and significant. But the size coefficient is positive but not significant.

Table 5.8

Cross-Sectional Time-Series FGLS Regression (Homoskadastic)

Variables	Coefficient	*Z*-value	P>ItI
Earning Forecast Error	-25.72	-2.09	0.037
Size	2.27	0.46	0.644
Industry Dummies	Not reported		
Constant	-25.91	-0.74	0.457
Num of observation:165 Wald chi^2(11): 56.98 Prob>chi^2 : 0.00			

Table 5.9 reports Cross-Sectional Time-Series FGLS regression after controlling for heteroskadasticity problems. Here the earning forecast error coefficient is negative and the associated Z-value is -3.98 (p=0.000) Size coefficient is positive and significant. It indicates that earning forecast error has negative significant relationship with long-run aftermarket return of IPOs and size coefficient has significant positive relationship with long-run return of IPOs.

Table 5.9

Cross-sectional time-series FGLS Regression (Heteroskadastic)

Variables	Coefficient	*Z*-value	P>ItI
Earning Forecast Error	-21.74	-3.98	0.000
Size	5.16	2.17	0.030
Industry Dummies	Not reported		
Constant	-46.77	3.47	0.001
Num of observation:165 Wald $chi^2(11)$: 58.82 Prob>chi^2 : 0.000			

The above model yields a variety of likelihood ratio indices, which are indicators of overall explanatory power of the model(analogous to the R^2 in a multiple regression model)The explanatory power of our model is very strong and most of the independent variable achieve statistical significance. In addition, predictive ability of the models is very powerful. However, the likelihood ratio chi-squared test statistics for testing joint significance of the explanatory variables in all models (i.e.H_0: $\beta_1=\beta_2=.....\beta_k=0$ and H_0: $\gamma_1=\gamma_2=.....=\gamma_k=0$)shows that collectively the variables included in the models provide significant explanations of the likelihood that earning forecast error to be a cause of long-run poor aftermarket performance of IPOs. This implies that firms that reported their earning with overoptimistic forecast in their prospectuses in time of IPO floatation performed significantly worse in the aftermarket. The strong significant negative earning forecast error coefficient implies that higher the forecast error worst will be the performance of that firm in future.

5.4 Conclusion

The prospective earnings multiple is highlighted in the prospectus of IPOs. Previous research has shown that the earning forecast is the most important valuation parameter for the market price of a newly listing stock (Firth, 1998). The accuracy of the forecast is a crucial attribute of the forecast, as it contains information. This study seeks to examine whether long-run poor stock price performance can be explained by earning forecast errors.

We find that in the long run, IPOs performed poorly when managers reported their earnings with overoptimisim in their prospectuses than when they reported earnings with more accuracy. Using the market adjusted return, the most conservative quartile firms (firms with lowest forecast error) earned a three year return of 8.75% In contrast, the most aggressive quartile firms(firms with the highest earning forecast error) earned a three year cumulative abnormal return of -61.50%. Besides we find that long-run IPO after market performance have systematic significant relation with forecast errors. Notably, we find that earning forecast errors are good predictors of the post-IPO return performance of Bangladeshi IPOs. So it can be inferred that long-run poor performance can be partially explained by earning forecast error in case of Bangladeshi IPOs.

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Chapter 6

Summary of Findings and Concluding Remarks

The main objective of this research study is to focus on price performance of IPOs in Bangladesh and to investigate its behavioral explanations. The first topic in the dissertation deals with documenting underpricing phenomenon and analyzing the degree of underpricing In doing so we have first identified the equilibrium price adjustment day of financial and non financial sector and also examined the degree of underpricing, underpricing differentials across different year, industry, determinants of underpricing, floatation cost of nonfinancial and financial sector, overshooting behavior etc. The degree of underpricing on the initial day from the offer price for non financial sector was found to be 92.54% and in case of financial sector it is 146.47%.The equilibrium price adjustment day was found to be 15th day in case of non financial sector and 21st day in case financial sector. The degree of underpricing on equilibrium price adjustment day for non-financial and financial issues was 84.29% and 136.94% respectively. We have made an effort to calculate the floatation cost for both the sectors. And we found that the floatation cost of non financial sector is higher than that of financial sector. And the difference is statistically significant. In order to find out the determinant of underpricing we have used a cross sectional regression model. Controlling for industry effects and incorporating some well known proxies for reputation, information signaling, uncertainty, size and excess demand, oversubscription, free float, offersize and aftermarket standard deviation, were found to be the significant determinants of underpricing. In our study we have made a small endeavor to assess whether there is any existence of fads in the market. The first day overshooting/overreaction for IPOs in Bangladesh that came in during 1991 to 2007 is 8.25% on an average. In analyzing fads in our market, we have made another cross sectional regression for explaining overshooting behavior. We find the evidence of the existence of overshooting behavior on the first day in the market.

The second research topic in this dissertation deals with the investigation of long-run stock price performance of initial public offerings. We provide evidence of long-run poor performance of IPOs from the Bangladeshi market. Firms that went public during 1991-2007 significantly underperform the market benchmark, in five years after going public. This underperformance is 10.19% per year. The magnitude of this underperformance is economically important: based on holding period realized return an investor buying IPOs in aftermarket equilibrium trading price (15th day price), would have to invest 50.48%

more money, than if market portfolio were purchased at the same time in order to achieve the same terminal wealth five years later.

We find evidence that initial return have no systematic relationship with long-run performance, implying that no long-term reversals have been observed. However, we find that companies with highest market adjusted initial return have done worst in the aftermarket. This evidence is consistent with the Shiller's 'fads hypothesis'. The general pattern of underperformance seems to be robust to offersize, company size at the time of floatation. We observed that there are some temporal variations and some variations across industries in long-run performance of IPOs. While examining the systematic risk profile of IPOs in secondary market in our sample, we found that IPO firms on average, have a cross-sectional beta lower than 1.The cross sectional adjusted beta is 0.91 As such the market adjustment procedure may not necessarily be as conservative in rising market as was previously assumed in underperformance studies. To the extent that IPOs underperform the market benchmark, the non-presence of beta-bias with respect to market benchmark allows us to rule out the risk mis-measurement problem as a possible explanation for the long-run underperformance.

The existence of the long-run underperformance of IPOs certainly raises the question that is what causes this behavior. The academics and researchers around the world have offered few explanations for the behavior of long-run underperformance of IPOs. We examined three conjectures about the long-run underperformance of IPOs - firm's timing ability, pre-IPO earnings management and earnings forecast error-as the last two topic of this dissertation. The contribution of this thesis at this juncture is providing evidence that pre-IPO discretionary accruals and earnings forecast errors are good predictors of the post-IPO return underperformance of Bangladeshi IPOs. Further, in the long-run bearish market issues have done worse than bullish market issues, suggesting firms might not have timing ability. We find no difference in the post-issue performance of IPOs issued either in a buoyant market or in a sluggish market casts doubt on the timing ability of Bangladeshi IPO firms.

We find that in the long run, IPOs performed poorly when managers aggressively manage pre-IPO discretionary accruals of these firms to report high pre-IPO earnings than when they manage pre-IPO discretionary accruals conservatively. Using the market adjusted return, the most conservative quartile firms (firms with lowest pre-IPO accruals) earned a

five year insignificant return of -55.68%. In contrast, the most aggressive quartile firms (firms with the highest pre-IPO accruals) earned a five year significant cumulative abnormal return of -67.64%. Notably, we find that pre-IPO discretionary accruals are good predictors of the post-IPO return performance of Bangladeshi IPOs.

Our evidence suggests that investors failed to properly adjust for pre-IPO discretionary accruals component of earnings and hence their valuations appear related to pre-IPO earnings performance that they naively extrapolated to the future. Under this interpretation, the failure to adjust properly for pre-IPO accrual component of earnings led investors to have high initial expectations of firms' future earning growth, and subsequent revelation about the actual accruals caused a downward correction in stock price. This behavior of investors is in support of long-run disappointment hypothesis of earning manipulation that led to pre-IPO boosting-up earning from the future earnings through accrual management.

We also find a systematic relationship of long-run after market stock price performance with earning forecast error. Using the three year holding period return we find that firms with highest forecast error quartile performed worst in the aftermarket. A significant overestimate of earnings forecast may mislead investors. But over time when actual information is revealed in the financial statements it causes a downward correction in the stock price. Random effect and maximum likelihood effect model of panel regression, and GLS for panel data confirm the conjecture that earnings forecast error is associated with poor long-run price performance of those IPOs suggesting that investors regard these forecasts as credible signal and larger the earnings forecast error, greater the underperformance of IPOs after floatation.

In some respects, the poor performance of IPOs in the long-run makes the new issues underpricing phenomenon even more a puzzle. Apart from the obvious implication for investors, issuers and underwriters, the persistent and systematic nature of anomalous return of IPOs raises challenging questions about the informational efficiency of capital market in Bangladesh. While a lot of challenging explanations have been provided for these phenomena, it still appears that the notion of underpricing and underperformance with efficiency of capital markets have not been reconciled fully by the financial theories advanced so far.