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Long-run Price Performance of Initial Public Offerings in Bangladesh

Dr.Rumana Haque[1*] Dr. Mahmood Osman Imam[2]
1.School of Management and Business Administration, Business Administration Discipline, Khulna University, ,Khulna-9100,Bangladesh
2. Faculty of Business Studies,Department of Finance , University of Dhaka,Dhaka,Bangladesh

Abstract
Long-run underperformance is a major a anomaly of the IPO market. But it is not as pervasive in nature as short run underpricing. The objective of this paper is to document empirically the long-run price performance of IPOs in Bangladesh. In addition to investigate whether this phenomena has any cross sectional or temporal pattern. We find a general pattern of underperformance in our market after five years of going public. The underperformance is 10.19% per year for investing in IPOs relative to the market. We observe some temporal variations and variations across different industries for long-run performance of IPOs.
Keywords: long-run performance, initial return, short –run underpricing, wealth relatives.

1. Introduction

The aim of this paper 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 a 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 performance. 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 appears 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, Imam(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 paper 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 paper 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.

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.

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.

To evaluate the long-run performance of IPOs, two measures were employed: 1) the average cumulative abnormal return metric (CARs,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] .:

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

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 :

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

where $\min\left(T, delist\right)$ is the earlier of its delisting date or the end of the five year window. For firms that went

[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.

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.

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

1. Long- Run Aftermarket Performance

Table 1A, Table 1B and Table 2A, Table 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. Here it is to be mentioned that 15 event day return is equilibrium price adjustment day return in Bangladesh IPO market.(Imam and Haque,2012) 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.

Table1A Abnormal Returns for Initial Public Offerings in 1991-2007

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

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

$$T, CARs_{,T} = 1/n \sum_{i=1}^{n} [\prod_{t=s}^{T} (1 + ARit) - 1]$$

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.

Table 1B Abnormal returns for Initial Public Offerings in 1991-2007

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

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

$$T, CARs_{,T} = 1/n \sum_{i=1}^{n} [\prod_{t=s}^{T} (1 + ARit) - 1]$$

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.

Table 2A
The long-run Performance of Bangladeshi Initial Public Offerings

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

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 $R_{sT} = \ln\left(1+\overline{R_{isT}}\right)$ 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 computed $V_{st}/\sqrt{\text{var}(Vst)}$ where $\text{var}\left(V_{sT}\right) = [T * \text{var}\left(V_{tt}\right) + 2*\left(T-1\right)*\text{cov}\left(V_{tt}\right)]$ where $\text{var}(V_{tt})$ is estimated from the single period abnormal performance $V_{sT} = V_{sT} - V_{sT-1}$, and $\text{cov}(V_{tt})$ 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_{tt}) value is .001525 for the

market , and the equivalent cov(V_{tt}) values are -.00029 representing autocorrelation coefficient of -0.18939

Table 2B
The long-run Performance of Bangladeshi Initial Public Offerings

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

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 $R_{sT} = \ln\left(1+\overline{R_{isT}}\right)$ 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 $\text{var}\left(V_{sT}\right) = [T * \text{var}\left(V_{tt}\right) + 2*\left(T-1\right)*\text{cov}\left(V_{tt}\right)]$ where $\text{var}(V_{tt})$ is estimated from the single period abnormal performance $V_{sT} = V_{sT} - V_{sT-1}$, and $\text{cov}(V_{tt})$ 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_{tt}) value is .001525 for the market , and the equivalent cov(V_{tt}) values are -.00029 representing autocorrelation coefficient of -0.18939

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

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

where $\text{cov}\left(V_{tt}\right)$ 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.

Figure1 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.

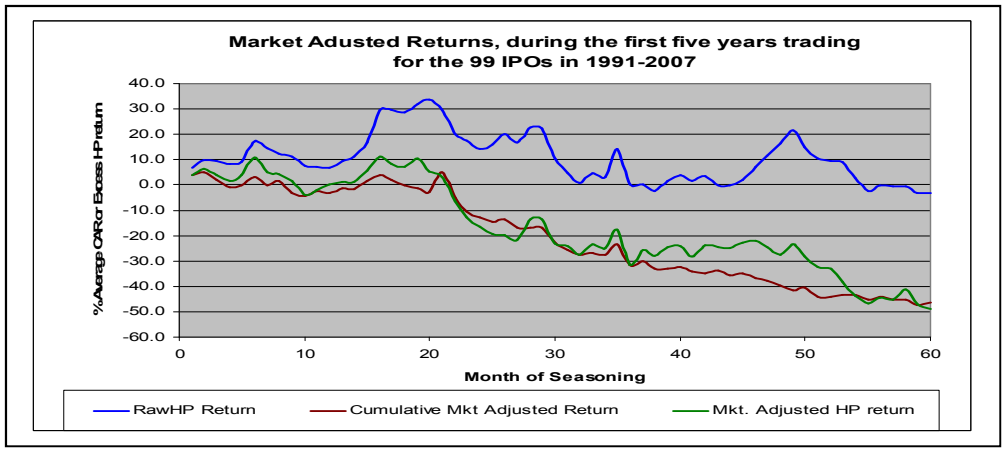

Figure 1

The Table 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.

Table 3
Distributions of five years buy- and- hold returns, exclusive of initial returns, for 99 IPOs And market in 1991-2007

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

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.

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

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.

4.1.2 Equally weighted Buy-and-Hold Returns

In Table 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.

4.1.2The Required Investment to achieve the same terminal wealth levels

The five year buy-and-hold return pattern depicted in Table 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 4
Long-Run Performances by year of issuance for Initial Public Offerings in 1991-2007

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

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.

4.1.3 Annualized Returns

In Table 5 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 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.

Table 5
Average Annual Percentage return during the five years after issuing for IPOs during 1991 to 2007 and market

	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

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.

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

4.2.1Long-Run performance by industry

Table 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).

Table 6
Long-Run Performance Categorized by 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

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.

4.2.2Long-Run Performance by Size

In Table 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

Table 7

Long -Run Performance Categorized by Size

Size	**No of IPOs**	**Market adjusted initial return (%)**	**Average 5 year buy and hold return**		
Panel A : Offer Size			**IPOs (%)**	**Market (%)**	**Wealth Relative**
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

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

4.2.3 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].

Table 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	0.91	39.03	0.73
9.44 ≤ IR < 28.67	25	29.89	100.27	0.65
28.67 ≤ IR <79.41	24	42.58	99.81	0.71
79.41 ≤ IR <1357.49	25	-22.82	22.51	0.63

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

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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.

5.1 Cross Sectional Holding Period Beta Estimate

Table 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.

Table 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**

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 offer size, 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.

References

Aggarwal, R. and Rivoli, P. 1990, Fads in the initial public offering market?," Financial Management", 19, 45-57.

Aggarwal, S; Liu, C L and Rhee, S G., 2008. Investor Demand for IPOs and Aftermarket Performance: Evidence from the Hong Kong Stock Market," Journal of International Financial Markets, Institutions & Money", 18(2), 176-190.

Aggarwal,R,, R. Leal and L, Hernandez,1993,The Aftermarket Performance of initial public offerings in Latin America," Financial Management' ,22, 42-53.

Almeida ,J and Duque, J .,2000, Ownership structure and initial public offerings in small economies–the case of Portugal," Mimeo",Portugal:Lisbon University of Technology.

Alvarez ,S and Gonzalez , 2005, Signaling and long-run performance of Spanish Initial Public Offerings, "Journal of Business , Finance and Accounting',32(1&2),323-348.

Bessler.W.,Thies,S.,2007 The long-run performance of initial public offerings in German, "Managerial Finance", 33, , 420-441

Carter, R.B., Dark, F.H. and Singh, A.K. 1998, Underwriter reputation, initial returns, and the long-run-performance of IPO stocks," Journal of Finance',. 53, 285-311.

Chan, K.L., Wei K.J. and Wang J.B., 2004. Underpricing and long-term performance of IPOs in China. "Journal of Corporate Finance", 10, 409-430.

Clarkson ,P, and R.Thompson,1990, Empirical estimates of beta when investors face estimation risk, "Journal of Finance', 45, 431-453.

Corhay, A., S. Teo and A. Tourani-Rad , 2002, The Long Run Performance of Malaysian Initial Public Offerings (IPOs): Value and Growth Effects, "Managerial Finance', .28, No.2, 52-65.

Derrien, F and Womack, K. , 2003. Auctions vs. Bookbuilding and the Control of Underpricing in Hot IPO Markets, "Review of Financial Studies', 16(4), 31-61.

Derrien, F and Womack, K., 2003. Auctions vs. Book building and the Control of Underpricing in Hot IPO Markets," Review of Financial Studies", 16(4), 31-61.

Dimson, E. and P. Marsh, 1986, Event Study Methodologies and the Size Effect-The Case of UK Press Recommendations," Journal of Financial Economics", 17,113-142.

Drobetz, Wolfgang; Kammermann, Matthias and Waelchli, Urs, 2005. Performance of Initial Public Offerings: The Evidence for Switzerland, Available at SSRN: http://ssrn.com/abstract=370400, date of access 15th July, 2009.

Fama, E.F. and K.R. French, 1996, Multifactor Explanations of Asset Pricing.

Finn, F. J. & Higham, R. 1988. The performance of unseasoned new equity issues-cum-stock exchange listings in Australia.," Journal of Banking and Finance", 12, 333-351.

Gregory, A., Matatko, J., Tonks, I. and R. Purkis, 1994, UK Directors' Trading: The Impact of Dealings in Smaller Firms, "Economic Journal", January 1994, 37-53

Imam. M.O and Ilias Jaber,2010, Earning Management of IPOs in Bangladesh-Test of Value Relevance Hypotheses: Evidence from Dhaka Stock Exchange, Working paper.

Imam. M.O and Amin, 2010, Operating Performance and Earning Forecast Errors of IPOs, Working paper.

Imam. M.O. and Rumana Haque, 2012, Underpricing of IPOs and its determinants:Evidence from the Stock Market of Bangladesh."International Journal Of Finance",24,7339-7360

Jain, B.A. and O. Kini, 1994, The Post Issue Operating Performance of IPO firms," Journal of Finance", 49, 1699-1726.

Keloharju, M., 1993 , The winners curse , legal liability, and the long-run price performance of initial public offerings in Finland, "Journal of Financial Economics",34, 251-277.

Levis, M., 1993, The long-run performance of initial public offerings: the UK experience1980-1988, "Financial Managemen"t, . 22,. 28-41.

Ljungqvist,A,P., 1993, Underpricing and long-term performance of German Initial public offerings ,1978-1992,mimeo (Nuffield College,Oxford University,United Kingdom), paper presented at the 1993 EFA conference, Copenhegen.

Loughran ,T. and J.R. Ritter, 1995, The New Issue Puzzle, "Journal of Finance",50,23-51

Mikkelson, W.H., Partch, M.M. and K. Shah, 1997, Ownership and Operating Performance of Companies that Go Public, "Journal of Financial Economics", 44, 281-307.

Page, M.J. and I. Reyneke, 1997, The Timing and Subsequent Performance of Initial Public Offerings (IPOs) on

the Johannesburg Stock Exchange, "Journal of Business Finance and Accounting", .24,1401-1420.
Rajan, R. and H. Servaes, 1997, Analyst following of Initial Public Offerings, "Journal of Finance", 52, 507-529.
Ritter, J.R. and Welch, I., 2002, A review of IPO activity, pricing and allocations, "Journal of Finance ", 57, 1795-828.
Ritter, J.R., 1991, The long-run performance of initial public offerings, Journal of Finance,Vol. 46,. 3-27.
Ritter, J.R., 2003, Differences between European and American IPO markets, "European Financial Management," 9, 421-34.
Saadouni, B., J. How, and R. Jelic, 2005, Share Allocation and the performance of the KLSE Second Board IPOs, Working Paper (University of Manchester), presented at the Asian Finance Association Conference, Kuala Lumpur, 2005.
Sahoo, S and P, Rajib, 2010, After market pricing performance of Initial Public Offerings(IPO): Indian IPO market 2002-2006, "Vikalpa", 35(4) 27-43
Schultz, P.H. 2003, Pseudo market timing and the long-run underperformance of IPOs," Journal of Finance", 58, 483-517.
Schuster, J.A., 2003, IPOs: insights from seven European countries, working paper, London School of Economics, London.
Sohail, M and Nasr, M., 2007. Performance of Initial Public Offerings in Pakistan," International Review of Business Research Papers," 3(2), 420-441.
Zaluki, N.A.Ahmed, Campbell and Goodacre, 2006, The Long Run share price performance of Malaysian Initial Public Offerings (IPOs) Working paper(University of Sterling) ,accepted for publication in" Journal of Business Finance &Accounting", , 1-49.